Listed below is a partial list of ANSI approved standards as of July 19, 2017. Many of these ANSI approved standards that are published are available in electronic format (PDF) via ANSI’s Electronic Standards Store (ESS) at http://webstore.ansi.org.

3-A (3-A Sanitary Standards, Inc.)
ANSI/3-A 00-00-2014, 3-A® Sanitary Standards for General Requirements
The 3-A Sanitary Standards define the general requirements for sanitary (hygienic) equipment intended for processing milk, milk products, foods, food ingredients, beverages, or other edible materials. To conform to the 3-A Sanitary Standards, equipment shall meet the following criteria for design, material of construction, fabrication techniques, and installation, as applicable. In addition, equipment shall meet the criteria defined in the corresponding 3-A Sanitary Standards for the specific equipment type. Specific additional requirements and exceptions to the general requirements contained herein are defined in the individual 3-A Sanitary Standards/Accepted Practices.

AA (ASC H35) (Aluminum Association)
ANSI H35.1/H35.1(M)-2013, Standard Alloy and Temper Designation Systems for Aluminum
Covers system for designating wrought aluminum and wrought aluminum alloys, aluminum and aluminum alloys in the form of castings and foundry ingot, and tempers in which they are produced.

ANSI H35.2 (M)-2013, Standard Dimensional Tolerances for Aluminum Mill Products
The standard includes dimensional tolerances for aluminum mill products in metric units

ANSI H35.2-2013, Standard Dimensional Tolerances for Aluminum Mill Products
The standard includes dimensional tolerances for aluminum mill products which are accepted and used within the aluminum industry and by users of metal.

ANSI H35.3-1997 (R2013), Standard Designation System for Aluminum Hardeners
Covers System for designation aluminum hardeners used primarily for the addition of alloying or grain-refining elements to aluminum alloy melts.

ANSI H35.4-2006 (R2013), Standard Designation System for Unalloyed Aluminum
The standard provides a system for designating unalloyed aluminum not made by a refining process and used primarily for remelting.

ANSI H35.5-2013, Standard Nomenclature System for Aluminum Metal Matrix Composite Materials
The standard covers a system for designating wrought and cast aluminum metal matrix composite materials including generic temper designations.

AABC (Associated Air Balance Council)
ANSI/AABC MN-1-2016, AABC National Standards for Total System Balance, 7th Edition
After the first public comment period, a revision has been proposed to Chapter 5 - Leakage Testing, Section 5.6.2 - Casing Deflection Test. The revision adds an exclusion to the Casing Deflection Test for central station air handling units that are shipped as complete assemblies and certified under AHRI's AHUC certification program, and also adds a reference to AHRI Standard 1350. Only comments on the limited proposed revisions are being considered at this time. Comments must be submitted on a form provided by AABC.

AAMI (Association for the Advancement of Medical Instrumentation)
ANSI/AAMI/IEC 60601-1-2-2014, Medical electrical equipment - Part 1-2: General requirements for basic safety and essential performance - Collateral standard: Electromagnetic disturbances - Requirements and tests
Specifies general requirements and tests for basic safety and essential performance with regard to electromagnetic disturbances of medical electrical (ME) equipment and ME systems. They are in addition to the requirements of the general standard and serve as the basis for particular standards. Applicability of this collateral standard includes ME equipment and ME systems that have been found to have no essential performance.

ANSI/AAMI 11663-2014, Quality of dialysis fluid for haemodialysis and related therapies
Specifies minimum quality requirements for dialysis fluids used in haemodialysis and related therapies. Includes dialysis fluids used for haemodialysis and haemofiltration, including substitution fluid for haemofiltration and haemofiltration. Includes 48 hour TSA method for tests for compliance with microbiological requirements.

ANSI/AAMI 13958-2014, Concentrates for haemodialysis and related therapies
Specifies minimum requirements for concentrates used for haemodialysis and related therapies. Addressed to the manufacturer of concentrates. Includes spikes. Also gives requirements for equipment used to mix acid and bicarbonate powders into concentrate at the user's facility. Includes 48 hour TSA method for tests for compliance with microbiological requirements.

ANSI/AAMI 13959-2014, Water for haemodialysis and related therapies
Specifies minimum requirements for water to be used in haemodialysis and related therapies. Includes water to be used in the preparation of concentrates, dialysis fluids for haemodialysis, haemofiltration and haemofiltration, and for the reprocessing of haemodialysers. Includes 48 hour TSA method for tests for compliance with microbiological requirements.

ANSI/AAMI 23500-2014, Guidance for the preparation and quality management of fluids for haemodialysis and related therapies
Addresses user's responsibility for the dialysis fluid once the equipment used in its preparation has been delivered and installed. For the purposes of this Standard, the dialysis fluid includes dialysis water used for the preparation of dialysis fluid and substitution fluid, dialysis water used for the preparation of concentrates at the user's facility, as well as concentrates and the final dialysis fluid and substitution fluid. Includes 48 hour TSA method for tests for compliance with microbiological requirements.

ANSI/AAMI 26722-2014, Water treatment equipment for haemodialysis applications and related therapies
Addresses the manufacturer and/or supplier of water treatment systems and/or devices used for the express purpose of providing water for haemodialysis or related therapies. Covers devices used to treat water intended for use in the delivery of haemodialysis and related therapies. Includes 48 hour TSA method for tests for compliance with microbiological requirements.

ANSI/AAMI AT6-2013, Autologous transfusion devices
Establishes labeling and performance requirements, test methods, and terminology that will help establish a reasonable level of safety and efficacy for autologous transfusion devices. Specifically, includes requirements for sterile, disposable systems and associated electromechanical hardware designed to collect and filter or process, or both, extravasated blood for reinfusion of erythrocytes or filtered whole blood into the patient's circulation. Aspects of these systems related to collection, anticoagulation (systemic and regional), storage, processing and filtration, and reinfusion are within the scope of this standard.

ANSI/AAMI BE83-2006 (R2011), Biological evaluation of medical devices - Part 18: Chemical characterization of materials
Describes a framework for the identification of a material and the identification and quantification of its chemical constituents.
ANSI/AAMI BF64-2012, Leukocyte reduction filters
Contains labeling requirements, performance requirements, test methods, and terminology for disposable filters used for the reduction of leukocytes from blood or blood products during transfusion.

ANSI/AAMI BF7-2012, Blood transfusion microfilters
This standard contains labeling requirements, performance requirements, test methods, and terminology for disposable blood transfusion microfilters for use with adult populations to remove microaggregates from blood or blood products during transfusion.

ANSI/AAMI BP22-1994 (R2016), Blood pressure transducers
This standard provides performance and safety requirements for transducers, including cables, designed for blood pressure measurements through an indwelling catheter or direct puncture, and also provides disclosure requirements to permit the user to determine the compatibility between the transducer and blood pressure monitor. This standard is a combined revision of two American National Standards (ANSI/AAMI BP22-1986 and ANSI/AAMI BP23-1986.

ANSI/AAMI CI86-2017, Cochlear implant systems - Safety, performance and reliability
This standard specifies requirements, test procedures, methods and labeling for active implantable medical devices intended to treat hearing impairment by means of electrical stimulation of the cochlea. Such devices are referred to as cochlear implants or cochlear prostheses. This standard is also applicable to non-implantable parts and accessories of the devices, including fitting and diagnostic components.

ANSI/AAMI EC12-2010 (R2015), Disposable ECG electrodes
This standard contains minimum labeling, safety and performance requirements, test methods, and terminology for disposable electrocardiographic electrodes.

ANSI/AAMI EC53-2013, ECG trunk cables and patient leadwires
Covers trunk cables and patient leadwires used to acquire surface electrocardiographic (ECG) monitoring signals for cardiac monitors/telemetry transmitters (IEC 60601-2-27), diagnostic electrocardiographs (IEC 60601-2-25) and ambulatory ECG recorders/event recorders (IEC 60601-2-47). In the broadest sense, this standard applies to any ECG device that uses patient leadwires and possibly ECG trunk cables to acquire surface electrocardiographic signals.

ANSI/AAMI EC57-2012, Testing and reporting performance results of cardiac rhythm and ST segment measurement algorithms
Establishes a method for testing and reporting the performance of algorithms used to detect cardiac rhythm disturbances, including the ST segment.

ANSI/AAMI EQ56-2013, Recommended practice for a medical equipment management program
This recommended practice specifies minimum criteria for a management program designed to minimize certain risks associated with equipment that is used during the routine care of patients in a health care organization. The recommended practice addresses the structure of the program, documentation requirements, staffing, and resources allocated to those responsible for maintaining medical equipment.

ANSI/AAMI EQ89-2015, Guidance for the use of medical equipment maintenance strategies and procedures
This document is intended to provide basic information to health care technology management professionals by identifying and describing in general various maintenance strategies and methods for efficient, effective, and timely maintenance of medical equipment in health care facilities.

ANSI/AAMI ES60601-1-2005 C1-2009 and A2 (R2012), Medical electrical equipment - Part 1: General requirements for basic safety and essential performance
Provides a baseline of requirements for the basic safety and essential performance of all medical electrical equipment used by or under the supervision of qualified personnel in the general medical and patient environment. Also contains certain requirements for reliable operation to ensure safety. This standard can also be applied to equipment used for compensation or alleviation of disease, injury, or disability.

This amendment will address several clauses of the document and is identical to the ongoing IEC project.

ANSI/AAMI HA60601-1-11-2015, Medical electrical equipment - Part 1-11: General requirements for basic safety and essential performance - Collateral Standard: Requirements for medical electrical equipment and medical electrical systems used in the home healthcare environment
Applies to the basic safety and essential performance of medical electrical equipment and medical electrical systems which are intended, as indicated in the instructions for use by their manufacturer for use in the home healthcare environment regardless of whether the ME equipment or ME system is intended for use by a lay operator by trained healthcare personnel. The home healthcare environment includes - the dwelling place in which a patient lives. - other places where patients are present, excluding professional healthcare facility environments where operators with medical training are continually available when patients are present.

ANSI/AAMI HE75-2009 (R2013), Human factors engineering - Design of medical devices
Addresses a broad range of human factors engineering (HFE) topics in a structured format. Examples are provided, as are references to more detailed information. The material emphasizes adoption of a user-centered focus throughout the product design and development process, with the goal of making medical devices easier to use and less prone to use error.

ANSI/AAMI ID54-1996 (R2012), Enteral feeding set adapters and connectors
Specifies safety requirements for enteral feeding set connectors and adapters.

ANSI/AAMI NS28-1988 (R2015), Intracranial pressure monitoring devices
Establishes minimum labeling, safety, and performance requirements for intracranial pressure monitoring devices, whether percutaneous, fully implantable, or noninvasive. Also covered by this standard are test and calibration methods needed to establish compliance with the standard.

ANSI/AAMI NS4-2013, Transcutaneous electrical stimulators
This standard establishes certain requirements for portable, battery-powered, transcutaneous electrical nerve stimulators (TENS devices) that are used in the treatment of pain syndromes, that are intended for use on intact skin and mucous membranes, and that do not require surgical intervention or violation of the skin surface.

ANSI/AAMI PB70-2012, Liquid barrier performance and classification of protective apparel and drapes intended for use in health care facilities
Establishes minimum barrier performance requirements; a classification system; and associated labeling requirements for protective apparel, surgical drapes, and drape accessories intended for use in health care facilities.

ANSI/AAMI RD47-2008 (R2013), Reprocessing of hemodialyzers
Describes the essential elements of good practice for reprocessing hemodialyzers to help ensure device safety and effectiveness. These practices embrace considerations of the device and the patient, as well as attention to equipment, facilities, cleaning and disinfection methods, labeling, preparation for multiple use, and quality control of the reuse process. Does not endorse either single use or reuse of dialyzers.
ANSI/AAMI ST5883-1-2009/A1-2014, Washer-disinfectors - Part 1: General requirements, terms and definitions and tests - Amendment 1

Specifies general performance requirements for washer-disinfectors and their accessories that are intended to be used for cleaning and disinfection of re-usable medical devices and other articles used in the context of medical, dental, pharmaceutical and veterinary practice. It specifies performance requirements for cleaning and disinfection as well as for the accessories which can be required to achieve the necessary performance. The methods and instrumentation required for validation, routine control and monitoring and re-validation, periodically and after essential repairs, are also specified.

ANSI/AAMI ST5883-1-2009/A2-2012, Washer-disinfectors - Part 1: General requirements, terms and definitions and tests, Amendment 2

This amendment will provide information to the health care community regarding the application of the Ao concept for the thermal disinfection of medical devices including a discussion of the technical basis of the concept and comparison with established disinfection criteria.

ANSI/AAMI ST5883-2-2013 (ISO 15883-2-2006 MOD)-2013 (R2015), Washer-disinfectors, Part 2: Requirements and tests for washer-disinfectors employing thermal disinfection for surgical instruments, anaesthetic equipment, bowls, dishes, receivers, utensils, glassware, etc

AAMI ST5883-2 specifies particular requirements for washer disinfectors (WD) that are intended for use for the cleaning and thermal disinfection, in a single operating cycle, of re-usable medical devices such as surgical instruments, anaesthetic equipment, bowls, dishes and receivers, utensils and glassware.

ANSI/AAMI ST5883-3-2012 (ISO 15883-3-2006 MOD)-2012 (R2015), Washer-disinfectors, Part 3: Requirements and tests for washer-disinfectors employing thermal disinfection for human waste containers

Specifies particular requirements for washer-disinfectors (WD) that are intended to be used for emptying, flushing, cleaning and thermal disinfection of containers used to hold human waste for disposal by one operating cycle.


This standard covers minimum labeling, safety, performance, and testing requirements for ethylene oxide sterilizers that are intended for general-purpose use in health care facilities and that have automatic controls. It also covers labeling, product composition, and container requirements for ethylene oxide sterilant sources, as well as labeling, performance, safety, and installation requirements for ethylene oxide emission control systems.

ANSI/AAMI ST40-2004 (R2010), Table-top dry heat (heated air) sterilization and sterility assurance in health care facilities

This recommended practice provides guidelines for dry heat sterilization in dental and medical facilities. The recommended practice covers functional and physical design criteria for work areas; staff qualifications, education, and other personnel considerations; sterilization processing procedures; installation, care, and maintenance of table-top dry heat sterilizers; and quality control. Definitions, a bibliography, and annexes providing supplementary information are also included.

ANSI/AAMI ST41-2008 (R2012), Ethylene oxide sterilization in health care facilities: Safety and effectiveness

Covers the safe and effective use of ethylene oxide, as a sterilant in health care facilities. The provisions of this document are intended to promote sterility assurance, help minimize occupational exposure to ethylene oxide, and guide health care personnel in the proper use of processing equipment.

ANSI/AAMI ST50-2004 (R2010), Dry heat (heated air) sterilizers

This standard covers minimum labeling, safety, performance, and testing requirements for convective-type dry heat (heated air) sterilizers that are intended for use in dental and physician's offices, laboratories, ambulatory-care clinics, hospitals, and other health care facilities. Definitions of terms and normative references are also included, as well as an annex explaining the rationale for the provisions of the standard.

ANSI/AAMI ST55-2016, Table-top steam sterilizers

This standard establishes minimum construction and performance requirements for small table-top steam sterilizers that use saturated steam as the sterilizing agent and that have a volume less than or equal to 56.63 liters (2 cubic feet).

ANSI/AAMI ST58-2013, Chemical sterilization and high-level disinfection in health care facilities

This recommended practice provides guidelines for the selection and use of chemical sterilizing agents and high level disinfectants (HLDs) that have been cleared for marketing by the FDA for use in hospitals and other healthcare facilities. These guidelines are intended to assist healthcare personnel in the safe and effective use of chemical sterilants, HLDs and associated equipment.

ANSI/AAMI ST65-2008 (R2013), Processing of reusable surgical textiles for use in health care facilities

Provides guidelines for the proper handling, processing, and preparation of reusable surgical textiles either on-site or off-site for use in health care facilities. Specifically addresses design criteria for functional work areas; staff qualifications, education, training, dress codes, and other personnel considerations; receiving and handling of soiled surgical textiles; laundry processing considerations; transport of both soiled and clean surgical textiles; installation, care, and maintenance of laundry equipment; quality control; and regulatory considerations.

ANSI/AAMI ST67-2011, Sterilization of health care products - Requirements and guidance for selecting a sterility assurance level (SAL) for products labeled "sterile"

Specifies requirements and provides guidance for selecting an appropriate SAL for a terminally sterilized health care product that is labeled 'STERILE.' The requirements and guidance provided in this standard also apply to the selection of an appropriate SAL for a terminally sterilized health care product that is labeled 'Sterile Fluid Path.'

ANSI/AAMI ST72-2011 (R2016), Bacterial endotoxin - Test methods, routine monitoring and alternatives to batch testing

Specifies general criteria to be applied in the determination of bacterial endotoxins (pyrogens) on sterilized or sterilizable healthcare products, components or raw materials. Endotoxin methodologies covered include both qualitative (limit) methods and quantitative (end-point) methods. Excludes determination of pyrogens other than bacterial endotoxins.

ANSI/AAMI ST77-2013, Containment devices for reusable medical device sterilization

This standard covers minimum labeling and performance requirements for rigid sterilization container systems and for instrument cases, cassettes, and organizing trays.

ANSI/AAMI ST79-2010 (R2014), Comprehensive guide to steam sterilization and sterility assurance in health care facilities

This recommended practice provides guidelines for decontamination and steam sterilization processing in hospitals and other health care facilities. These guidelines are intended to promote sterility assurance and to assist health care personnel in the proper use of processing equipment.

ANSI/AAMI ST79-2010/A2.1-2011, Comprehensive guide to steam sterilization and sterility assurance in health care facilities Amendment to replace the term "manufacturer's written instructions" with "manufacturer's instructions for use (IFU)" to better reflect current practice.
ANSI/AAMI ST79-2010/A2.2-2011, Comprehensive guide to steam sterilization and sterility assurance in health care facilities Amendment to replace the term "hand washing" with "hand hygiene" to better reflect current practices.

ANSI/AAMI ST79-2010/A2.3-2011, Comprehensive guide to steam sterilization and sterility assurance in health care facilities Amendment to replace the term "transmission-based (enhanced) precautions" with "transmission-based precautions" to more accurately reflect current practice in the sterile processing field.

ANSI/AAMI ST79-2010/A2.5-2011, Comprehensive guide to steam sterilization and sterility assurance in health care facilities Amendment to update chemical disinfection and sterilization section to provide the latest information on safe practices.

ANSI/AAMI ST79-2010/A3.1-2012, Comprehensive guide to steam sterilization and sterility assurance in health care facilities This amendment replaces the term "flash sterilization" with "immediate use steam sterilization" to better reflect current practice.

ANSI/AAMI ST79-2010/A3.2-2012, Comprehensive guide to steam sterilization and sterility assurance in health care facilities This amendment will provide guidance to sterile processing professionals on the different ways that chemical indicators may be classified.

ANSI/AAMI ST79-2010/A3.3-2012, Comprehensive guide to steam sterilization and sterility assurance in health care facilities This amendment will add, delete, or update definitions to reflect changes elsewhere in the document.

ANSI/AAMI ST79-2010/A3.4-2012, Comprehensive guide to steam sterilization and sterility assurance in health care facilities This amendment will provide updates to the design considerations section to reflect current best practice in the field.

ANSI/AAMI ST79-2010/A3.5-2012, Comprehensive guide to steam sterilization and sterility assurance in health care facilities This amendment updates recommendations in the personnel considerations section of the recommended practice to reflect current best practices in the field.

ANSI/AAMI ST79-2010/A3.6-2012, Comprehensive guide to steam sterilization and sterility assurance in health care facilities This amendment updates the section on handling, collection, and transportation of contaminated items in the recommended practice to reflect current best practices in the field.

ANSI/AAMI ST79-2010/A3.7-2012, Comprehensive guide to steam sterilization and sterility assurance in health care facilities This amendment updates the section on cleaning and other decontamination processes in the recommended practice to reflect current best practices in the field.

ANSI/AAMI ST79-2010/A4.1-2013, Comprehensive guide to steam sterilization and sterility assurance in health care facilities This amendment updates Section 8.3.3, Package closure, with new drawings and text.

ANSI/AAMI ST79-2010/A4.2-2013, Comprehensive guide to steam sterilization and sterility assurance in health care facilities This amendment adds a new Annex P on moisture assessment.

ANSI/AAMI ST8-2013, Hospital steam sterilizers This standard covers minimum construction and performance requirements for hospital sterilizers that use saturated steam as the sterilizing agent and have a volume greater than 2 cubic feet.

ANSI/AAMI ST81-2004 (R2016), Sterilization of medical devices - Information to be provided by the manufacturer for the processing of resterilizable medical devices Specifies the information to be provided by the medical device manufacturer on the processing of medical devices claimed to be resterilizable and medical devices intended to be sterilized by the processor.

ANSI/AAMI ST91-2015, Flexible and semi-rigid endoscope reprocessing in health care facilities This standard provides guidelines for precleaning, leak-testing, cleaning, packaging (where indicated), storage, high-level disinfecting, and/or sterilizing of flexible gastrointestinal (GI) endoscopes, flexible bronchoscopes, surgical flexible endoscopes (e.g., flexible ureteroscopes), and semi-rigid operative endoscopes (e.g., choledochoscopes) in health care facilities. These guidelines are intended to provide comprehensive information and direction for health care personnel in the reprocessing of these devices and accessories.

ANSI/AAMI SW87-2012, Application of Quality Management System concepts to Medical Device Data Systems (MDDS) An introduction to the subject of a quality management system for organizations that develop, provide, and support an MDDS. This document highlights five key quality management system processes that have relevance for these organizations.

ANSI/AAMI/IEC 60601-1-12-2016, Medical electrical equipment -Part 1-12: General requirements for basic safety and essential performance - Collateral Standard: Requirements for medical electrical equipment and medical electrical systems intended for use in the emergency medical services environment Applies to basic safety and essential performance of medical electrical equipment and medical electrical systems which are intended for use by their manufacturers for use in the EMS environment. Does not apply to equipment and systems intended for use solely in home healthcare environments or professional healthcare facilities.

ANSI/AAMI/IEC 60601-1-8-2013, Medical electrical equipment - Part 1-8: General requirements for basic safety and essential performance - Collateral Standard: General requirements, tests and guidance for alarm systems in medical electrical equipment and medical electrical systems This standard applies to the basic safety and essential performance of medical electrical equipment and medical electrical systems, hereafter referred to as ME equipment and ME systems. This collateral standard specifies requirements for alarm systems and alarm signals in ME equipment and ME systems. It also provides guidance for the application of alarm systems.

ANSI/AAMI/IEC 60601-2-16, Ed. 4-2012, Medical electrical equipment - Part 2-16: Particular requirements for basic safety and essential performance of haemodialysis, haemodiafiltration and haemofiltration equipment Specifies the minimum safety requirements for single-patient haemodialysis, haemodiafiltration and haemofiltration equipment. These devices are intended for use either by medical staff or under the supervision of medical expertise, including haemodialysis, haemodiafiltration and haemofiltration equipment operated by the patient. The addenda addresses comments received during the process of harmonizing the standard in Europe; alphabetical sorting of the definitions section; improves the reference to 60600-1-8, including reference to 60600-1-11; adds an appendix with a hazardous situation list; updates several references to defined terms that were not printed in SMALL CAPS; and improves terminology usage.

ANSI/AAMI/IEC 60601-2-19-2009 (R2014), Medical electrical equipment - Part 2-19: Particular requirements for the basic safety and essential performance of infant incubators This standard applies to the basic safety and essential performance of baby incubators. This standard can also be applied to baby incubators used for compensation or alleviation of disease, injury or disability. This standard does not apply to heating devices intended for physiotherapy, radiant warmers, and transport incubators.
ANSI/AAMI/IEC 60601-2-19/A1-2016, Medical electrical equipment - Part 2-19: Particular requirements for the basic safety and essential performance of infant incubators, Amendment 1
This amendment applies to the standard for the basic safety and essential performance of baby incubators. This standard can also be applied to baby incubators used for compensation or alleviation of disease, injury or disability. This standard does not apply to heating devices intended for physiotherapy, radiant warmers, and transport incubators.

ANSI/AAMI/IEC 60601-2-2-2009 (R2014), Medical electrical equipment - Part 2-2: Particular requirements for the basic safety and essential performance of high frequency surgical equipment and high frequency surgical accessories
This standard specifies requirements for the safety of high frequency (HF) surgical equipment and HF surgical accessories used in medical practice. Some low-powered high frequency surgical equipment (for example for micro-coagulation, or for use in dentistry or ophthalmology) is exempt from certain requirements of this particular standard.

ANSI/AAMI/IEC 60601-2-2-2017, Medical electrical equipment - Part 2-2: Particular requirements for the basic safety and essential performance of high frequency surgical equipment and high frequency surgical accessories
This international standard applies to the basic safety and essential performance of HF surgical equipment and HF surgical accessories. HF surgical equipment having a rated output power not exceeding 50 W (for example micro-coagulation, or for use in dentistry or ophthalmology) is exempt from certain of the requirements of this particular standard.

ANSI/AAMI/IEC 60601-2-20-2009 (R2014), Medical electrical equipment - Part 2-20: Particular requirements for the basic safety and essential performance of infant transport incubators
This standard applies to the basic safety and essential performance of transport incubators. This standard does not apply to heating devices intended for physiotherapy, baby incubators, radiant warmers.

ANSI/AAMI/IEC 60601-2-20/A1-2016, Medical electrical equipment - Part 2-20: Particular requirements for the basic safety and essential performance of transport infant incubators, Amendment 1
This amendment is for the standard which applies to the basic safety and essential performance of transport incubators. This standard does not apply to heating devices intended for physiotherapy, baby incubators, radiant warmers.

ANSI/AAMI/IEC 60601-2-21-2009 (R2014), Medical electrical equipment - Part 2-21: Particular requirements for the basic safety and essential performance of infant radiant warmers
This standard harmonizes with the third edition of IEC 60601-1 and specifies the safety and performance requirements for infant radiant warmers.

ANSI/AAMI/IEC 60601-2-21/A1-2016, Medical electrical equipment - Part 2-21: Particular requirements for the basic safety and essential performance of infant radiant warmers, Amendment 1
This amendment is for the standard which harmonizes with the third edition of IEC 60601-1 and specifies the safety and performance requirements for infant radiant warmers.

ANSI/AAMI/IEC 60601-2-25-2011 (R2016), Medical electrical equipment - Part 2-25: Particular requirements for the basic safety and essential performance of electrocardiographs
Specifies basic safety and essential performance requirements for electrocardiographs for the production of ECG reports for diagnostic purposes. This particular standard does not include the part of electrocardiographs that provides vector loops, ambulatory electrocardiographic equipment covered by IEC 60601-2-47, and cardiac monitors covered by IEC 60601-2-27.

Specifies basic safety requirements and essential performance for electrocardiographic (ECG) monitoring equipment. It is applicable to ECG monitoring equipment used in a hospital environment. If it is used outside the hospital environment, such as in ambulances and air transport, the ECG monitoring equipment shall comply with this standard. This standard is not applicable to electrocardiographic monitors for home use and ECG telemetry systems. However, manufacturers should consider using relevant clauses of this standard as appropriate for their intended use/intended purpose.

ANSI/AAMI/IEC 60601-2-4-2010 (R2015), Medical electrical equipment - Part 2-4: Particular requirements for the basic safety and essential performance of cardiac defibrillators
This standard covers the basic safety and essential performance of medical electrical equipment intended to defibrillate the heart by an electrical pulse via electrodes applied either to the patient's skin (external electrodes) or to the exposed heart (internal electrodes). This standard does not apply to implantable defibrillators, remote control defibrillators, external transtunaneous pacemakers, or separate cardiac monitors.

ANSI/AAMI/IEC 60601-2-47-2012 (R2016), Medical electrical equipment – Part 2-47: Particular requirements for the basic safety and essential performance of ambulatory electrocardiographic systems
Specifies the basic safety and essential performance of ambulatory electrocardiographic (ECG) systems. Within the scope of this standard are systems of the following types: a) systems that provide continuous recording and continuous analysis of the ECG allowing full re-analysis giving essentially similar results. The systems may first record and store the ECG and analyse it later on a separate unit, or record and analyse the ECG simultaneously. The type of storage media used is irrelevant with regard to this standard; b) systems that provide continuous analysis and only partial or limited recording not allowing a full re-analysis of the ECG.

ANSI/AAMI/IEC 60601-2-50-2009 (R2014), Medical electrical equipment - Part 2-50: Particular requirements for the basic safety and essential performance of infant phototherapy equipment
This standard specifies requirements for infant phototherapy equipment and can also be applied to infant phototherapy equipment used for compensation or alleviation of disease, injury or disability.

ANSI/AAMI/IEC 60601-2-50/A1-2016, Medical electrical equipment - Part 2-50: Particular requirements for the basic safety and essential performance of infant phototherapy equipment, Amendment 1
This amendment is for the standard which specifies requirements for infant phototherapy equipment and can also be applied to infant phototherapy equipment used for compensation or alleviation of disease, injury or disability.

ANSI/AAMI/IEC 62304-2006/Amd 1-2016, Medical device software - Software life cycle processes, Amendment 1
Amendment 1 updates the standard to add requirements to deal with LEGACY SOFTWARE, where the software design is prior to the existence of the current version, to assist manufacturers who must show compliance to the standard to meet European Directives. Software safety classification changes include clarification of requirements and updating of the software safety classification to include a risk-based approach.

ANSI/AAMI/IEC 62366-1-2015, Medical devices - Application of usability Engineering to medical devices
This document specifies a process for a manufacturer to analyze, specify, develop and evaluate the usability of a medical device as it relates to safety. This usability engineering (human factors engineering or usability engineering) process assesses and mitigates risks associated with correct use and use errors, i.e., normal use. It can be used to identify but does not assess or mitigate risks associated with abnormal use.
ANSI/AAMI/IEC 80001-1-2010, Application of risk management for IT Networks incorporating medical devices - Part 1: Roles, responsibilities and activities
Defines the roles, responsibilities and activities that are necessary for risk management of IT-networks incorporating medical devices to address the key properties.

This standard applies to the basic safety and essential performance of automated sphygmomanometers which are used for the non-invasive blood pressure measurement.

ANSI/AAMI/IEC 80601-2-30-2009/A1-2013 (R2017), Medical electrical equipment - Part 2-30: Particular requirements for the basic safety and essential performance of automated type non-invasive sphygmomanometers and Amendment 1
This standard applies to the basic safety and essential performance of automated sphygmomanometers, which by means of an inflatable cuff, are used for intermittent indirect measurement of the blood pressure without arterial pressure.

ANSI/AAMI/IEC 80601-2-30-2009/C1-2009, Medical electrical equipment - Part 2-30: Particular requirements for basic safety and essential performance of automated type non-invasive sphygmomanometers and Amendment 1
This amendment is identical to the technical corrigendum (IEC 2020/DC) and updates subclauses 201.105.1, 201.105.3, and figure 201.101 for the standard, which applies to the basic safety and essential performance of automated sphygmomanometers that are used for the non-invasive blood pressure measurement.

This International Standard Applies To The Basic Safety And Essential Performance Of Heating Devices Using Blankets, Pads Or Mattresses In Medical Use, Also Referred To Asme Equipment. Heating Devices Intended To Warm A Bed Are Included In The Scope Of This International Standard. If A Clause Or Subclause Is Specifically Intended To Be Applicable To Me Equipment Only, Or Toome Systems Only, The Title And Content Of That Clause Or Subclause Will Say So. If That Is Not Thecase, The Clause Or Subclause Applies Both To Me Equipment And To Me Systems, As Relevant.

ANSI/AAMI/IEC 80601-2-35/A1-2016, Medical electrical equipment - Part 2-35: Particular requirements for the basic safety and essential performance of heating devices using blankets, pads and mattresses intended for heating in medical use, Amendment 1
This is an amendment to a standard which specifies requirements for blankets, pads, and mattresses, including air-floatation mattresses and forced-air system.

The purpose of this standard is to set appropriate requirements for the safety and performance of lens removal and vitrectomy devices for ophthalmic surgery to reduce the risk of detrimental impact on the medical treatment to an acceptable level for their intended use. The benefit of this standard is to the medical industry, manufacturers, medical regulators, hospitals, clinics, medical users and finally to the patient.

This amendment modifies the content of the second edition of IEC 80601-2-58 and includes an integration of updated definition of essential performance and updating the essential performance analysis, removing the dates of collateral and general standard references, addition of symbols, and updating of EMC requirements.

ANSI/AAMI/ISO 10993-1-2009 (R2013), Biological evaluation of medical devices - Part 1: Evaluation and testing within a risk management process
The standard describes the general principles governing the biological evaluation of medical devices within a risk management framework; the general categorization of devices based on the nature and duration of their contact with the body; the evaluation of existing relevant data from all sources; the identification of gaps in the available data set on the basis of a risk analysis; the identification of additional data sets necessary to analyze the biological safety of the medical device; and the assessment of the biological safety of the medical device.

Describes the procedure for the assessment of medical devices and their constituent materials with regard to their potential to produce irritation and skin sensitization. Includes: a) pretest considerations for irritation, including in silico and in vitro methods for dermal exposure; b) details of in vivo (irritation and sensitization) test procedures, and; c) key factors for the interpretation of the results. Instructions are given in Annex A for the preparation of materials specifically in relation to the above tests. In Annex B several special irritation tests are described for application of medical devices in areas other than skin.

 Specifies requirements and gives guidance on the procedures to be followed in the evaluation of the potential for medical devices and their materials to cause adverse systemic reactions.

Specifies requirements and gives guidance on the procedures to be followed in the preparation of samples and the selection of reference materials for medical device testing in biological systems in accordance with one or more parts of the ISO 10993 series. Includes extraction procedures and soluble polymer procedures.

ANSI/AAMI/ISO 10993-13-2010 (R2014), Biological evaluation of medical devices - Part 13: Identification and quantification of degradation products from polymeric medical devices
Provides general requirements for the design of tests in a simulated environment for identifying and quantifying degradation products from finished polymeric medical devices ready for clinical use.

ANSI/AAMI/ISO 10993-14-2001 (R2011), Biological evaluation of medical devices - Part 14: Identification and quantification of degradation products from ceramics
Specifies two methods for obtaining solutions of degradation products from ceramics (including glasses) for the purpose of quantification. Also gives guidance on the analysis of these solutions.

Provides guidance on general requirements for the design of tests for identifying and quantifying degradation products from finished metallic medical devices or corresponding materials samples finished as ready for clinical use.
Biological evaluation of medical devices - Part 16: Toxicokinetic study design for degradation products and leachables

Specifies principles on how toxicokinetic studies relevant to medical devices should be designed and performed. Includes an annex that describes considerations for inclusion of toxicokinetic studies in the biological evaluation of medical devices.

Biological evaluation of medical devices - Part 17: Establishment of allowable limits for leachable substances

 Specifies a method for determining allowable limits for leachable substances from medical devices and describes a systematic process through which identified risks arising from toxicologically hazardous substances present in medical devices can be quantified. Intended for use in deriving standards and estimating appropriate limits where standards do not exist.

Biological evaluation of medical devices - Part 2: Animal welfare requirements

AAMI/ISO 10993-2 specifies minimum requirements for the use of animals in biological testing.

Biological evaluation of medical devices - Part 3: Tests for genotoxicity, carcinogenicity and reproductive toxicity

The standard specifies strategies for hazard identification and tests on medical devices for genotoxicity, carcinogenicity, and reproductive and developmental toxicity.

Biological evaluation of medical devices - Part 4: Selection of tests for interactions with blood (Amendment 1)


Biological evaluation of medical devices - Part 4: Selection of tests for interactions with blood

The standard provides a classification of medical and dental devices that are intended for use in contact with blood based on the intended use and duration of contact as defined in ISO 10993-1, the fundamental principles governing the evaluation of the interaction of devices with blood, and the rationale for structured selection of tests.

Biological evaluation of medical devices - Part 5: Tests for in vitro cytotoxicity

The standard describes test methods to assess the in vitro cytotoxicity of medical devices. These methods specify the incubation of cultured cells either directly or through diffusion with extracts of the device, and/or in contact with a device. These methods are designed to determine the biological response of mammalian cells in vitro using appropriate biological parameters.
ANSI/AAMI/ISO 11138-4-2006 (R2015), Sterilization Of Health Care Products - Biological Indicators - Part 4: Biological Indicators For Dry Heat Sterilization Processes

Provides specific requirements for test organisms, suspensions, inoculated carriers, biological indicators, and test methods intended for use in assessing the performance of sterilization processes employing dry heat as the sterilizing agent at sterilizing temperatures within the range of 120 °C to 180 °C.

ANSI/AAMI/ISO 11138-5-2006 (R2015), Sterilization Of Health Care Products - Biological Indicators - Part 5: Biological Indicators For Low-Temperature Steam And Formaldehyde Sterilization Processes

Provides specific requirements for test organisms, suspensions, inoculated carriers, biological indicators and test methods intended for use in assessing the performance of sterilization processes employing low-temperature steam and formaldehyde as the sterilizing agent.

ANSI/AAMI/ISO 11140-1-2014, Sterilization of health care products - Chemical indicators - Part 1: General requirements

Specifies performance requirements for indicators that show exposure to sterilization processes by means of physical and/or chemical change of substances.

ANSI/AAMI/ISO 11140-3-2012 (R2015), Sterilization Of Health Care Products - Chemical Indicators - Part 3: Class 2 Indicator Systems For Use In The Bowie And Dick-Type Steam Penetration Test

Specifies the requirements for chemical indicators to be used in the steam penetration test for steam sterilizers for wrapped goods, e.g. instruments and porous materials. The indicator for this purpose is a Class 2 indicator as described in ISO 11140-1.

ANSI/AAMI/ISO 11140-4-2012 (R2015), Sterilization Of Health Care Products - Chemical Indicators - Part 4: Class 2 Indicators As An Alternative To Bowie And Dick Test For Detection Of Steam Penetration

Specifies the performance for a Class 2 indicator to be used as an alternative to the Bowie and Dick-type test for steam sterilizers for wrapped health care goods (instruments, etc., and porous loads).

ANSI/AAMI/ISO 11140-5-2012 (R2015), Sterilization Of Health Care Products - Chemical Indicators - Part 5: Class 2 Indicators For Bowie and Dick Air Removal Test Sheets and Packs

Specifies the requirements for Class 2 indicators for Bowie and Dick-type air removal tests used to evaluate the effectiveness of air removal during the pre-vacuum phase of prevacuum steam sterilization cycles.


This standard specifies the requirements and test methods for materials, preformed sterile barrier systems, sterile barrier systems and packaging systems that are intended to maintain sterility of terminally sterilized medical devices to the point of use.


This amendment clarifies and corrects references, table and other areas in ISO 11607-1:2006.


This standard specifies the requirements for development and validation of processes for packaging medical devices that are terminally sterilized and maintain sterility to the point of use. These processes include forming, sealing and assembly of preformed sterile barrier systems, sterile barrier systems and packaging systems.


This amendment clarifies and corrects some references and makes other changes in ISO 11607-2:2006.

ANSI/AAMI/ISO 11658-2012, Cardiovascular implants and extracorporeal systems - Blood/tissue contact surface modifications for extracorporeal perfusion systems

This standard will apply to components of heart-lung bypass equipment and of extracorporeal life support equipment that carry blood and have a coating on the blood contact surface of the device. While standards exist for the main components used in heart-lung bypass and extracorporeal life support equipment, many of these components are currently distributed with a surface coating that comes in contact with blood. This aspect of the design of these components was not addressed in the existing standard.


Specifies requirements and provides guidance for the enumeration and microbial characterization of the population of viable microorganisms on or in a medical device, component, raw material, or package.


Specifies the general criteria for tests of sterility on medical devices that have been exposed to a treatment with the sterilizing agent that is a fraction of the specified sterilization process. These tests are intended to be performed when defining, validating or maintaining a sterilization process.


Specifies requirements for vascular device-drug combination products (VDDCPs) based upon current technical and medical knowledge. VDDCPs are medical devices with various clinical indications for use in the human vascular blood system. A VDDCP incorporates, as an integral part, substance(s) which, if used separately, can be considered to be a medicinal substance or product (drug substance, drug product) but the action of the medicinal substance is ancillary to that of the device and supports the primary mode of action (PMOA) of the device.

ANSI/AAMI/ISO 13022-2012, Medical products containing viable human cells -- Application of risk management and requirements for processing practices

Specifies a procedure to identify the hazards and hazardous situations and to manage the risk associated with viable cellular component(s) of products regulated as medicinal products, biologics, medical devices and active implantable medical devices or combinations thereof. Covers viable human materials of autologous as well as allogeneic human origin.

ANSI/AAMI/ISO 13408-1-2008 (R2011), Aseptic processing of health care products - Part 1: General requirements

This part of ISO 13408 specifies the general requirements for, and offers guidance on, processes, programs and procedures for development, validation and routine control of the manufacturing process for aseptically-processed health care products. This part of ISO 13408 includes requirements and guidance relative to the overall topic of aseptic processing. Specific requirements and guidance on various specialized processes and methods related to filtration, lyophilization, clean-in-place (CIP) technologies, sterilization in place (SIP) and isolator systems are given in other parts of ISO 13408.
Specifies the general requirements for, and offers guidance on, processes, programs and procedures for development, validation and routine control of the manufacturing process for aseptically processed health care products.

Specifies requirements for sterilizing filtration as part of aseptic processing of health care products. It also offers guidance to filter users concerning general requirements for selection, set up, validation and routine operation of a sterile-filtration process to be used for aseptic processing of health care products. Does not apply to removal of mycoplasma or viruses by filtration nor to filtration of whole cell vaccines.

ANSI/AAMI/ISO 13408-3-2012 (R2015), Aseptic processing of health care products - Part 3: Lyophilization
Specifies requirements for and offers guidance on equipment, processes, programs and procedures for the control and validation of lyophilization as an aseptic process. It does not address the physical/chemical objectives of a lyophilization process.

Specifies the general requirements for clean-in-place (CIP) processes applied to product contact surfaces of equipment used in the manufacture of sterile health care products by aseptic processing and offers guidance on qualification, validation, operation and control. This document applies to processes where cleaning agents are delivered to the internal surfaces of equipment designed to be compatible with CIP that may come in contact with the product.

ANSI/AAMI/ISO 13408-5-2012 (R2015), Aseptic processing of health care products - Part 5: Sterilization in place
Specifies the general requirements for sterilization in place (SIP) applied to product contact surfaces of the equipment used in the manufacture of sterile health care products by aseptic processing and offers guidance on qualification, validation, operation and control. This document applies to processes where sterilizing agents are delivered to the internal surfaces of the equipment that can come in contact with the product.

Specifies the requirements for isolator systems used for aseptic processing and offers guidance on qualification, bio-decontamination, validation, operation and control of isolator systems used for aseptic processing of health care products. The document focuses on the use of isolator systems to maintain aseptic conditions; this may include applications for hazardous materials.

This amendment updates references, deletes definitions, introduces new requirements, modifies some informative notes, and updates the Bibliography.

ANSI/AAMI/ISO 13408-7-2012, Aseptic processing of health care products - Part 7: Alternative processes for atypical medical devices and combination products
Specifies requirements and provides guidance on alternative approaches to process simulations for the qualification of the aseptic processing of atypical medical devices and combination products that cannot be terminally sterilized and where the process simulation approach according to AAMI/ISO 13408-1 cannot be applied.

ANSI/AAMI/ISO 13485 (Ed.3)-2016, Medical devices - Quality management systems - Requirements for regulatory purposes
Specifies requirements for a quality management system where an organization needs to demonstrate its ability to provide medical devices and related services that consistently meet customer requirements and regulatory requirements applicable to medical devices and related services.

ANSI/AAMI/ISO 14117-2012, Active implantable medical devices - Electromagnetic compatibility - EMC test protocols for implantable cardiac pacemakers, implantable cardioverter defibrillators and cardiac resynchronization devices
This document specifies a comprehensive test methodology for the evaluation of the electromagnetic (EM) compatibility of active implantable cardiovascular devices. The devices addressed by this standard include those that provide one or more therapies for bradycardia, tachycardia, and cardiac resynchronization. This document details test methods appropriate for the interference frequencies at issue. It specifies performance limits or requires disclosure of performance in the presence of EM emitters, where indicated.

Defines procedures for the conduct and performance of clinical investigation of medical devices.

Covers clinical investigation plans for clinical investigation in human subjects of those medical devices whose clinical performance and safety needs assessment before being placed on the market (does not apply to in vitro diagnostic devices).

Specifies particular requirements for active implantable medical devices intended for electrical stimulation of the central or peripheral nervous system, to provide basic assurance of safety for both patients and users. It amends and supplements ISO 14708-1:2014.

ANSI/AAMI/ISO 14708-4-2008 (R2011), Implants for surgery - Active implantable medical devices - Part 4: Implantable infusion pumps

This part of ISO 14708 is applicable to active implantable medical devices intended to deliver medicinal substances to site-specific locations within the human body. This part of ISO 14708 is also applicable to some non-implantable parts and accessories of the devices as defined in Clause 3. The tests that are specified in this part of ISO 14708 are type tests intended to be carried out on a sample of a device to show compliance, and are not intended to be used for the routine testing of manufactured products.

ANSI/AAMI/ISO 14708-5-2010 (R2015), Implants for surgery - Active implantable medical devices - Part 5: Circulatory support devices

Specifies requirements for safety and performance of active implantable circulatory support devices. It is not applicable to extracorporeal perfusion devices, cardiomyoplasty, heart restraints and counterpulsation devices, such as extra- or intra-aortic balloon pumps.

ANSI/AAMI/ISO 14937-2009 (R2013), Sterilization of health care products -- General requirements for characterization of a sterilizing agent and the development, validation and routine control of a sterilization process for medical devices

Specifies general requirements for the characterization of a sterilizing agent and for the development, validation and routine monitoring and control of a sterilization process for medical devices. Applies to sterilization processes in which microorganisms are inactivated by physical and/or chemical means. Intended to be applied by process developers, manufacturers of sterilization equipment, manufacturers of medical devices to be sterilized, and organizations responsible for sterilizing medical devices.

ANSI/AAMI/ISO 14971-2007 (Ed 2, vers 2) (R2016), Medical devices - Risk management - Application of risk management to medical devices

This International Standard specifies a process for a manufacturer to identify the hazards associated with medical devices, including in vitro diagnostic (IVD) medical devices, to estimate and evaluate the associated risks, to control these risks, and to monitor the effectiveness of the controls. The requirements of this International Standard are applicable to all stages of the life-cycle of a medical device. This International Standard does not apply to clinical decision making. This International Standard does not specify acceptable risk levels. This International Standard does not require that the manufacturer have a quality management system in place.

ANSI/AAMI/ISO 15223-1:2016, Medical devices - Symbols to be used with medical device labels, labelling and information to be supplied - Part 1: General requirements

This part of ISO 15223 is applicable to symbols used in a broad spectrum of medical devices, which are marketed globally and therefore need to meet different regulatory requirements. These symbols may be used on the medical device itself, on its packaging or in the associated documentation.

ANSI/AAMI/ISO 15223-2:2016, Medical devices - Symbols to be used with medical device labels, labelling and information to be supplied - Part 2: Symbol development, selection and validation

This part of ISO 15223 specifies a process for developing, selecting and validating symbols for inclusion in ISO 15223-1. The purpose of this part of ISO 15223 is to ensure that symbols included in ISO 15223-1 are readily understood by the target group. If the symbol validation process detailed in this part of ISO 15223 has been complied with, then the residual risks, as defined in ISO 14971 and IEC 62366, associated with the usability of a medical device symbol are presumed to be acceptable, unless there is objective evidence to the contrary.

ANSI/AAMI/ISO 15225-2016, Medical devices - Quality management - Medical device nomenclature data structure

This International Standard provides rules and guidelines for a medical device nomenclature data structure, in order to facilitate cooperation and exchange of data used by regulatory bodies on an international level between interested parties, e.g. regulatory authorities, manufacturers, suppliers, health care providers and end users.

ANSI/AAMI/ISO 15674-2016, Cardiovascular implants and artificial organs - Hardshell cardiotomy/venous reservoir systems (with/without filter) and soft venous reservoir bags

Specifies requirements for sterile, single-use, extracorporeal hard-shell cardiotomy/venous reservoir systems and soft venous reservoir bags intended for use as a blood reservoir during cardiopulmonary bypass (CPB) surgery. Applies only to the blood reservoir aspects for multifunctional systems which can have integral parts such as blood-gas exchangers (oxygenators), blood filters, defoamers, blood pumps, etc.

ANSI/AAMI/ISO 15675-2016, Cardiovascular implants and artificial organs - Cardiopulmonary bypass systems - Arterial blood line filters

Specifies requirements for sterile, single-use, arterial blood line filters intended to filter and remove emboli, debris, blood clots and other potentially hazardous solid and gaseous material from the blood of humans during cardiopulmonary bypass surgery.

ANSI/AAMI/ISO 15676-2016, Cardiovascular implants and artificial organs - Requirements for single-use tubing packs for cardiopulmonary bypass and extracorporeal membrane oxygenation (ECMO)

Specifies requirements for single-use tubing packs for cardiopulmonary bypass and extracorporeal membrane oxygenation (ECMO). Applicable to all medical tubing intended for cardiopulmonary bypass (CPB) and/or extracorporeal membrane oxygenation (ECMO), but specific requirements and tests are included for tubing intended for use with peristaltic pumps during (short term, i.e. < 6 h duration) CPB surgery, or (long term, i.e. > 24 h) ECMO procedures. The sterility and non-pyrogenicity provisions of this standard are applicable to tubing packs labelled as ‘sterile’.

ANSI/AAMI/ISO 15882-2008 (R2013), Sterilization of health care products - Chemical indicators - Guidance for selection, use and interpretation of results

Provides guidance for the selection, use and interpretation of results of chemical indicators used in process definition, validation and routine monitoring and overall control of sterilization processes. Applies to indicators that show exposure to sterilization processes by means of physical and/or chemical change of substances, and which are used to monitor one or more of the variables required for a sterilization process. These chemical indicators are not dependent for their action on the presence or absence of a living organism.

This part of ISO 16142, identifies significant standards and guides that can be used in the assessment of conformity of a medical device to the recognized essential principles that when met, indicate a medical device is safe and performs as intended and describes the six general essential principles of safety and performance that apply to all medical devices, including IVD medical devices (in vitro diagnostic).

ANSI/AAMI/ISO 17665-1:2005 (R2013),
Sterilization of health care products -- Moist heat -- Part 1: Requirements for the development, validation and routine control of a sterilization process for medical devices

Specifies requirements for the development, validation and routine control of a moist heat sterilization process for medical devices. Moist heat sterilization processes covered by ISO 17665-1:2006 include but are not limited to: saturated steam venting systems; saturated steam active air removal systems; air steam mixtures; water spray; water immersion.

ANSI/AAMI/ISO 18241-2016, Cardiovascular implants and extracorporeal systems - Cardiopulmonary bypass systems - Venous bubble traps

Specifies requirements for sterile, single-use, venous bubble traps intended to remove air entering the venous line during surgical procedures requiring extracorporeal circulatory support, which may include cardiopulmonary bypass (CPB), extracorporeal membrane oxygenation (ECMO), or venovenous bypass for liver transplantation.

ANSI/AAMI/ISO 18242-2016, Cardiovascular implants and extracorporeal systems - Centrifugal blood pumps

Specifies requirements for sterile, single-use, extracorporeal centrifugal blood pumps, whether coated, non-surface modified, or surface-modified, intended for producing blood flow during extracorporeal circulation. Such blood flow is most commonly used to provide systemic perfusion during cardiopulmonary bypass, but also has applications for venovenous bypass, kinetic-assisted venous drainage, or extracorporeal membrane oxygenation.

ANSI/AAMI/ISO 18472-2010 (R2015),
Sterilization of Health Care Products - Biological and Chemical Indicators - Test Equipment

Specifies the requirements for test equipment to be used to test chemical and biological indicators for steam, ethylene oxide, dry heat and vaporized hydrogen peroxide processes for conformity to the requirements given in ISO 11140-1 for chemical indicators, or the requirements given in the ISO 11138 series for biological indicators. This International Standard also provides informative methods useful in characterizing the performance of biological and chemical indicators for intended use and for routine quality control testing.

ANSI/AAMI/ISO 20857-2010 (R2015),
Sterilization of health care products - Dry heat: Requirements for the development, validation and routine control of a sterilization process for medical devices

Specifies requirements for the development, validation and routine control of an industrial dry heat sterilization process for medical devices. Dry heat sterilization processes covered by this standard include but are not limited to forced air cycles and convection cycles. Although this standard primarily addresses dry heat sterilization, it also covers depyrogenation processes. The standard excludes processes that utilize infrared or microwaves as the heating medium.

ANSI/AAMI/ISO 22442-2016, Medical devices utilizing animal tissues and their derivatives - Part 1: Application of risk management

Applies to medical devices other than in-vitro diagnostic medical devices manufactured utilizing materials of animal origin, which are non-viable or have been rendered non-viable. Specifies, in conjunction with ANSI/AAMI/ISO 14971, a procedure to identify the hazards and hazardous situations associated with such devices, to estimate and evaluate the resulting risks, to control these risks, and to monitor the effectiveness of that control. Outlines the decision process for the residual risk acceptability, taking into account the balance of residual risk, as defined in ANSI/AAMI/ISO 14971, and expected medical benefit as compared to available alternatives.

ANSI/AAMI/ISO 22442-2-2016, Medical devices utilizing animal tissues and their derivatives - Part 2: Controls on sourcing, collection and handling

Specifies requirements for controls on the sourcing, collection and handling (which includes storage and transport) of animals and tissues for the manufacture of medical devices utilizing materials of animal origin, other than in vitro diagnostic medical devices.

ANSI/AAMI/ISO 22442-3-2007 (R2016), Medical devices utilizing animal tissues and their derivatives - Part 3: Validation of the elimination and/or inactivation of viruses and transmissible spongiform encephalopathy (TSE) agents

Specifies requirements for the validation of the elimination and/or inactivation of viruses and TSE agents during the manufacture of medical devices (excluding in-vitro diagnostic medical devices) utilizing animal tissue or products derived from animal tissue, which are non-viable or have been rendered non-viable. Does not cover other transmissible and non-transmissible agents.

ANSI/AAMI/ISO 23747-2015, Anaesthetic and respiratory equipment - Peak expiratory flow meters for the assessment of pulmonary function in spontaneously breathing humans

Specifies requirements for a peak expiratory flow meter (pefm) intended for the assessment of pulmonary function in spontaneously breathing humans. Covers all medical devices that measure peak expiratory flow rate in spontaneously breathing humans either as part of an integrated lung function medical device or as a stand-alone medical device.

ANSI/AAMI/ISO 25539-1:2003 (R2014),
Cardiovascular implants - Endovascular devices - Part 1: Endovascular prostheses

 Specifies requirements for endovascular prostheses, including requirements for intended performance, design attributes, materials, design evaluation, manufacturing, sterilization packaging, and information to be supplied by the manufacturer.


Provides guidance for the development of preclinical test methods to be used to characterize and evaluate endovascular prostheses. Also provides guidance for developing test reports.


Specifies requirements for the evaluation of endovascular systems (prostheses and delivery systems) and requirements with respect to nomenclature, design attributes and information supplied by the manufacturer, based upon current medical knowledge. Guidance for the development of in vitro test methods is included in an informative annex to this standard. This standard should be considered as a supplement to ISO 14630, which specifies general requirements for the performance of non-active surgical implants.

Specifies requirements for vascular stents, based upon current medical knowledge. Gives requirements for intended performance, design attributes, materials, design evaluation, manufacturing, sterilization packaging and information supplied by the manufacturer. Includes vascular stents used to treat vascular lesions or stenoses, or other vascular abnormalities. These devices may or may not incorporate surface modifications of the stent such as drug and/or other coatings.

ANSI/AAMI/ISO 25539-3-2012 (R2015), Cardiovascular Implants - Endovascular Devices - Part 3: Vena Cava Filters

Specifies requirements for vena cava filters, based upon current medical knowledge. With regard to safety, it gives requirements for intended performance, design attributes, materials, design evaluation, manufacturing, sterilization, packaging and information supplied by the manufacturer. This part of ISO 25539 supplements ISO 14630, which specifies general requirements for the performance of non-active surgical implants.

ANSI/AAMI/ISO 26782-2015, Anaesthetic and respiratory equipment - Spirometers

Intended for the measurement of time forced expired volumes in humans

Specifies requirements for SPIROMETERS intended for the assessment of pulmonary function in humans weighing more than 10 kg. Applies to a SPIROMETER that measures timed forced expired volumes, either as part of an integrated lung function device or as a stand-alone device, irrespective of the measuring method employed.

ANSI/AAMI/ISO 27185-2012 (R2017), Cardiac rhythm management devices - Symbols to be used with cardiac rhythm management device labels, and information to be supplied - General requirements

Identifies requirements for the development and use of symbols that may be used to convey information on the safe and effective use of cardiac rhythm management medical devices. The document is limited to symbols applicable to cardiac rhythm management medical devices that may be marketed globally. These symbols may be used on the device itself or its labels.

ANSI/AAMI/ISO 27186-2010, Active implantable medical devices - Four-pole connector system for implantable cardiac rhythm management devices - Dimensional and test requirements

This standard specifies a four-pole connector system for implantable cardiac rhythm management devices which have pacing, electrogram sensing and/or defibrillation functions. This document includes requirements for the connector portion of an implantable lead as well as for the mating connector cavity attached to an implantable pulse generator. Essential dimensions and performance requirements are specified together with appropriate test methods.

ANSI/AAMI/ISO 5359-2015, Anaesthetic and respiratory equipment - Low-pressure hose assemblies for use with medical gases

Specifies requirements for low-pressure hose assemblies intended for use with the following medical gases: oxygen, nitrous oxide, medical air, helium, carbon dioxide, xenon, specified mixtures of the gases listed above, oxygen-enriched air, air for driving surgical tools, nitrogen for driving surgical tools, and for use with vacuum.

ANSI/AAMI/ISO 5360-2015, Anaesthetic vaporizers - Agent-specific filling systems

Specifies requirements, including dimensions, for agent-specific filling systems for agent-specific anaesthetic vaporizers.

ANSI/AAMI/ISO 5367-2015, Anaesthetic and respiratory equipment - Breathing sets and connectors

Specifies basic requirements for breathing sets and breathing tubes intended to be used with anaesthetic breathing systems, ventilator breathing systems, humidifiers or nebulizers. It applies to breathing sets and breathing tubes and patient end adaptors supplied already assembled and to those supplied as components and assembled in accordance with the manufacturer’s instructions. Applicable to breathing sets which include special components (e.g. water traps) between the patient end and machine end which are supplied already assembled.

ANSI/AAMI/ISO 5840-1-2015, Cardiovascular implants - Cardiac valve prostheses - Part 1: General requirements

Applicable to heart valve substitutes intended for human implantation and provides general requirements. Subsequent parts provide specific requirements. Applicable to both newly developed and modified heart valve substitutes and to the accessories, packaging, and labelling required for their implantation and for determining the appropriate size of the heart valve substitute to be implanted. Outlines an approach for qualifying the design and manufacture of a heart valve substitute through risk management.

ANSI/AAMI/ISO 5840-2-2015, Cardiovascular implants - Cardiac valve prostheses - Part 2: Surgically implanted heart valve substitutes

Applicable to heart valve substitutes intended for implantation in human hearts, generally requiring cardiopulmonary bypass and generally with direct visualization. Applicable to both newly developed and modified surgical heart valve substitutes and to the accessories, packaging, and labeling required for their implantation and for determining the appropriate size of the surgical heart valve substitute to be implanted. Outlines an approach for qualifying the design and manufacture of a surgical heart valve substitute through risk management.

ANSI/AAMI/ISO 5840-3-2012, Cardiovascular implants - Cardiac valve prostheses - Part 3: Heart valve substitutes implanted by minimally invasive techniques

Applies to all devices intended for implantation in human hearts as a minimally invasive implanted heart valve substitute. Applies to both newly developed and modified versions and to the accessory devices, packaging and labeling required for their implantation and for determining the appropriate size to be implanted. Outlines an approach for qualifying the design and manufacture of a heart valve substitute through risk management. Imposes design specifications and minimum performance specifications for minimally invasive heart valve substitutes where adequate clinical and/or clinical evidence exists for their justification.

ANSI/AAMI/ISO 5841-2-2014, Implants for surgery - Cardiac pacemakers - Part 2: Reporting of clinical performance of populations of pulse generators or leads

Specifies requirements for reports on the clinical performance in humans of population samples of pulse generators or leads, intended for long-term implantation as cardiac pacemakers. It includes general requirements for all reports and supplementary requirements for reports on cumulative experience with devices and estimates of future clinical performance for devices, when appropriate.

ANSI/AAMI/ISO 5841-3-2013, Implants for surgery - Cardiac pacemakers - Part 3: Low-profile connectors (IS-1) for implantable pacemakers

This document specifies a connector assembly to be used to connect implantable pacemaker leads to implantable pacemaker pulse generators. Essential dimensions and performance requirements related to connector fit are specified, together with appropriate test methods.

ANSI/AAMI/ISO 7198, Ed. 4-2016, Cardiovascular implants and extracorporeal systems - Vascular Prostheses - Tubular vascular grafts and vascular patches

Specifies requirements for the evaluation of vascular prostheses and requirements with respect to nomenclature, design attributes and information supplied by the manufacturer, based upon current medical knowledge. Guidance for the development of in vitro test methods is included in an informative annex to this standard. This standard should be considered as a supplement to ISO 14630, which specifies general requirements for the performance of non-active surgical implants.


Amendment 1: Includes clarifications for test methodologies, labeling, and sampling schedule.
ANSI/AAMI/ISO 80369-1-2010, Small bore connectors for liquids and gases in healthcare applications - Part 1: General requirements
Covers general aspects of non-interchangeability and appropriate validation procedures for small bore connectors for liquids and gases in healthcare applications.

This part of ISO 80369 specifies the TEST METHODS to support the functional requirements for SMALL-BORE CONNECTORS intended to be used for CONNECTIONS of MEDICAL DEVICES and related ACCESSORIES.

ANSI/AAMI/ISO 80369-3-2016, Small-bore connectors for liquids and gases in healthcare applications - Part 3: Connectors for enteral applications
 Specifies the dimensions and requirements for the design and functional performance of SMALL-BORE CONNECTORS intended to be used on ENTERAL MEDICAL DEVICES and ACCESSORIES.

ANSI/AAMI/ISO 80369-5-2016, Small-bore connectors for liquids and gases in healthcare application - Part 5: Connectors for limb cuff inflation applications
Includes the dimensions and drawings for connectors in limb cuff inflation applications.

ANSI/AAMI/ISO 80369-6-2016, Small-bore connectors for liquids and gases in healthcare applications -- Part 6: Connectors for neuraxial applications
 Specifies requirements for SMALL-BORE CONNECTORS intended to be used for CONNECTIONS in neuraxial APPLICATIONS. Neuraxial APPLICATIONS involve the use of MEDICAL DEVICES intended to administer medications to neuraxial sites, wound infiltration anesthesia delivery, and other regional anesthesia procedures or to monitor or remove cerebro-spinal fluid for therapeutic or diagnostic purposes.

ANSI/AAMI/ISO 80369-7-2016, Small-bore connectors for liquids and gases in healthcare applications - Part 7: Connectors with 6% (Luer) taper for intravascular or hypodermic applications
This part of ISO 80369 specifies requirements for SMALL-BORE CONNECTORS intended to be used as intravascular CONNECTIONS in intravascular APPLICATIONS or hypodermic CONNECTIONS in hypodermic APPLICATIONS of MEDICAL DEVICES and related ACCESSORIES. This part of ISO 80369 specifies dimensions and requirements for the design and functional performance of 025 these SMALL-BORE CONNECTORS intended to be used with MEDICAL DEVICES.

 Specifies particular requirements for the BASIC SAFETY and ESSENTIAL PERFORMANCE of a RESPIRATORY GAS MONITOR (RGIM), hereafter referred to as ME EQUIPMENT, intended for CONTINUOUS OPERATION for use with a PATIENT. Specifies requirements for anaesthetic gas monitoring, carbon dioxide monitoring, and oxygen monitoring.

ANSI/AAMI/ISO 80601-2-61-2015, Medical electrical equipment - Part 2-61: Particular requirements for the basic safety and essential performance of pulse oximeter equipment
 Applies to the BASIC SAFETY and ESSENTIAL PERFORMANCE of PULSE OXIMETER EQUIPMENT intended for use on humans, hereafter referred to as ME EQUIPMENT. This includes any part necessary for NORMAL USE, including the PULSE OXIMETER MONITOR, PULSE OXIMETER PROBE, and PROBE CABLE EXTENDER.

ANSI/AAMI/ISO 81060-1-2007 (R2010), Non-invasive sphygmomanometers - Part 1: Requirements and test methods for non-automated measurement type
 ISO/IEC 81060-1 specifies requirements for mechanical sphygmomanometers and their accessories that, by means of an inflatable cuff, are used for the non-invasive measurement of blood pressure. This standard also specifies requirements for the safety, essential performance, effectiveness, and labeling, for these instruments and their accessories, including test methods to determine the accuracy of their measurements. The standard covers non-invasive blood pressure measuring devices with a mechanical pressure sensing element and display used in conjunction with a stethoscope or other manual methods for detecting Korotkoff sounds.

ANSI/AAMI/ISO 8637-2010 (R2015), AM1-2013 (R2015), Cardiovascular Implants and Extracorporeal Systems - Hemodialyzers, Hemodiafilters, Hemofilters and Hemoconcentrators
 Specifies requirements for hemodialyzers, hemodiafilters, hemofilters and hemoconcentrators, hereinafter collectively referred to as 'the device'&#8221; for use in humans.

ANSI/AAMI/ISO 8638-2010 (R2015), Cardiovascular implants and extracorporeal systems - Extracorporeal blood circuit for hemodialyzers, hemodiafilters and hemofilters
 Specifies requirements for hemodialyzers, hemodiafilters, hemofilters and hemoconcentrators (hereafter referred to as 'the device'&#8221;) and (integral and non-integral) transducer protectors which are intended for use in hemodialysis, hemodialfiltration and hemofiltration.

ANSI/AAMI/ISO 8836-2015, Suction catheters for use in the respiratory tract
 Specifies requirements for suction catheters, including closed suction catheters, made of flexible materials and intended for use in suctioning of the respiratory tract.

ANSI/AAMI/ISO/IEC 81060-2-2013, Non-invasive sphygmomanometers - Part 2: Clinical validation of automated measurement type
 Specifies the requirements and methods for the clinical validation of medical electrical equipment used for the intermittent non-invasive automatic estimation of the arterial blood pressure by utilizing a cuff. It is applicable to all sphygmomanometers that sense or display pulsations, flow, or sounds for the estimation, display, or recording of blood pressure. These sphygmomanometers need not have automatic cuff inflation.

ANSI/AAMI/AAMI ST15883-1-2009 (R2014), Washer-disinfectors, Part 1: General requirements, terms and definitions and tests
 Specifies general performance requirements for washer-disinfectors and their accessories that are intended to be used for cleaning and disinfection of re-usable medical devices and other articles used in the context of medical, dental, pharmaceutical and veterinary practice. It specifies performance requirements for cleaning and disinfection as well as for the accessories which can be required to achieve the necessary performance. The methods and instrumentation required for validation, routine control and monitoring and re-validation, periodically and after essential repairs, are also specified.

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ANSI/ISO 10079-3-2002 (R2014), Medical Suction Equipment - Part 3: Suction Equipment Powered from a Vacuum or Pressure Source with Deviations
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ANSI/ISO 10651-4-2002 (R2014), Lung Ventilators - Part 4: Particular requirements for operator powered resuscitators

ANSI/ISO 10651-5-2006 (R2014), Lung Ventilators for Medical Use - Particular Requirements for Basic Safety - and Essential Performance - Part 5: Gas powered emergency resuscitators

ANSI/ISO 11712-2014, Anaesthetic and respiratory equipment - Supralaryngeal airways and connectors

ANSI/ISO 5361-2014, Anaesthetic and Respiratory Equipment - Tracheal Tubes and Connectors
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ANSI/ISO 5366-3-2009 (R2014), Anaesthetic and Respiratory Equipment - Tracheostomy Tubes - Part 3: Paediatric Tracheostomy Tubes - Cor 1
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ASTM/ISO 11195-2009, Gas Mixers for Medical Use - Stand-alone Gas Mixers with Deviations by ASTM international

ASTM/ISO 14408-2009, Tracheal Tubes Designed for Laser Surgery - Requirements for Marking and Accompanying Information

ASTM/ISO 4135-2009, Anaesthetic and Respiratory Equipment - Vocabulary with Deviations by ASTM International

ASTM/ISO 5356-1-2009, Anaesthetic and respiratory equipment-Conical connectors-Part 1: Cones and sockets

ASTM/ISO 5362-2014, Anaesthetic Reservoir Bags
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ASTM/ISO 5364-2009, Anaesthetic and Respiratory Equipment - Oropharyngeal Airways

AARST (American Association of Radon Scientists and Technologists)

This standard of practice establishes minimum requirements for buildings that reduce occupant exposure to radon gas or other soil gas hazards using prescriptive provisions that are applicable to the construction of any building intended for human occupancy, except for 1 & 2 Family Dwellings. This standard and informational supplements address construction of buildings including, among others, the use of a building or structure, or a portion thereof for multifamily or congregate residential occupancies, educational occupancies, commercial occupancies and any other building intended for human occupancy that is not designed for 1 & 2 family residential occupa

ANSI/AARST CCAH-2013, Reducing Radon in New Construction of 1 & 2 Family Dwellings and Townhouses
Model Code for Radon Reduction Features in New Construction of One- and Two- Family Dwellings

ANSI/AARST MAH-2014, Protocol for Conducting Radon and Radon Decay Product Measurements In Homes
Scope: This standard specifies procedures, minimum requirements and general guidance for measuring radon concentrations in single-family residences. The protocol included in this standard of practice applies to testing these structures whether conducted for real estate or non-real-estate purposes. Purpose: The purpose of test protocols is to consistently produce, to the extent possible, reliable and repeatable radon measurements. Radon measurements are conducted to determine if radon mitigation is necessary in order to protect current and future occupants.

ANSI/AARST MALB-2014, Protocol for Conducting Radon and Radon Decay Product Measurements In Schools and Large Buildings
This standard specifies procedures, minimum requirements and general guidance for measurement of radon and radon decay product concentrations in schools and large buildings.

This standard of practice contains procedures, minimum requirements and general guidance for measurement of radon in buildings having more than one attached dwelling or other occupied unit that were under the same ownership or designated maintenance or management authority for the purpose of determining if radon mitigation is necessary in order to protect current or future occupants. These protocols address testing in multifamily structures that can include those with shared ownership or maintenance such as co-op units, townhouses, condominiums or vacation timeshare properties and structures, or a portion thereof that are used, for example, as apartment houses, dormitories, military congregate residences, fraternities and sororities, nontransient boarding houses, hotels, convents, monasteries, motels and live/work units. These protocols also address testing a single dwelling within a multifamily building.

ANSI/AARST MS-PC-2015, Performance Specifications for Instrumentation Systems Designed to Measure Radon Gas in Air
This standard specifies minimum performance criteria and testing procedures for instruments and/or systems designed to quantify the concentration of 222Rn gas in air. These are consistent but general performance criteria applicable to the wide variety of radon measurement devices used for indoor measurements, primarily in residential environments or buildings not associated with the possession or handling of radioactive materials. Also included is a description of documentation necessary for demonstration of compliance with this standard. This initial edition of the standard addresses performance criteria for radiological and environmental parameters only.

ANSI/AARST RMS-LB-2014, Radon Mitigation Standards for Schools and Large Buildings
This standard specifies practices, minimum requirements and general guidance for mitigation of radon in existing schools and large buildings including both low-rise and high-rise schools and large buildings. The techniques addressed in this standard provide whole building consideration yet also apply when implemented to portions of a building or individual occupied spaces.

ANSI/AARST RMS-MF-2014, Radon Mitigation Standards for Schools and Large Buildings
This standard specifies practices, minimum requirements and general guidance for mitigation of radon in existing schools and large buildings including both low-rise and high-rise schools and large buildings. The techniques addressed in this standard provide whole-building consideration yet also apply when implemented to portions of a building or individual occupied spaces.
ANSI/AARST SGM-SF-2017, Soil Gas Mitigation Standards for Existing Homes
This standard specifies practices, minimum requirements and general guidance for reducing soil gas entry into existing homes in order to mitigate occupant exposures to certain hazardous soil gases including radon gas, chemical vapors and other hazardous gases. This standard of practice is applicable to residential structures to include: those not more than three stories above-ground in height; those often classified as single-family structures; and those that contain not more than four attached dwelling units on a contiguous foundation. This standard of practice is applicable to existing homes be they rented or owned, including timeshare properties.

ABMA (American Brush Manufacturers Association)
ANSI B165.1-2013, Power Driven Brushing Tools - Safety Requirements for Design, Care and Use
The standard establishes the rules and specifications for safety that apply in the design, use and care of power driven brushing tools, which are specifically defined and covered under the scope of the standard. It include specifications for shanks, adapters, flanges, collets, chucks and safety guards and the rules for proper storage, handling, mounting and use of brushes.

ABMA (ASC B3) (American Bearing Manufacturers Association)
ANSI ABMA 9-2015, Load Ratings and Fatigue Life for Ball Bearings
Specifies the method of calculating the basic dynamic load rating of rolling bearings within the size ranges shown in the relevant ANSI/ABMA standards, manufactured from contemporary, commonly used, good quality hardened steel.

ANSI B3.1-1992 (S2010), Rolling Element Bearings - Aircraft Engine, Engine Gearbox, and Accessory Applications - Eddy Current Inspection
Specifies a method of detecting discontinuities in bearing components by means of eddy current interrogation. Applies to rolling element bearings used in aircraft engines, engine gearboxes and accessory applications.

ANSI B3.2-1992 (S2010), Rolling Element Bearings - Aircraft Engine, Engine Gearbox, and Accessory Applications - Surface Visual Inspection
This standard provides a system for uniform visual acceptance criteria for surface imperfections on rolling element bearings used in aircraft engine, engine gearbox and accessory applications.

ANSI B3.3-1992 (S2010), Rolling Element Bearings - Aircraft Engine, Engine Gearbox, and Accessory Applications - Surface Temper Etch
Applies to rolling element bearings used in aircraft engines, engine gearboxes and accessory applications.

ANSI/ABMA 10A-2001 (R2015), Metal Balls for Unground Bearings and Other Uses
This standard establishes the requirements for metal balls for unground rolling contact bearings and other uses. The requirements for finished balls for rolling contact bearings are contained in ISO 3290.

ANSI/ABMA 11-2014, Load Ratings and Fatigue Life for Roller Bearings
Specifies the method of calculating the basic dynamic load rating of rolling bearings within the size ranges shown in the relevant ABMA standards, manufactured from contemporary, commonly used, good quality hardened steel in accordance with good manufacturing practice.

ANSI/ABMA 12.1-1992 (S2010), Instrument Ball Bearings - Inch Design
Covers the characteristics that define the requirements of precision and super-precision instrument ball bearings. It establishes their boundary dimensions, tolerances, internal clearances, and classification for this assembly. The recommended practices for gauging, frictional torque determination, load rating determination, operational life prediction and yield rate limitation are provided. All components covered by this standard are designed to S.I. (metric) dimensions and are presented in Part 1 of the tables provided. The equivalent U.S. Customary (inch) dimensions shown in Part 2 of the Tables are provided for the convenience of those using that system.

ANSI/ABMA 12.2-1992 (S2010), Instrument Ball Bearings - Inch Design
Covers the characteristics that define the requirements of precision and super-precision instrument ball bearings. It establishes their boundary dimensions, tolerances, internal clearances, and classification for this assembly. The recommended practices for gauging, frictional torque determination, load rating determination, and operational life prediction on yield rate limitation are provided. All components covered by this standard are designed to U.S. Customary (inch) dimensions and are presented in Part 2 of the tables provided. The equivalent S.I. (metric) dimensions shown in Part 1 of the tables are provided for the convenience of those using that system.

ANSI/ABMA 14-1995 (S2010), housings for bearings with spherical outside surfaces
Establishes boundary dimensions and other dimensions, and tolerances values for those dimensions, for pillow block housings, flanged housings and take-up units for use with ball bearings with spherical outside surfaces (insert bearings).

ANSI/ABMA 15-1991 (S2010), Ball Bearings with Spherical Outside Surfaces and Extended Inner Ring Width (Includes Eccentric Locking Collars)
Specifies boundary dimensions and tolerances for bearings with spherical outside surfaces and extended inner ring width and eccentric locking collars.

ANSI/ABMA 18.1-1982 (S2013), Radial Needle Roller Bearings, Metric Design
This standard for Metric Design Industrial Radial Needle Roller Bearings and components includes: identification code, boundary dimensions, bearing tolerances, and fitting and mounting practice.

ANSI/ABMA 18.2-1982 (S2013), Needle Roller Bearings - Radial, Inch Design
This standard for Inch Design Industrial Needle Roller Bearings and components includes: identification code, boundary dimensions, bearing tolerances, and fitting and mounting practice.

Covers metric-design radial-tapered roller bearings of various types, part-numbering systems, boundary dimensions, tolerances, and fitting practices.

ANSI/ABMA 19.2-2013, Tapered Roller Bearings - Radial - Inch Design
Covers inch design radial tapered roller bearings of various types, part numbering systems, tolerances and fitting practices.

ANSI/ABMA 20-2011, Radial Bearings of Ball, Cylindrical Roller and Spherical Roller Types - Metric Design
Covers metric radial ball, cylindrical roller, and spherical roller bearings in common usage in the United States.

Covers metric thrust needle roller and cage assemblies and thrust washers includes: identification code, symbols and nomenclature, boundary dimensions, tolerances, and mounting practice.

ANSI/ABMA 21.2-1988 (S2010), Thrust Needle Roller and Cage Assemblies and Thrust Washers - Inch Design
Includes identification code, symbols and nomenclature, boundary dimensions, tolerances, and mounting practice.

ANSI/ABMA 22.2-1988 (S2010), Spherical Plain Radial Bearings, Joint Type - Inch Design
 Defines the characteristics of spherical bearings, joint type such as boundary dimensions, tolerances and terminology.

ANSI/ABMA 23.2-1988 (S2010), Thrust Bearings of Tapered Roller Type - Inch Design
Covers bearing number and type identity, symbols and nomenclature, boundary dimensions, tolerances, and mounting dimensions (covers only external dimensions).

ANSI/ABMA 24.1-1989 (S2010), Thrust Bearings of Ball, Cylindrical Roller and Spherical Roller Types - Metric Design
This standard covers identification code, symbols and nomenclature, boundary dimensions, tolerances, and mounting dimensions for specified bearings.
ANSI/ABMA 24.2-1989 (S2010), Thrust Bearings of Ball and Cylindrical Roller Types - Inch Design
Covered identification code, symbols and nomenclature, boundary dimensions, tolerances, and mounting dimensions (external dimensions only).

ANSI/ABMA 25.2-1990 (S2010), Rolling Bearings, Linear Motion Recirculating Ball, Sleeve Type - Inch Series
Covered boundary dimensions, tolerances, and terminology for these bearings.

ANSI/ABMA 26.2-1994 (S2013), Thin Section Bearing - Inch Design
Specifies the boundary dimensions and the tolerances for boundary dimensions, running accuracy and internal clearances for thin section ball bearings of single row radial contact, angular contact and four-point angular contact types.

ANSI/ABMA 4-1994 (S2013), Tolerance Definition and Gauging Practices for Ball and Roller Bearings
Includes terms and definitions of tolerances for the boundary dimensions, running accuracy and internal clearance of ball and roller bearings listed in other ABMA and ISO standards. Includes description of methods of measuring, commonly used by bearings users.

ANSI/ABMA 7-1995 (S2013), Shaft and Housing Fits for Metric Radial Ball and Roller Bearings (Except Tapered Roller Bearings) Conforming to Basic Boundary Plans
Covers the general selection of shaft and housing fits for metric radial ball and roller bearings of tolerance classes ABEC 1 - RBEC 1 as influenced by the type and extent of bearing loading and other design requirements.

ANSI/ABMA 8.1-1990 (S2010), Ball and Roller Bearing Mounting Accessories - Metric Design
Establishes dimensions and minimum physical properties of these bearings consistent and compatible with ABMA, ANSI, and ISO standards related to ball and roller bearings. Mounting accessories covered in this standard are used for the location or fixing of the bearings to a shaft or a machine or mechanism. This is the second public review for this standard. It was originally listed in the January 29, 1999 issue of Standards Action. It is being resubmitted due to substantive changes in the text.

ANSI/ABMA 8.2-1999 (S2010), Ball and Roller Bearing Mounting Accessories - Inch Design
Establishes dimensions and minimum physical properties of these bearings consistent and compatible with ABMA, ANSI, and ISO standards related to ball and roller bearings. Mounting accessories covered in this standard are used for the location or fixing of the bearings to a shaft or a machine or mechanism. This is the second public review for this standard. It was originally listed in the January 29, 1999 issue of Standards Action. It is being resubmitted due to substantive changes in the text.

ANSI/ABMA/ISO 10285-2009 (R2015), Rolling bearings - Sleeve type linear ball bearings - Boundary dimensions and tolerances
Specifies the boundary dimensions, tolerances and definitions for sleeve type linear motion ball bearings.

ANSI/ABMA/ISO 104-2016, Rolling bearings - Thrust bearings - Boundary dimensions, general plan
ISO 104:2015 specifies preferred boundary dimensions for single-direction and double-direction thrust bearings with flat back faces. In addition, it gives the minimum bore diameters of housing washers and maximum outside diameters of shaft washers of bearings in dimension series 11, 12, 13, 14, 22, 23 and 24. Guidelines for the extension of this International Standard for single-direction thrust bearings are given in Annex A. NOTE Boundary dimensions for aligning thrust bearings (none flat back faces) and aligning seat washers are given in ISO 20516.

ANSI/ABMA/ISO 12240-1:1998 (S201x), Spherical Plain Bearings - Part 1: Radial Spherical Plain Bearings
Specifies dimension series, tolerances and radial spherical plain bearings.

ANSI/ABMA/ISO 12240-2:1998 (S2010), Spherical plain bearings - Part 2: Angular contact spherical plain bearings
This part of ISO 12240 specifies dimensions and tolerances for angular contact radial spherical plain bearings. The specified tolerance values apply to finished, angular contact radial spherical plain bearings before any coating or plating. Angular contact spherical plain bearings need not conform to the design illustrated but compliance is required as regards dimensions and tolerances specified.

Specifies dimensions and tolerances for thrust spherical plain bearings.

ANSI/ABMA/ISO 12240-4:1998 (S2010), Spherical plain bearings - Part 4: Spherical plain bearing rod ends
Specifies dimensions, tolerances and radial internal clearances for various dimension series of spherical plain bearing rod ends.

This part of ISO 15242 specifies measuring methods for vibration of rotating rolling bearings under established measuring conditions, together with calibration of the related measuring systems.

Specifies vibration measuring methods for single-row and double-row radial ball bearings, with a contact angle up to and including 45°. It covers radial ball bearings with cylindrical bore and outside surface, except bearings with filling slots and three- and four-point-contact ball bearings.

ISO 15242-3:2006 specifies vibration measuring methods for double-row radial spherical roller bearings and single-row and double-row radial tapered roller bearings, with a contact angle up to and including 45 degrees, under established test conditions. It covers double-row radial spherical roller bearings as well as single-row and double-row radial tapered roller bearings with cylindrical bore and outside surface.


ANSI/ABMA/ISO 15243-2010, Rolling bearings -- Damage and failures -- Terms, characteristics and causes
Defines, describes and classifies the characteristics, changes in appearance and possible causes of failure of rolling bearings, occurring in service. It will assist in the understanding of the various forms of change in appearance and the failure that has occurred.

ANSI/ABMA/ISO 199-2014, Rolling bearings - Thrust bearings - Geometrical product specification (GPS) and tolerance values
This standard specifies dimensional characteristics, limit deviations from nominal values, and tolerance values to define the interface (except chamfers) of thrust rolling bearings.

Specifies dimensions and tolerances for finished steel needle rollers used as rolling elements in rolling bearings. Replaces the first edition.

Specifies dimensions and tolerances for finished steel needle rollers used as rolling elements in rolling bearings. Replaces the first edition.
ANSI/ABYC A-1-2013, Marine Liquefied Petroleum Gas (LPG) Systems

Provides a guide for the design, construction, installation, and maintenance of liquefied petroleum gas (LPG) systems on boats.

ANSI/ABYC A-14-2015, Gasoline and Propane Gas Detection Systems

These standards are guides for the design, construction, and installation of gas detection equipment and indicating equipment on boats.

ANSI/ABYC A-16-2016, Electric Navigation Lights

These standards and recommended practices are guides for the selection, location, installation, and wiring of navigation lights.

ANSI/ABYC A-22-2012, Marine Compressed Natural Gas (CNG) Systems

This standard is a guide for the design, manufacture, installation, and maintenance of compressed natural gas (CNG) systems on boats.

ANSI/ABYC A-24-2015, Carbon Monoxide Detection Systems on Boats

These Standards are guides for the design, construction, and installation of carbon monoxide detection systems on boats.

ANSI/ABYC A-26-2012, LPG and CNG Fueled Appliance

This standard is a guide for the design, construction, installation, and maintenance of LPG and CNG fueled appliances.

ANSI/ABYC A-27-2016, Alternating Current (AC) Generator Sets

This standard is a guide for the design, construction, and installation of alternating current (AC) generator sets on boats.

ANSI/ABYC A-3-2013, Galley Stoves

This standard is a guide for the design, construction, installation and maintenance of galley stoves.

ANSI/ABYC A-30-2013, Cooking Appliances with Integral LPG Cylinders

This standard is a guide for the design, construction, installation, and maintenance of cooking appliances with integral LPG cylinders.

ANSI/ABYC A-31-2015, Battery Chargers and Inverters

This standard is a guide for the design, construction and installation of permanently installed marine alternating current (AC) battery chargers, power inverters and inverter/chargers.

ANSI/ABYC A-32 2012, AC Power Conversion Equipment and Systems

Provides a guide to the design, construction, and installation of electrical and electrical power conversion, control equipment, and systems.


This standard applies to devices that stop the propulsion engine under emergency conditions. It is not intended to be an instantaneous device that will offer immediate protection if the wearer falls into the path of the propulsion system/rudder.

ANSI/ABYC C-1-2016, Primer Bulbs

This standard applies to the primer bulb and primer bulb assemblies consisting of the primer bulb, the connecting hose lengths and the fittings necessary to connect the fuel tank to the engine on outboard engine installations.

ANSI/ABYC C-2-2016, Carbon Canisters

This standard applies to carbon canister devices installed for the purpose of reducing hydrocarbon emissions.

ANSI/ABYC E-10-2016, Storage Batteries

These standards and recommended practices apply to storage batteries used in direct current (DC) electrical systems on boats that operate at potentials of nominal fifty (50) volts or less.

ANSI/ABYC E-11-2015, AC and DC Electrical Systems on Boats

This standard is a guide for the design, construction, and installation of alternating current (AC) electrical systems on boats and of direct current (DC) electrical systems on boats.

ANSI/ABYC EDU-1-2015, On-Water Power Standards

This standard is a guide for on-water skills necessary to safely operate a boat of 26' or less.

ANSI/ABYC EDU-2-2016, Skill-Based Human Propelled Standard

This standard is a guide for on-water skills necessary to safely operate a human-propelled boat.

ANSI/ABYC EDU-3-2017, Skills-based Sail Standard

This standard is a guide for on-water skills necessary to safely operate a sailboat.

ANSI/ABYC H-1-2010, Field of Vision from the Helm Position

Provides a guide to minimize obstructions in the field of vision from the helm station(s).

ANSI/ABYC H-2-2013, Ventilation of Boats Using Gasoline

This standard is a guide for the design, construction, and installation of both powered and natural ventilation systems for engine and fuel tank compartments of boats for the purpose of expelling or diluting potentially explosive gasoline vapor from a boat's interior.

ANSI/ABYC H-22-2011, Electric Bilge Pump Systems

This standard is a guide for the design, construction, installation, operation, and control of electric bilge pump systems.

ANSI/ABYC H-24-2017, Gasoline Fuel Systems

This standard is a guide for the design, choice of materials for, construction, installation, repair, and maintenance of permanently installed gasoline fuel systems.

ANSI/ABYC H-25-2016, Portable Marine Gasoline Fuel Systems

This standard is a guide for the design, construction and stowage of portable tanks with related fuel lines and accessories comprising a portable gasoline fuel system for boats.

ANSI/ABYC H-26-2016, Powering of Boats

This standard is a guide for determining the maximum power for propulsion of outboard boats; evaluating the suitability of power installed in inboard boats; and determining maneuvering speed.

ANSI/ABYC H-28-2016, Inflatable Boats

This standard is a guide for the design, construction, material and testing of inflatable boats, including RIBs.

ANSI/ABYC H-29-2012, Canoes and Kayaks

This standard is a guide for determining capacities, flotation, powering, design, construction, and labeling of canoes and kayaks.

ANSI/ABYC H-3-2008, Exterior Windows, Windshields, Hatches, Doors, Port Lights, and Glazing Materials

This standard is a guide for the design, construction, and installation of exterior windows, windshields, hatches, port lights, doors, and all glazing materials on boats.

ANSI/ABYC H-30-2017, Hydraulic Systems

This standard is a guide for the design, construction, installation, operation, and control of hydraulic components used to transmit force.
ANSI/ABYC H-31-2015, Seat Structures
This standard is a guide for the design, testing, construction, and installation of permanently installed seating systems in boats.

ANSI/ABYC H-32-2013, Ventilation of Boats Using Diesel Fuel
This standard is a guide for the design, construction, and installation of ventilation systems for boats using diesel fuel for the purpose of removal of fixed gaseous fire-extinguishing system discharge, and/or combustion air, and/or any incidental additional uses.

ANSI/ABYC H-33-2016, Diesel Fuel Systems
These standards are guides for the design, choice of materials, construction, installation, repair, and maintenance of permanently installed diesel fuel systems.

ANSI/ABYC H-35-2017, Powering and Load Capacity of Pontoon Boats
This standard is a guide for determining powering and load capacity of pontoon boats.

ANSI/ABYC H-37-2017, Jet Boats - Light Weight
This standard is a guide for the design, construction, and maintenance of inboard water jet propelled boats.

ANSI/ABYC H-4-2015, Cockpit Drainage Systems
This standard is a guide for the definition, design, and construction of cockpit drainage systems on boats.

ANSI/ABYC H-40-2008, Anchoring, Mooring and Strong Points
This standard is a guide for the selection, design, construction, and installation of fittings and equipment for anchoring, mooring, docking, lifting, towing, and trailer ing of boats.

This is a 2nd review as a result of and limited to revisions noted in the document. Comments are being sought on the noted revisions only.

ANSI/ABYC H-5-2017, Boat Load Capacity
This standard is a guide for determining the maximum weight and persons capacity of boats.

ANSI/ABYC H-8-2017, Buoyancy in the Event of Flooding/Swamping
This standard is a guide for determining the flotation and placement required to keep boats afloat when flooded/swamped and where indicated, floating in an approximately level attitude when flooded/swamped.

ANSI/ABYC P-1-2009, Installation of Exhaust Systems for Propulsion and Auxiliary Engines
This standard is a guide for the design, installation, and selection of materials for exhaust systems for marine engines.

ANSI/ABYC P-14-2016, Mechanical Propulsion Control Systems
This standard is a guide for the design, testing, and installation of systems for mechanical remote control of the forward and reverse thrust, speed, and trim/tilt of propulsion machinery on boats.

ANSI/ABYC P-17-2013, Mechanical Steering Systems
This standard is a guide for the design and construction of remote mechanical cable steering systems and the major components thereof, covering design, construction, and installation of steering systems for outboard, inboard, sterndrive, and water jet drive boats.

ANSI/ABYC P-18-2013, Cable Over Pulley Steering Systems for Outboard Engines
This standard is a guide for the design and installation of cable over pulley steering systems.

ANSI/ABYC P-21-2017, Manual Hydraulic Steering Systems
This standard is a guide for the design, construction, and installation for remote manual hydraulic steering systems, and their major components.

ANSI/ABYC P-22-2013, Steering Wheels
This standard is a guide for the design, construction, and installation of steering wheels for marine application.

ANSI/ABYC P-23-2012, Mechanical Steering and Propulsion Controls for Jet Boats
This standard is a guide for the design and construction of systems for mechanical steering and mechanical control of propulsion machinery for inboard water-jet propelled boats.

ANSI/ABYC P-24-203, Electric/Electronic Propulsion Control Systems
This standard is a guide for the design, construction, testing, and installation of systems for electric/electronic remote control of forward and reverse thrust, speed, and trim/tilt of propulsion machinery on boats.

ANSI/ABYC P-27-2013, Electric/Electronic Steering Control Systems
This standard is a guide for the design, construction, testing, and installation of systems for electric/electronic steering on boats.

ANSI/ABYC P-4-2012, Marine Inboard Engines and Transmissions
This standard is a guide for the design, construction, installation, and selection of materials for inboard engines and transmissions.

ANSI/ABYC P-6-2016, Propeller Shafting Systems
This standard is a guide for the design, construction and materials for propeller shafts and struts, and the installation of shaft bearings, stern bearings, struts, shaft seals, shaft logs, shaft couplings, and propellers.

ANSI/ABYC S-30-2012, Outboard Engine and Related Equipment Weights
This industry conformity standard is a guide for outboard engine and related equipment weights for use in determining vessel capacity and flotation.

ANSI/ABYC S-7-2015, Boat Capacity Labels
This industry conformity standard establishes methods for the display of capacity information on boats.

ANSI/ABYC S-8-2016, Boat Measurement and Weight
This industry conformity standard is intended as a guide to establish uniformity in describing boat dimensions and weight specifications.

ANSI/ABYC T-1-2010, Aluminum Applications for Boats and Yachts
This technical information report provides information on the use of aluminum for constructing outboard boats using riveted construction, outboard boats using welded construction, and inboard powered boats and yachts using welded construction.

ANSI/ABYC TE-30-2009, Electric Propulsion Systems
This technical information report is a compilation of the key safety requirements of commonly used national and international standards related to voltages and the design, construction, and installation of electrical systems and components used in high voltage electric propulsion systems.

ACC (American Chemistry Council)
This ANSI Standard combines and updates both SDS and labeling guidance into a single standard.

ACCA (Air Conditioning Contractors of America)
ANSI/ACCA 1 Manual D-2016, Residential Duct Systems
Revises the standard that provides the methods and procedures for the design of residential heating, ventilating, and air-conditioning (HVAC) duct systems for single- and multi-zone HVAC systems. The Standard uses ANSI/ACCA 2 Manual J - 2016 heating and cooling loads to determine space air delivery requirements. The Standard matches duct system resistance (pressure drop) to blower performance (as defined by manufacturer's blower performance tables). Info on obtaining the REVISED STANDARD and required RESPONSE FORM is at www.acca.organsi

This proposed standard establishes the unique mechanical system design requirements for indoor pool and spa applications that include: Envelope moisture/thermal barriers, design issues for humid spaces, control space temperature, humidity, pressurization, IAQ, ventilation, conditioning of outdoor and makeup air, htg. and clg. loads, evaporation loads, heat recovery, water heating and water treatment, equipment choices, control options and operational strategies, supply air CFM and distribution and duct systems.


Zoning of HVAC systems achieve their full potential, operating cost savings and consumer comfort when designed and installed properly. Currently there are conflicting zoning guidance provided by various sectors of the HVAC industry. This standard will provide the step-by-step procedures for the design of optimum zoning in residential structures.

ANSI/ACCA 12 QH-2014, Home Evaluation and Performance Improvement

This is a 3rd public review. The revised standard provides guidance to those practitioners who evaluate building performance of existing residential buildings. The proposed standard will identify the metrics, tolerances, approved procedures, and required documentation to (1) evaluate the current performance, (2) establish the basis to create performance improvement specifications, (3) identify approved approaches to implement the specified improvements, (4) and establish the procedures to objectively assess the performance change of the completed improvements. Note: Public Comments are limited to the changes (Red-Lined Text) only.

ANSI/ACCA 14 QMref-2015, Quality Maintenance of Commercial Refrigeration Systems

This is the 3rd public review of a comprehensive standard to provide the Commercial Refrigeration Industry with quality assessment/maintenance guidelines for fluorocarbon charged refrigeration systems of Medium and Low Temperature Applications.

ANSI/ACCA 2 Manual J-2016, Residential Load Calculations

The provisions of the revised Standard apply to any dwelling unit that has its own heating-cooling-ventilating system and equipment, and its own exhaust air system(s). This includes: single family detached structures, duplex structures, ad triplex structures; single family attached structures (row house or town house); the dwelling units in multi-family attached structures (condo units and apartment units); and energy efficient homes.


This is a comprehensive standard for properly selecting heating and cooling equipment. This revised standard establishes the procedures to be used to select and size residential cooling equipment, furnaces and heat pumps. This standard includes the explanation of why ‘certification ratings’ should not be used for selecting equipment.

ANSI/ACCA 4 QM-2013, Maintenance of Residential HVAC Systems

This standard provides minimum inspection requirements for the inspection, by appropriately licensed contractors, of residential HVAC equipment found in one- or two-family dwellings of three or fewer stories. The standard contains a procedural checklist of tasks for the inspection and assessment points within the electrical, controls, mechanical and air distribution system of HVAC systems that require checking, cleaning, adjusting and/or replacing on a periodic basis to confirm that the numerous components within the HVAC system function safely, as designed, and at the highest level of operating efficiency.BSR/ACCA

ANSI/ACCA 5 QI Addendum-2010, HVAC Quality Installation Specification

This supplement would revise the acceptable procedures for the testing of duct leakage in 5.0 of the 2010 standard that establishes minimum attributes and specification elements on 1.) Quality Contractors that include; business prerequisites, contract or business practices and internal support for achieving customer satisfaction. 2.) Quality Installation that include: design & equipment selection aspects, equipment installation aspects, distribution aspects and system documentation/owner education. These elements identify practices that lead to a quality HVAC installation in residential and commercial buildings.

ANSI/ACCA 5 QI-2015, HVAC Quality Installation Specifications

This is the 2nd public review. The revised standard improves on the nationally recognized minimum criteria for the proper installation of HVAC systems in residential and commercial applications. The standard applies to HVAC equipment and components being installed in new and existing residential and commercial buildings. Note: Public comments are limited to the consolidated red-line edits only.

ANSI/ACCA 6 QR-2015, Restoring the Cleanliness of HVAC Systems

This revised standard establishes minimum criteria for the cleaning of HVAC systems that require cleaning activities beyond those performed in normal HVAC maintenance and servicing. The standard also outlines the procedures to control contaminants, which may be released during or after the cleaning process, and to provide methods to verify system cleanliness.

ANSI/ACCA 9 QIvp Standard-2016, HVAC Quality Installation Verification Protocols

This if the first public review for the revision of the existing American National Standard that contains the verification protocols applicable to installations of HVAC equipment / components, in new and existing residential and commercial buildings, that seek to demonstrate adherence to the requirements of the ANSI/ACCA 5 QI Standard.

ACCT (Association for Challenge Course Technology)

ANSI/ACCT 03-2016, Challenge Course and Canopy/Zip Line Tour Standards

Develops and maintains consensus standards for the challenge course industry.

ACDE (Association of Commercial Diving Educators)

ANSI/ACDE 01-2015, Commercial Diver Training Minimum Standard

Sets the minimum standards for commercial diver training. The standard presents the body of knowledge and minimum training hours required for initial training of entry level personnel in the commercial diving industry.

ACMA (American Composites Manufacturers Association)

ANSI/ACMA UEF-1-2011a, Estimating Emission Factors from Open Molding and Other Composites Processes

This revision adds clarification language to the current standard for emissions generated by the cast polymer manufacturing process.


The Fiberglass Grating Manufacturers Council (FGMC) has developed this manual of standard practices to provide useful information related to the procedures and practices for the fabrication and installation of pultruded and molded grating and stair treads.


This proposal will be to adopt ISO 191712 to replace the old, inactive SS-1-2001 standard.


The Pultrusion Industry Council initiated the development of this Code of Standard Practice to provide recommendations for construction contract documents, as well as procedures and practices for the fabrication and installation of pultruded FRP structures that is followed by the pultrusion industry manufacturers.
ANSI (Organization) (American Dental Association)

ANSI/ADA 100, ISO 27020-2012, Brackets and Tubes for Use in Orthodontics

This standard is applicable to brackets and tubes for use in fixed orthodontic appliances. It gives details of methods to compare the functional dimensions of orthodontic brackets and tubes, the test methods by which they can be determined, as well as packaging and labeling information.

ANSI/ADA 12-2002 (R2008), Denture Base Polymers

This specification classifies denture base polymers and copolymers and specifies their requirements. It also specifies the test methods to be used in determining compliance with these requirements. It further specifies requirements with respect to packaging and marking the products and to the instructions to be supplied for use of these materials.

ANSI/ADA 125, ISO 16409-2012, Manual Interdental Brushes

This standard specifies requirements and test methods for performance criteria for manual interdental brushes with a round crosssection of the brush head. It also specifies the accompanying information, such as the manufacturer’s instructions for use and labeling of the packaging.

ANSI/ADA 96, ISO 9917-2012, Dental Water-Based Cements

This standard specifies requirements for the following types of dental cements, including both hand-mixed and capulated cements for mechanical mixing, that are intended for permanent cementation, lining and restoration, and that effect setting only by an aqueous acid-base reaction.

ANSI/ADA No. 135-2015, Denture Adhesives

This standard classifies denture adhesives used by wearers of removable dentures; it also specifies requirements, test methods and instructions to be supplied for the use of such products. This standard is applicable to denture adhesives for use by the public and excludes the dental lining materials prescribed or applied by dental professionals.

ANSI/ADA Specification No. 39-2006 (R2011), Pit and Fissure Sealants

This Specification specifies requirements and test methods for polymer-based materials intended for sealing pits and fissures in teeth. This Specification covers both self-cured and external-energy-activated materials.

ANSI/ADA Specification No 88-2000 (R2012), Dental Brazing Alloys

This standard specifies requirements and test methods for brazing filler alloys suitable for use in brazing cast dental restorations.


This standard specifies requirements and test methods for hand or mechanically operated instruments for root canal shaping and cleaning having designs or materials which are not included within the provisions of ANSI/ADA Specification Nos. 28 and 58. Generally this specification includes root-canal instruments having 2% tapers with diameter sizes not included within Specifications Nos. 28 and 58; root-canal instruments having tapers other than 2%; and root-canal instruments having other shapes.


The purpose of this standard is to develop uniform content requirements for documentation to be included in a periodontal attachment. Attachment documentation specified in this standard will enable, for various periodontal procedures, claims adjudication both for predetermination of estimated benefits and for payment for actual services.


This standard specifies the requirements for dental separators used in connection with dental equipment in the dental treatment center. It specifies the efficiency in terms of the level of metal particulate capture and retention based on a laboratory test. It also includes requirements for safe functioning of the separator, marking, instructions for use, operation and maintenance.


ANSI/ADA Specification No. 108 for Amalgam Separators specifies requirements and test methods for amalgam separators used in connection with dental equipment in the dental treatment center. It specifies the efficiency of the amalgam separators in terms of the level of retention of amalgam based on a laboratory test and the test procedure for determining this efficiency. It also includes requirements for the safe functioning of the amalgam separator, for marking, and for instructions for use, operation and maintenance. This addendum revises the sections on minimum water flow rate and maximum water flow rate during the flushing period.


Describes procedures for storing and preparing amalgam waste for delivery to recyclers or their agents for recycling. In addition, this standard gives requirements for the containers for storing and/or shipping amalgam waste.

ANSI/ADA Specification No. 116-2010, Oral Rinses

This specification defines physical and chemical requirements and test methods for oral rinses. It also specifies the accompanying information such as manufacturer’s instructions for use, marking and/or labeling requirements. This specification is not applicable to other delivery systems (e.g. mouthsprays, foams, powders). It is not intended to describe regulatory aspects, e.g. methods of prescription. This specification is not applicable to oral rinses available by prescription only.


This standard specifies a method of fatigue testing of single post endosseous dental implants of the transmucosal type and their premanufactured prosthetic components. It is most useful for comparing endosseous dental implants of different designs or sizes. While this standard simulates the functional loading of an endosseous dental implant body and its premanufactured prosthetic components under ‘worst case’ conditions, it is not applicable for predicting the in vivo performance of an endosseous dental implant or prosthesis, particularly if more than one implant is used for a prosthesis.

ANSI/ADA Specification No. 139-2012, Dental Base Polymers

This standard classifies denture base polymers and copolymers and specifies their requirements. It is also applicable to orthodontic base polymers and copolymers used in the construction of both active and passive orthodontic appliances and specifies their requirements. It specifies the test methods to be used in determining compliance with these requirements. It further specifies requirements with respect to packaging and marking the products and to the instructions to be supplied for use of these materials.

ANSI/ADA Specification No. 28-2008 (R2013), Root Canal Files and Reamers, Type K

This standard is for endodontic files and reamers having a working part taper of 2% (0.02 millimeter per millimeter of length) and standard sizes for use in endodontic preparation or shaping operations.

ANSI/ADA Specification No. 32-2006 (R2010), Orthodontic Wires

This specification specifies requirements and test methods for wires to be used in fixed and removable orthodontic appliances. It includes preformed orthodontic archwires but excludes springs and other preformed components.

ANSI/ADA Specification No. 57-2000 (R2012), Endodontic Sealing Materials

This specification is for materials used in endodontics within the tooth to seal the root canal space.
ANSI/ADA Specification No. 70-1999 (R2010), Dental X-Ray Protective Aprons and Accessory Devices
This specification applies to dental x-ray protective aprons and accessory devices, such as thyroid collars and thyroid shields used in dentistry to protect the patient, as much as feasible, from the harmful effects of dental diagnostic X-radiation. It specifies the requirements for X-radiation absorption and the areas of anatomy that the aprons and thyroid collars protect.

ANSI/ADA Specification No. 71-2008 (R2013), Root Canal Filing Condensers (Pluggers and Spreaders)
This standard is for root canal instruments for finger, hand, or mechanical operation used to compact root canal filling materials.

ANSI/ADA Specification No. 85-Part 1-2004 (R2009), Disposable Prophy Angles
This specification covers disposable prophy angles suitable for a dental hygienist or a dentist to use in conjunction with a dornit style handpiece during the final stages of a dental cleaning, also known as a polish.

ANSI/ADA Standard 136-2015, Products for External Tooth Bleaching
This standard specifies requirements and test methods for external tooth bleaching products. These products are intended for use in the oral cavity, either by professional application (in-office tooth bleaching products) or consumer application (professional or non-professional home use of tooth bleaching products), or both. It also specifies requirements for their packaging, labeling and instructions for use.

ANSI/ADA Standard No. 1-2003 (R2013), Alloy for Dental Amalgam
This standard is for alloys, composed mainly of silver, tin and/or copper, used in the preparation of dental amalgam. Only capsulated alloy is covered under this standard. When a capsule containing mercury and alloy is shaken, the mercury and alloy react to form the metal-matrix composite called dental amalgam. Dental amalgam is designed for use in dentistry as a restorative material for decayed, fractured, or eroded teeth.

ANSI/ADA Standard No. 1000-2010 (R2015), Standard Clinical Data Architecture
Patient health information is a critical element in the healthcare decision-making process. Accurate information is essential for timely, appropriate and quality health services. This standard provides a logical data model for persistent patient data in healthcare information systems that can be engineered into a database supporting various clinical functions such as electronic health records, clinical decision support, imaging and referrals.

ANSI/ADA Standard No. 102-1998 (R2015), Non-Sterile Nitrile Gloves for Dentistry
This specification covers non-sterile nitrile gloves suitable for dentistry that do not contain any natural rubber latex.

This implementation guide provides technical guidance for architects and developers for preparing a clinical data design that conforms to the ADA Standard 1000 requirements.

ANSI/ADA Standard No. 103-2010 (R2015), Non-Sterile Poly Vinyl Chloride Gloves for Dentistry
This specification covers non-sterile poly vinyl chloride gloves suitable for dentistry.

ANSI/ADA Standard No. 1039-2006 (R2014), Standard Clinical Conceptual Data Model
This standard provides descriptions of activities and data structures specific to clinical healthcare and population health services. It presents a high level structured analysis of the fundamental activities shared throughout the delivery of healthcare services and the principal types of data needed to support these activities.

ANSI/ADA Standard No. 1040-2008 (R2013), Dental Extension to the ASTM Continuity of Care Record
This standard provides a means for one dental practitioner or system, to aggregate all of the pertinent data about a patient and forward it to another practitioner or system to support the continuity of care. The major sections of ADA Standard No. 1040 (Header, Body and Footer) conform to the same sections of ASTM E2369-05, Standard Specification for Continuity of Care Record, 2007.

ANSI/ADA Standard No. 105-2010 (R2015), Orthodontic Elastomeric Materials
This specification is applicable to all elastomeric auxiliaries including orthodontic elastics, elastomeric bands, chains, links, thread and ligatures used for orthodontics both inside and outside the mouth, in conjunction with fixed and removable appliances.

ANSI/ADA Standard No. 1058-2010 (R2015), Forensic Dental Data Set
The purpose of this standard is to develop uniform nomenclature for the description of forensic dental data and define a standardized set of uniform terms to convey this information.

ANSI/ADA Standard No. 1067-2013, Electronic Dental Record System Standard Functional Requirements
This standard addresses the functions performed by dental computer systems to document the dental health services in a whole-patient care environment.

ANSI/ADA Standard No. 1079-2015, Standard Content of Electronic Attachments for Dental Claims
This standard describes content for electronic dental claims attachments to third party payers.
ANSI/ADA Standard No. 130-2013, Dentifrices - Requirements, Test Methods and Marking
This standard specifies requirements for the physical and chemical properties of dentifrices and provides guidelines for suitable test methods. It also specifies requirements for the marking, labelling and packaging of dentifrices. This standard applies to dentifrices, including toothpastes, destined to be used by the public on a daily basis with a toothbrush to promote oral hygiene.

ANSI/ADA Standard No. 131-2015, Dental CAD/CAM Machinable Zirconia Blanks
This standard specifies the requirements and test methods for partially stabilized zirconia materials used for the fabrication of dental fixed restorations.

ANSI/ADA Standard No. 132-2015, Scanning Accuracy of Dental Chairside and Laboratory CAD/CAM Systems
This standard describes test methods used to evaluate the repeatability, reproducibility and accuracy of dental devices for 3D metrology. The standard is applicable to dental chairside and dental laboratory CAD/CAM systems. The scope of this document is not intended to include unique systems with other specific applications of 3D metrology in the dental field such as 3D computed tomography, magnetic resonance imaging and stereophotogrammetry.

ANSI/ADA Standard No. 134 (ISO 22674)-2013, Metallic Materials for Fixed and Removable Restorations and Appliances
This standard classifies metallic materials that are suitable for the fabrication of dental appliances and restorations, including metallic materials recommended for use either with or without a ceramic veneer, or recommended for both uses, and specifies their requirements. It further specifies requirements with respect to packaging and marking the products and to the instructions to be supplied for the use of these materials. This standard does not apply to alloys for dental amalgam, dental brazing materials or metallic materials for orthodontic appliances, e.g., wire, bracket, band and screw.

ANSI/ADA Standard No. 137-2014, Essential Characteristics of Test Methods for the Evaluation of Treatment Methods Intended to Improve or Maintain the Microbiological Quality of Dental Unit Procedural Wastewater
This standard provides guidelines for type test methods for evaluating the effectiveness of treatment methods intended to improve or maintain the microbiological quality of procedural water from dental units and other dental equipment under laboratory conditions. It does not establish specific upper limits for microbial contamination or describe test methods to be used in clinical situations.

ANSI/ADA Standard No. 141 (ISO 14356)-2013, Dental Duplicating Material
This standard specifies requirements and tests for the duplicating materials used in dentistry which are primarily intended for forming flexible moulds needed to produce positive refractory investment copies of properly blocked-out master models.

ANSI/ADA Standard No. 15-2008 (R2013), Artificial Teeth for Dental Prostheses
This standard defines the classification, requirements, and test methods for synthetic polymer and ceramic teeth that are manufactured for use in prostheses used in dentistry.

This standard specifies a screening method for the erosion potential of nonfluoridated oral rinses on dental hard tissues. The results of the screening method are intended for use in enamel and/or dentine erosion models.

ANSI/ADA Standard No. 17-1983 (R2014), Denture Base Temporary Relining Resins
This standard is for pink and clear powder/liquid auto-polymerizing (self-initiating cure) type hard-setting resins used as temporary reline materials for denture bases. The soft relining materials are not covered by this standard.

ANSI/ADA Standard No. 2000-2016, Systemized Nomenclature of Dentistry (SNODENT)
SNODENT is a clinical terminology designed for use with electronic health records that enables the capture, aggregation and analysis of detailed oral health data. It includes oral anatomical sites, oral health conditions, findings, and other clinical concepts unique to dentistry. It provides a standardized way to represent clinical oral health descriptions captured by dentists and enables automated interpretation of their observations.

ANSI/ADA Standard No. 23-1982 (R2015), Dental Excavating Burs
This specification establishes the requirements for burs suitable for use with straight and angle dental handpieces.

ANSI/ADA Standard No. 25-2015, Dental Gypsum Products
This standard gives a classification of, and specifies requirements for, gypsum products used for dental purposes such as making oral impressions, moulds, casts, dies or model bases, and mounting models. It specifies the test methods to be employed to determine compliance with these requirements. It also includes requirements for the labelling of packaging and for adequate instructions to accompany each package. This standard does not apply to dental bone graft substitutes composed of calcium sulfate hemihydrate (or gypsum).

ANSI/ADA Standard No. 27-2016, Polymer-Based Restorative Materials
This standard specifies requirements for dental polymer-based restorative materials supplied in a form suitable for mechanical mixing, hand-mixing, or intra-oral and extra-oral external energy activation, and intended for use primarily for the direct or indirect restoration of cavities in the teeth and for luting. The polymer-based luting materials covered by this standard are intended for use in the cementation or fixation of restorations and appliances such as inlays, onlays, veneers, crowns and bridges.

ANSI/ADA Standard No. 30-2013, Dental Zinc Oxide/Eugenol and Zinc Oxide/Non-Eugenol Cements
This standard specifies requirements for non-water-based zinc oxide/eugenol cements suitable for use in restorative dentistry for temporary cementation, for bases and as temporary restorations. This standard also specifies requirements for non-eugenol cements containing zinc oxide and aromatic oils suitable for temporary cementation.

ANSI/ADA Standard No. 33-2003 (R2014), Dental Products Standards Development Vocabulary
The bulk of the terms and definitions (TDEs) in this revision of ANSI/ADA Specification No. 33 relate to products, procedures and testing of products used in dentistry. This effort to update and standardize the nomenclature for dental products and testing should permit the authors of the various specifications and standards to discuss their concepts and procedures so they will be understood by those who must read and interpret these documents and test the products to determine if they are suitable for the purpose intended.

ANSI/ADA Standard No. 34 (ISO 9997)-2013, Dental Cartridge Syringes
This standard specifies requirements and test methods for dental cartridge syringes which are reusable dental syringes of the aspirating, non-aspirating and self-suspending types using cartridges with dental local anesthetics.

ANSI/ADA Standard No. 37-2001 (R2015), Dental Abrasive Powders
This standard is for powered abrasive materials used in dentistry for removing stains and gross scratches from natural tooth structures and protheses but not including materials used in laboratory blasting processes. These materials are divided into types depending on the intended manner of use and further sub-divided into classes based upon the predominant abrasive agent present in the product.

ANSI/ADA Standard No. 38-2000 (R2015), Metal-Ceramic Dental Restorative Systems
This regional/national standard specifies requirements and test methods for metallic dental materials processed by casting or machining, and for ceramics suitable for use in the fabrication of metal-ceramic dental restorations, together with requirements and test methods for the composite structure. The requirements of this regional/national standard apply to the metallic materials and ceramics when used in combination, and compliance may not be claimed for either metallic materials or for ceramics alone.

ANSI/ADA Standard No. 3950-2015, Designation System for Teeth and Areas of the Oral Cavity
This standard provides a system for designating teeth or areas of the oral cavity.
ANSI/ADA Standard No. 41-2015, Evaluation of Biocompatibility of Medical Devices Used in Dentistry
This standard covers standard practices for the biological evaluation of the safety of medical devices used in dentistry. In addition, this document covers biological evaluation of the device component of combination products, including those with a pharmacological or biologic component as an integral part of the device. This standard does not cover testing of materials and devices that do not come into direct or indirect contact with the patient's body.

ANSI/ADA Standard No. 43-1986 (R2015), Electrically Powered Dental Amalgamators
This standard is for mechanical dental amalgamators used for the mixing of alloy and mercury to make dental amalgam. It includes multipurpose devices but is restricted to their function of triturating alloy and mercury to produce dental amalgam.

ANSI/ADA Standard No. 46-2016, Dental Patient Chair
This standard is applicable to all patient chairs, regardless of their construction, and regardless of whether they are operated manually, electrically or by other means, or as a combination of these. This standard specifies requirements, test methods, manufacturer's information, marking and packaging.

ANSI/ADA Standard No. 47-2006 (R2017), Dental Units
This standard specifies requirements and test methods for dental units, regardless of whether or not they are electrically powered. Requirements and test methods for the materials, design and construction of the water and air supply within dental units are also included in order to ensure that the pressurized water and air supplied via the dental unit are of appropriate quality. Provisions for the prevention of retraction of oral fluids into the water supply of the dental unit are included as well. This specification does not address prevention of contamination and/or proliferation of hazardous micro-organisms (for example bacteria, viruses) in the dental unit.

ANSI/ADA Standard No. 48-2-2009 (R2015), LED Curing Lights
This specification details requirements and test methods for powered polymerization activators with light-emitting diodes (LED) in the blue wavelength region intended for chair-side use in polymerization of dental polymer-based restorative materials.

ANSI/ADA Standard No. 48-2004 (R2015), Visible Light Curing Units
The standard specifies requirements, recommendations and methods of test for dental operator’s stools as well as requirements for manufacturer’s instructions, marking and packaging. It covers also recommendations to manufacturer’s on the design of tools.

ANSI/ADA Standard No. 53-2008 (R2013), Polymer-Based Crown and Bridge Materials
This standard classifies polymer-based dental crown and bridge materials and specifies their requirements. It also specifies the test methods to be used to determine compliance with these requirements. It is applicable to polymer-based dental crown and bridge materials for laboratory-fabricated permanent facings or anterior crowns that may or may not be attached to a metal substructure. It also applies to polymer-based dental crown and bridge materials for which the manufacturer claims adhesion to the metal substructure without macromechanical retention such as beads or wires.

ANSI/ADA Standard No. 54-1986 (R2014), Double-Pointed, Parenteral, Single Use Needles for Dentistry
This standard covers sterile, single-use, individually-packaged, double-pointed needles with a means of secure attachment to cartridge-type syringes used for dental, regional, anesthetic injections.

ANSI/ADA Standard No. 58-2010 (R2015), Root Canal Files, Type H (Hedstrom)
This standard is for endodontic Hedstrom files for hand use only having a working part taper of 2% (0.02 millimeter per millimeter of length) as used in endodontic preparation or shaping operations.

ANSI/ADA Standard No. 62-2005 (R2015), Dental Abrasive Pastes
This standard is for in-office abrasive pastes used in dentistry for removing stains and other exogenous materials from natural tooth structures and prostheses.

ANSI/ADA Standard No. 63-2013, Root Canal Barbed Broaches and Rasp
This standard specifies requirements and test methods for root canal instruments for hand use utilized in endodontic preparation.

ANSI/ADA Standard No. 69-2010 (R2015), Dental Ceramic
This standard specifies the requirements and the corresponding test methods for dental ceramic materials for fixed alceramic and metal-ceramic restorations and prostheses.

ANSI/ADA Standard No. 73-2008 (R2013), Dental Absorbent Points
This standard specifies requirements and test methods for nonmedicated absorbent points used in endodontic procedures. For the purposes of this document, points refer to dental absorbent points. The requirements apply to points which have been sterilized once in a manner approved by the manufacturer. Points include standard and taper sized points. This standard does not specify requirements or test methods for sterility and/or freedom from biological hazard of points.

ANSI/ADA Standard No. 74-2010 (R2015), Dental Operator's Stool
This specification sets forth requirements, recommendations and test methods for the operator's stool in the dental office as well as requirements for the manufacturer's instructions for use and for marking and packaging. It also covers recommendations to manufacturers on the design of operator's stools.

This part of ANSI/ADA Standard No. 75 specifies requirements for the physical properties, test methods, packaging, marking and manufacturer’s instructions for denture lining materials suitable for short-term use.

ANSI/ADA Standard No. 76-2005 (R2015), Non-Sterile Natural Rubber Latex Gloves for Dentistry
This specification covers non-sterile natural rubber latex gloves suitable for dentistry.

ANSI/ADA Standard No. 78-2013, Dental Obturating Cones
This standard specifies the dimensions and requirements for prefabricated metallic or polymeric-based cones suitable for use in the obturation of a root canal system restoration. It also specifies numerical systems and color-coding system for designating sizes.

This standard specifies a procedure for determining the color stability of dental materials after exposure to light or water.

ANSI/ADA Standard No. 87-1995 (R2014), Dental Impression Trays
This standard applies to reusable and disposable impression trays used in dentistry for delivering impression materials into the oral cavity for the purpose of making impressions (negative copies) of teeth and oral tissues. It applies to trays made of plastic, aluminum, stainless steel and nickel or chrome plated brass for the purposes of full arch dentulous or edentulous, partially edentulous, partial arch and water cooled impressions.

ANSI/ADA Standard No. 89-2008 (R2013), Dental Operating Lights
This standard specifies requirements and test methods for operating lights used in the dental office and intended for illuminating the oral cavity of patients. It also contains specifications on manufacturers’ instructions, marking and packaging. This standard applies to operating lights that are intended to be permanently fixed to the ceiling, or to the wall or to the floor. Excluded are auxiliary light sources, e.g., from dental handpieces and dental headlamps. Also excluded are dental luminaires, which are specifically designed for use in a dental surgery.
ANSI/ADA Standard No. 94-1996 (R2014),
Dental Compressed Air Quality
This standard applies to all compressed air used in the
dental office to power dental equipment and laboratory
equipment and to dry oral structures. It
does not apply to compressed air used to supply
breathable air and should never be used to support
life (e.g., Medical Compressed Air). This standard only
addresses the quality of compressed air and is not
intended to limit the mechanisms utilized. Air flow
and pressures are determined by equipment in use,
length of air lines, diameter of air lines, number of
bends in the air lines, etc., all of which are unique for
each dental facility. Therefore, air flow and pressure
are not addressed in this standard.

ANSI/ADA Standard No. 95-2013, Root Canal
Enlargers
This standard is for root canal instruments used
mechanically to access and enlarge canals. This
document specifies requirements for size, product
designation, safety considerations, marking, and their
labeling and packaging.

ANSI/ADA Standard No. 97-2002 (R2013),
Corrosion Test Methods
This standard provides test methods and protocols to
determine the corrosion behaviour of all metallic
materials used in restorative, prosthetic and
orthodontic dentistry in the oral cavity, including
cast, machined and prefabricated devices. This
standard is not applicable to instruments and
appliances.

ANSI/ADA Standard No. 99-2001 (R2013),
Athletic Mouth Protectors and Materials
This standard is for thermoplastic or thermosetting
polymeric materials, with or without a polymeric shell,
that are capable of being formed into an
athletic mouth protector, either on a model of the
teeth or in the mouth directly on the teeth. It lists the
types and classes of mouth protectors and lists
requirements for physical properties along with tests
specified for determining compliance with those
requirements. It also specifies requirements for
manufacturer's instructions and for packaging,
labeling, and marking.

ANSI/ADA Standard No.19-2004 (R2014),
Dental Elastomeric Impression Materials
This standard specifies requirements and tests for
evaluating elastomeric dental impression materials.

AGA (ASC Z223) (American Gas
Association)
AGA Z223.1/NFPA 54-2014, National Fuel Gas
Code
The National Fuel Gas Code provides installation
requirements for gas piping, appliances, equipment
and venting systems, downstream from the gas
utility's gas meter or LP second stage regulator.

AGA (ASC Z380) (American Gas
Association)
and Gathering Piping Systems
Consolidation of BSR GPTC Z380.1-2015 TR08-30
-20x BSR GPTC Z380.1-2015 TR08-31-200x BSR GPTC
TR12-45-200x BSR GPTC Z380.1-2015 TR12-47-200x
BSR GPTC Z380.1-2015 TR13-31-200x BSR GPTC
TR14-22-200x BSR GPTC Z380.1-2015 TR14-33-200x

and Gathering Piping Systems
Consolidation of BSR GPTC Z380.1-2015 TR08-30
-20x BSR GPTC Z380.1-2015 TR08-31-200x BSR GPTC
TR12-45-200x BSR GPTC Z380.1-2015 TR12-47-200x
BSR GPTC Z380.1-2015 TR13-31-200x BSR GPTC
TR14-22-200x BSR GPTC Z380.1-2015 TR14-33-200x

and Gathering Piping Systems
Consolidation of BSR GPTC Z380.1-2015 TR12-28
-20x BSR/GPTC Z380.1-2015 TR08-32-200x
BSR/GPTC Z380.1-2015 TR13-01-200x BSR/GPTC
TR14-16-200x BSR/GPTC Z380.1-2015 TR14-32-200x
BSR/GPTC Z380.1-2015 TR15-06-200x BSR/GPTC
Z380.1-2015 TR15-18-200x

ANSI/GPTC Z380.1-2015, Addendum No. 4, Guide for Gas Transmission, Distribution,
and Gathering Piping Systems
Consolidation of BSR GPTC Z380.1-2015 TR12-18
-200x BSR GPTC Z380.1-2015 TR13-19-200x BSR GPTC
TR14-04-200x BSR GPTC Z380.1-2015 TR14-07-200x
BSR GPTC Z380.1-2015 TR15-21-200x BSR GPTC
Z380.1-2015 TR15-25-200x

Consolidation of BSR GPTC Z380.1-2015 TR15-04
-201x BSR GPTC Z380.1-2015 TR15-07-201x BSR GPTC
TR15-28-201x

and Gathering Piping Systems
Consolidation of BSR GPTC Z380.1-2015 TR 2008-28
-201x BSR GPTC Z380.1-2015 TR 2010-28-201x BSR
GPTC Z380.1-2015 TR 2012-30-201x BSR GPTC Z380.1
2014-20-201x BSR GPTC Z380.1-2015 TR 2015-05
-201x BSR GPTC Z380.1-2015 TR 2016-01-201x BSR
GPTC Z380.1-2015 TR 2016-07-201x

and Gathering Piping Systems
Consolidation of BSR GPTC Z380.1-2015 TR 14-21
-201x BSR GPTC Z380.1-2015 TR 2009-21-201x BSR
GPTC Z380.1-2015 TR 2014-26-201x BSR GPTC Z380.1
2016-13-201x

Transmission, Distribution, and Gathering
Piping Systems
Consolidation of BSR GPTC Z380.1-2012 TR10-09
-200x BSR GPTC Z380.1-2012 TR10-25-200x BSR GPTC

ANSI/GPTC Z380.1-2015, Addendum No. 1, Guide for Gas Transmission, Distribution,
and Gathering Piping Systems
Consolidation of BSR GPTC Z380.1-2015 TR13-20
-200x BSR GPTC Z380.1-2015 TR13-24-200x BSR GPTC
TR14-12-200x

AGMA (American Gear Manufacturers
Association)
ANSI/AGMA 1003-2007 (R2014), Tooth
Proportions for Fine-Pitch Spur and Helical
Gearing
This standard is applicable to external spur and
helical gears with diametral pitch of 20 through 120
and a profile angle of 20 degrees. It only applies to
standard gears with 24 teeth or more; enlarged
pinions with 9 through 23 teeth; and reduced gears
for meshing with enlarged pinions at standard center
distances.
ANSI/AGMA 1006-A97 (R2016), Tooth Proportions for Plastic Gears
This standard presents a new basic rack, AGMA PT, which, with its full round fillet, may be preferred in many applications of gears made from plastic materials. It also explains and illustrates the general concept of the basic rack. It contains a description, with equations and sample calculations, of how the proportions of a spur or helical gear may be derived from the design tooth thickness and the basic rack data.

ANSI/AGMA 1010-2014, Appearance of Gear Teeth - Terminology of Wear and Failure
This standard provides nomenclature for general modes of gear tooth wear and failure. It classifies, identifies, and describes the most common types of failure and provides information that will, in many cases, enable the user to identify failure modes and evaluate the degree or progression of wear.

ANSI/AGMA 1012-2005 (R2011), Gear Nomenclature, Definitions of Terms with Symbols
This standard establishes the definitions of terms, symbols and abbreviations which may be used to communicate the technology and specifications of external and internal gear teeth. It provides definitive meanings by the use of words and illustrations, for commonly used gearing terms.

ANSI/AGMA 1102-2013, Tolerance Specification for Gear Hobs
This standard provides specifications for nomenclature, dimensions, tolerances, and inspection for gear hobs for modules 0.63 to 40 mm. It establishes a basis for understanding the use and manufacture of these tools.

This standard is applicable to external spur and helical gears with 1.25 through 0.2 module and a profile angle of 20 degrees. It only applies to standard gears with 24 teeth or more; enlarged pinions with 9 through 23 teeth; and reduced gears for meshing with enlarged pinions at standard center distances.

ANSI/AGMA 1104-2009 (R2015), Tolerance Specification for Shaper Cutters
This standard covers types, sizes, tolerances, marking and nomenclature for finishing and pre-finish type shaper cutters for generating involute spur and helical gears, splines and serrations. Also provided are informational annexes containing reference tolerance tables, shaper cutter tool tolerance tables, suggested rack shaper cutter specifications, and gear shaping manufacturing terminology.

This standard presents a new basic rack, AGMA PT, which, with its full round fillet, may be preferred in many applications of gears made from plastic materials. It also explains and illustrates the general concept of the basic rack. It contains a description, with equations and sample calculations, of how the proportions of a spur or helical gear may be derived from the design tooth thickness and the basic rack data.

ANSI/AGMA 2001-D04-2010 (R2016), Fundamental Rating Factors and Calculation Methods for Involute Spur and Helical Gear Teeth
This standard specifies a method for rating the pitting resistance and bending strength of spur and helical involute gear pairs. A detailed discussion of factors influencing gear survival and calculation methods are provided.

ANSI/AGMA 2002-C-2016, Tooth Thickness and Backlash Measurement of Cylindrical Involute Gearing
This standard establishes the calculation procedures for determining specification limits for external and internal cylindrical involute gearing when the desired tooth thickness is known. This standard also shows the relationships between backlash and the tooth thickness, center distance, and tooth deviations in a pinion and gear mesh.

ANSI/AGMA 2003-2010 (R2015), Rating the Pitting Resistance and Bending Strength of Generated Straight Bevel, Zerol Bevel and Spiral Bevel Gear Teeth
Presents a method for rating the pitting resistance and bending strength of bevel gear elements. Includes a detailed discussion of factors influencing gear survival, and calculation methods.

This manual was developed to provide basic information and recommend sources of additional information pertaining to metallic gear materials, their treatments, and other considerations related to the manufacture and use of gearing.

This standard explains the materials and procedures necessary to determine, evaluate, and describe localized overheating on ground surfaces. A system to describe and classify the indications produced during this inspection is included. This standard applies to steel parts, such as gears, shafts, splines and bearings, but is not applicable to nitrided parts and stainless steels.

ANSI/AGMA 2008-D11 (R2016), Assembling Bevel Gears
This Standard was prepared for the assembly in the factory and the field. Each definition, explanation, and instruction is directed toward the physical appearance of the gears as they are inspected and assembled. An Annex provides detailed instructions on performing contact pattern checks.

ANSI/AGMA 2011-BXX-2014, Cylindrical Wormgearing Tolerance and Inspection Methods
This standard establishes a classification system which may be used to communicate geometrical accuracy specifications of unassembled cylindrical wormgearing with axes at right angles. It also provides information on measuring methods and practices.

ANSI/AGMA 2015-2-B2015, Accuracy Classification System - Radial Measurements for Cylindrical Gears
This standard establishes a classification system relevant to radial (double flank) composite deviations of individual cylindrical involute gears. It serves as a concise means of specifying gear accuracy without the immediate need of supplying individual tolerances. It simplifies discussions of gear accuracy between gear manufacturer and purchaser. It specifies the appropriate definitions of gear tooth accuracy terms, the structure of the gear accuracy system and the tolerances (allowable values of the deviations).

ANSI/AGMA 2101-D04-2010 (R2016), Fundamental Rating Factors and Calculation Methods for Involute Spur and Helical Gear Teeth
This standard specifies a method for rating the pitting resistance and bending strength of spur and helical involute gear pairs. A detailed discussion of factors influencing gear survival and calculation methods are provided.

ANSI/AGMA 2111-A98 (R2015), Cylindrical Wormgearing Tolerance and Inspection Methods (Metric)
This standard describes and defines variations that may occur in unassembled wormgearing. It displays measuring methods and practices, giving suitable warnings if a preferred probe cannot be used. The applicability of single or double flank composite testing is discussed, using a reference gear.

ANSI/AGMA 2116-A05 (R2017), Evaluation of Double Flank Testers for Radial Composite Measurement of Gears
This standard provides evaluation methods for double flank testers used for radial composite measurement of gears.

ANSI/AGMA 6000-B96 (R2016), Specification for Measurement of Linear Vibration on Gear Units
This standard presents a method for the measurement of linear vibrations on a gear unit. Instrumentation, measuring methods, test procedures and discrete frequency vibration limits are recommended for acceptance testing.
ANSI/AGMA 6001-E-2008 (R2014), Design and Selection of Components for Enclosed Gear Drives
This standard provides an acceptable practice for the design and selection of components for enclosed gear drives. Fundamental equations provide for the proper sizing of shafts, keys, and fasteners based on stated allowable stresses.

ANSI/AGMA 6002-C2015, Design Guide for Vehicle Spur and Helical Gears
This standard provides information on the design of spur and helical vehicle power transmission gears. Included are considerations for design, material and heat treatment, determination of load capacity, mounting features, and typical design problems.

ANSI/AGMA 6008-A98 (R2012), Specifications for Powder Metallurgy Gears
This standard defines the minimum detailed information to be included in the powder metallurgy gear specifications submitted by the gear purchaser to the gear producer. This information covers gear tooth geometry data, gear drawing specifications and gear material specifications.

ANSI/AGMA 6011-2014, Specification for High Speed Helical Gear Units
This high speed helical gear units standard is provided as a basis for improved communication regarding establishment of uniform criteria for rating; guidance for design considerations, and, identification of the unique features of high speed gear units.

ANSI/AGMA 6013-B-2016, Standard for Industrial Enclosed Gear Drives
This standard includes design, rating, lubrication, testing and selection information for enclosed gear drives, including foot mounted, shaft mounted, screw conveyor drives and gearmotors. These drives may include spur, helical, herringbone, double helical, or bevel gearing in single or multistage arrangements, and worm gearing in multistage drives, as either parallel, concentric or right angle configurations.

ANSI/AGMA 6014-B-2015, Gear Power Rating for Cylindrical Shell and Trunnion Supported Equipment
This standard specifies a method for rating the pitting resistance and bending strength of open or semi-enclosed gearing for use on cylindrical shell and trunnion supported equipment such as grinding mills, kilns, coolers, and dryers.

ANSI/AGMA 6015-2013, Power Rating of Single and Double Helical Gearing for Rolling Mill Service
This Standard provides a method to determine the power rating of gear sets used in main mill drives, pinion stands, and combination units used for the reduction of material size in metal rolling mills.

ANSI/AGMA 6022-C93 (R2008), Design Manual for Cylindrical Wormgearing
This Design Manual provides information pertaining to selection of geometric parameters which will constitute good design of fine and coarse pitch cylindrical wormgearing. It discusses such topics as tooth proportions, contact patterns, run-in procedures, efficiency, manufacturing practices, materials and lubrication.

ANSI/AGMA 6025-D98 (R2016), Sound for Enclosed Helical, Herringbone and Spiral Bevel Gear Drives
This standard describes the instrumentation, measuring methods and test procedures necessary for the determination of a gear unit’s sound pressure levels for acceptance testing. Sound power measurement methods are provided in annexes A, B and C for use when required by specific contract provisions between the manufacturer and purchaser.

ANSI/AGMA 6032-B-2013, Standard for Marine Gear Units: Rating and Application for Spur and Helical Gear Teeth
This document considers rating practices for marine main propulsion, power take-off and auxiliary propulsion service.

ANSI/AGMA 6033-2008 (R2014), Materials for Marine Propulsion Gearing
This document identifies commonly used alloy steels, heat treatments and inspection requirements for through hardened, case hardened and surface hardened gearing for main propulsion marine service over 1500 hp. Forged and hot rolled alloy steel bar stock are specified to two metallurgical quality grades (1 and 2) according to cleanliness and test requirements. Cast steel gearing is specified to a single metallurgical quality level. Mechanical, metallurgical and nondestructive test requirements are provided for various heat treat processes and metallurgical quality grades of gearing.

ANSI/AGMA 6034-892-2010 (R2016), Practice for Enclosed Cylindrical Wormgear Speed Reducers and Gearmotors
This standard gives a method for rating and design of specific enclosed cylindrical wormgear reducers and gearmotors at speeds not greater than 3600 rpm or mesh sliding velocities not more than 6000 ft/min (30 m/s). It contains power, torque and efficiency equations with guidance on component design, thermal capacity, service factor selection, lubrication, and self-locking features of wormgears. Annexes are supplied on service factors and user recommendations.

ANSI/AGMA 6035-2002 (R2013), Design, Rating and Application of Industrial Globoidal Wormgearing
This standard provides guidelines for the design, rating and application of globoidal wormgearing mounted with axes at a 90 degree angle. Specific definitions for globoidal wormgearing terms are presented, along with formulas for determining the geometric sizes of the major features for the worm and gear.

This standard provides an acceptable practice for the design and selection of components for enclosed gear drives. Fundamental equations provide for the proper sizing of shafts, keys, and fasteners based on stated allowable stresses.

This standard provides information on the design of spur and helical vehicle power transmission gears. Included are considerations for design, material and heat treatment, determination of load capacity, mounting features, and typical design problems.

This standard includes design, rating, lubrication, testing and selection information for enclosed gear drives, including foot mounted, shaft mounted, screw conveyor drives and gearmotors. These drives may include spur, helical, herringbone, double helical, or bevel gearing in single or multistage arrangements as either parallel, concentric or right angle configurations.

This standard specifies a method for rating the pitting resistance and bending strength of open or semi-enclosed gearing for use on cylindrical shell and trunnion supported equipment such as grinding mills, kilns, coolers, and dryers.

This Standard provides a method to determine the power rating of gear sets used in main mill drives, pinion stands, and combination units used for the reduction of material size in metal rolling mills.

ANSI/AGMA 6123-C2016, Design Manual for Enclosed Epicyclic Gear Drive
This standard is applicable to enclosed epicyclic speed reducers and increasers which use spur and helical gears. It applies to non-aircraft, industrial, vehicular, or machine tool gear units with carrier speeds less than 1800 rpm and pinion absolute speed less than 4500 rpm.

This document considers rating practices for marine main propulsion, power take-off and auxiliary propulsion service.
This document identifies commonly used alloy steels, heat treatments and inspection requirements for through hardened, case hardened and surface hardened gearing for main propulsion marine service over 1500 hp. Forged and hot rolled alloy steel bar stock are specified to two metallurgical quality grades (1 and 2) according to cleanliness and test requirements. Cast steel gearing is specified to a single metallurgical quality level. Mechanical, metallurgical and nondestructive test requirements are provided for various heat treat processes and metallurgical quality grades of gearing.

This standard provides guidelines for the design, rating and application of globoidal wormgearing mounted with axes at a 90 degree angle. Specific definitions for globoidal wormgearing terms are presented, along with formulas for determining the geometric sizes of the major features for the worm and gear.

ANSI/AGMA 9000-D11-2011 (R2016), Flexible Couplings - Potential Unbalance Classification
This standard defines classes of flexible coupling potential unbalance, one of which the user must select in order to meet the needs of their system. The standard defines types of unbalance, provides a method of selecting balance class, identifies contributors to potential unbalance, and provides a method of determining potential coupling unbalance.

ANSI/AGMA 9001-B97 (R2014), Flexible Couplings - Lubrication
This standard provides information on lubrication of gear couplings, chain couplings and metallic grid couplings. Types of lubricants and lubrication methods and practices are included.

ANSI/AGMA 9002-C2014, Bores and Keyways for Flexible Couplings (Inch Series)
This standard presents inch dimensions, tolerances, and sizes for straight bores, tapered bores, single keys and keyways for unmounted industrial flexible couplings. The keys are square or rectangular. This specification includes index tolerances for multiple keyways.

ANSI/AGMA 9003-B-2008 (R2014), Flexible Couplings - Keyless Fits
This standard presents information on design, dimensions, tolerances, inspection, mounting, removal, and equipment that is in common use with keyless tapered and keyless straight (cylindrical) bore hubs for flexible couplings.

ANSI/AGMA 9004-B-2008 (R2014), Flexible Couplings - Mass Elastic Properties and Other Characteristics
This standard provides information and calculation methods related to mass elastic properties of flexible couplings. Properties discussed are coupling weight, polar weight moment of inertia (WR2), center of gravity, axial stiffness, axial natural frequency, lateral stiffness, lateral natural frequency and torsional stiffness. Calculation examples are provided in informative annexes.

ANSI/AGMA 9005-F-2016, Industrial Gear Lubrication
This standard provides the end user, original equipment builder, gear manufacturer, and lubricant supplier with guidelines for minimum performance characteristics for lubricants suitable for use in general power transmission applications. This standard applies to both open and enclosed metallic gearing that has been designed and rated in accordance with applicable AGMA standards.

ANSI/AGMA 9006-A-2016, Flexible Couplings - Basis for Rating
This standard presents criteria and guidelines for the establishment of the basis for ratings of standard flexible couplings. Due to the diversity of coupling types, details of design such as formulas and analysis used to derive the stresses, etc. are often considered proprietary and are not considered in this standard. This standard is of importance to coupling manufacturers, users and equipment designers for the proper selection, comparison and application of flexible couplings.

ANSI/AGMA 9008-B99 (R2012), Flexible Couplings - Gear Type - Flange Dimensions (Inch Series)
This standard defines the North American industry classification system, and allowable values. This standard provides the end user, original equipment builder, gear manufacturer, and lubricant supplier with guidelines for minimum performance characteristics for lubricants suitable for use in general power transmission applications. This standard applies to both open and enclosed metallic gearing that has been designed and rated in accordance with applicable AGMA standards.

ANSI/AGMA 9009-D02 (R2014), Flexible Couplings - Nomenclature for Flexible Couplings
This standard provides nomenclature common to flexible couplings and their application as used in mechanical power transmission drives.

This standard presents information on design, dimensions, tolerances, inspection, mounting, removal, and equipment that is in common use with keyless tapered and keyless straight (cylindrical) bore hubs for flexible couplings.

This standard provides calculation methods related to mass elastic properties of flexible couplings. Properties discussed include coupling mass, polar mass moment of inertia, center of gravity, axial stiffness, axial natural frequency, lateral stiffness, lateral natural frequency, and torsional stiffness. Calculation examples are provided in informative annexes.

This metric standard defines classes of flexible coupling potential unbalance, one of which the user must select in order to meet the needs of their system. The standard defines types of unbalance, provides a method of selecting balance class, identifies contributors to potential unbalance, and provides a method of determining potential coupling unbalance.

ANSI/AGMA 9112-B-2015, Bores and Keyways for Flexible Couplings (Metric Series)
This standard presents metric dimensions, tolerances, sizes and fits for straight bores, tapered bores, keys and keyways for unmounted industrial flexible couplings. This specification includes index tolerances for multiple keyways.

ANSI/AGMA ISO 1328-1-2014, Cylindrical gears - ISO system of flank tolerance classification - Part 1: Definitions and allowable values of deviations relevant to flanks of gear teeth
This standard establishes a tolerance classification system relevant to manufacturing and conformity assessment of tooth flanks of individual cylindrical involute gears. It specifies definitions for gear flank tolerance terms, the structure of the flank tolerance class system, and allowable values. This standard provides the gear manufacturer and the buyer with a mutually advantageous reference for uniform tolerances. Eleven flank tolerance classes are defined, numbered 1 to 11, in order of increasing tolerance.

This International Standard establishes a classification system that can be used to communicate geometrical accuracy specifications of unassembled bevel gears, hypoid gears and gear pairs. It defines gear tooth accuracy terms, specifies the structure of the gear accuracy grade system, and provides allowable values.

ANSI/AGMA ISO 18653-2006, Gears - Evaluation of Instruments for the Measurement of Individual Gears
This standard describes methods for the determination of instrument suitability for use in making gear measurements of involute, helix, pitch and runout. Includes instruments that measure runout directly, or compute it from index measurements. Of necessity, it contains the estimation of measurement uncertainty with the use of calibrated gear artifacts.
ANSI/AGMA ISO 23509-A-2008, Bevel and Hypoid Gear Geometry
This standard integrates straight bevel gears and the three major design generation methods for spiral bevel gears into one complete set of geometry formulas. The formulas of the three methods are developed for the general case of hypoid gears and calculate the specific case of spiral bevel gears by entering zero for the hypoid offset. The geometries correspond such that each gear set consists of a generated or non-generated wheel without offset and a pinion which is generated and provided with the total hypoid offset.

ANSI/AGMA ISO 6336-6-A-2008 (R2014), Calculation of Load Capacity of Spur and Helical Gears - Part 6: Calculation of Service Life Under Variable Load
This standard specifies the information and standardized conditions necessary for the calculation of the service life (as safety factors for a required life) of gears subject to variable loading. While the method is presented in the context of ISO 6336 and calculation of the load capacity of spur and helical gears, it is equally applicable to other types of gear stress.

ANSI/AGMA/AWEA 6006-A03-2004 (R2016), Standard for Design and Specifications of Gearboxes for Wind Turbines
This standard applies to gearboxes for wind turbines with power capacities ranging from 40kW to 2MW. It applies to all parallel axis, one stage epicyclic, and combined one stage epicyclic and parallel shaft enclosed gearboxes. The provisions made in this standard are based on field experience with wind turbines having the above power capacities and configurations.

AGSC -AGRSS (Auto Glass Safety Council)
ANSI AGRSS 003-2015, Automotive Glass Replacement Safety Standard
Revises and updates auto glass replacement safety standard.

AHAM (Association of Home Appliance Manufacturers)
ANSI/AHAM AC-1-2015, Method for Measuring Performance of Portable Household Electric Room Air Cleaners
This standard method measures the relative reduction by the air cleaner of particulate matter suspended in the air in a specified test chamber. It also prescribes a method for measuring the operating power and standby power of the air cleaner.

ANSI/AHAM AC-2-2006 (R2008), Method for Sound Testing of Portable Household Electric Room Air Cleaners
This standard establishes a method to determine the sound rating of portable household electric room air cleaners. The sound rating is comprised of a set of sound levels that include: (1) Overall A-weighted sound power level (Lwa) and (2) Loudness level in SONES. Established in the standard are definitions, tests, calculations, ratings, and minimum data requirements for published ratings and conformance conditions.

ANSI/AHAM CHA-1-2003 (R2007), Connected Home Appliances - Object Modeling
The purpose of this standard is to promote new appliance services and features enabled through networking by describing generic appliance models, objects, and high-level messages. The models define standardized elements of appliances that are accessible and controllable remotely by users, service providers, and other devices, independent of the underlying network. This document assumes that each appliance and device contains a communications interface module linked to a home systems network.

This standard establishes a uniform, repeatable procedure or standard method for measuring specified product characteristics of household electric coffee makers. The standard methods provide a means to compare and evaluate different brands and models of household electric coffee makers regarding characteristics significant to product use. The standard methods (including the recommended levels of performance, where they appear) are not intended to inhibit improvement and innovation in product testing, design or performance.

ANSI/AHAM DH-1-2008, Dehumidifiers
This standard establishes a uniform, repeatable procedure for measuring the capacity and energy input of dehumidifiers under specified test conditions.

ANSI/AHAM DW-1-2010, HOUSEHOLD ELECTRIC DISHWASHERS
This standard establishes uniform, repeatable procedures or standard methods for measuring specified product characteristics of household electric dishwashers.

ANSI/AHAM ER-1-2007, Household Electric Ranges
This standard establishes a uniform, repeatable procedure or standard method for evaluating the performance of household electric ranges. The standard methods provide a means to compare and evaluate different brands and models of household electric ranges regarding characteristics significant to product use. The standard methods are not intended to inhibit improvement and innovation in product testing, design or performance.

ANSI/AHAM HLD-1-2010, Household Tumble Type Clothes Dryers
The purpose of this standard is to establish a uniform, repeatable procedure for evaluating the performance of household dryers. This standard provides technical means to compare and evaluate the performance of different brands and models of household dryers. This standard is not intended to inhibit improvement and innovation in product testing, design or performance.

ANSI/AHAM HLW-1-2007, Performance Evaluation Procedure for Household Washers
The purpose of this standard is to establish a uniform, repeatable procedure for evaluating the performance of household clothes washers. This standard provides technical means to compare and evaluate the performance of different brands and models of household clothes washers. This standard applies to automatic household clothes washers and combination washer-dryer equipment. With respect to combination washer-dryer equipment, this standard covers the washing function only. This standard includes definitions and test methods for evaluating the performance of various cycles of household clothes washers.

The purpose of this standard is to establish a uniform and repeatable procedure or standard method for measuring specified product characteristics of household refrigerators, household wine chillers and household freezers. The standard methods and the recommended levels of performance, where they appear, are intended to provide a means by which different brands and models of household refrigerators, household wine chillers and household freezers can be compared and evaluated with respect to characteristics of significance in the design and use of the products.

ANSI/AHAM PAC-1-2015, Portable Air Conditioners
This standard establishes a uniform, repeatable procedure or standard method for measuring specified product characteristics of portable air conditioners. The standard methods and the recommended levels of performance, where they appear, are intended to provide a means to compare and evaluate different brands and models of portable air conditioners regarding characteristics significant to product use.

ANSI/AHAM RAC-1-2015, Room Air Conditioners
This standard establishes standard methods for measuring performance and includes sections on definitions, test conditions, tests for standard measurements, performance tests, and safety which apply to room air conditioners.
This standard establishes a uniform, repeatable procedure and specified test conditions for determining the performance of household trash compactors and certain components used in connection with the compactor. The standard methods provide a means to compare and evaluate different brands and models of household trash compactors regarding characteristics significant to product use.

AHRI (Air-Conditioning, Heating, and Refrigeration Institute)
ANSI/AHRI 310/380-2014, Standard for Packaged Terminal Air-Conditioners and Heat Pumps
This Standard applies to factory-manufactured residential, commercial, and industrial packaged terminal air-conditioners and heat pumps as defined in Section 3.

This standard applies to factory-made Air-to-Air Exchangers for use in Air-to-Air Energy Recovery Ventilation Equipment as defined in Section 3.

This standard applies to factory-made Air-to-Air Heat Exchangers for use in Air-to-Air Energy Recovery Ventilation Equipment.

This standard applies to factory-made Air-to-Air Exchangers for use in Air-to-Air Energy Recovery Ventilation Equipment as defined in Section 3.

This standard applies to 50 Hz and 60 Hz electrical voltage ratings and operating limits as applied to air-conditioning, heating and refrigerating equipment, heat pumps, and electric furnaces as well as components.

ANSI/AHRI Standard 1110 (I-P)-2013, Performance Rating of Commercial Transport Refrigeration Units
This standard applies to encased direct expansion vapor compression type Mechanical Transport Refrigeration Units with the following components: Compressor, Air-cooled condenser, Refrigerant flow control(s), Forced-Circulation Air-Cooler, Base or frame, Prime Mover as described in the unit manufacturer’s literature, Power Train (coupling, power take-off, transmission, V-belt drive, etc.) connecting the unit to the Prime Mover

ANSI/AHRI Standard 1111 (SI)-2013, Performance Rating of Mechanical Transport Refrigeration Units
This standard applies to encased direct expansion vapor compression type Mechanical Transport Refrigeration Units with the following components: Compressor, Air-cooled condenser, Refrigerant flow control(s), Forced-Circulation Air-Cooler, Base or frame, Prime Mover as described in the unit manufacturer’s literature, Power Train (coupling, power take-off, transmission, V-belt drive, etc.) connecting the unit to the Prime Mover

This standard applies to factory-made Transport Refrigeration Equipment.

This standard applies to factory-made, residential and commercial air-conditioning as well as transport refrigeration equipment.

This standard applies to the rating and testing of complete factory-made Heat Pump Pool Heaters as defined in Section 3.

This standard applies to the rating and testing of complete factory-made Heat Pump Pool Heaters as defined in Section 3.

ANSI/AHRI Standard 1200 (I-P)-2013, Performance Rating of Commercial Refrigerated Display Merchandisers and Storage Cabinets
This standard applies to the following manufacturers’ standard catalog Commercial Refrigerated Display Merchandisers and Storage Cabinets, provided that the cases are equipped and designed to work with electrically driven, direct expansion type systems: Self-contained and Remote Commercial Refrigerated Display Merchandisers and Storage Cabinets, Open and Closed Commercial Refrigerated Display Merchandisers

ANSI/AHRI Standard 1210 (I-P)-2011 with Addendum 1, Performance Rating of Variable Frequency Drives
This standard applies, within the heating, ventilating, air-conditioning and refrigeration (HVACR) context, to VFDs used in the control of asynchronous induction motors. The range includes all those found within a building including: low voltage (&#8804; 600 V) and drives that are stand alone, not mechanically integrated into motors.

ANSI/AHRI Standard 1211 (SI)-2011 with Addendum 1, Performance Rating of Variable Frequency Drives
This standard applies, within the heating, ventilating, air-conditioning and refrigeration (HVACR) context, to VFDs used in the control of synchronous induction motors. The range includes all those found within a building including: low voltage (&#8804; 600 V) and drives that are stand alone, not mechanically integrated into motors.

This standard covers matched variable refrigerant flow Multi-Split Air Conditioners and Multi-Split Heat Pumps using distributed refrigerant technology with cooling and heating capacities for outdoor units from 12,000 Btu/h [3508 W] to 200,000 Btu/h [60,000 W] and outdoor units from 5,000 Btu/h [1,000 W] to 60,000 Btu/h [20,000 W]. Each indoor unit is designed to condition a single zone.

ANSI/AHRI Standard 1250 (I-P)-2014, Performance Rating of Walk-In Coolers and Freezers
This standard applies to mechanical refrigeration equipment consisting of an integrated single package refrigeration unit, or separate Unit Cooler and condensing unit sections, where the condensing section can be located either outdoor or indoor. Controls may be integral, or can be provided by a separate party as long as performance is tested and certified with the listed mechanical equipment accordingly.
ANSI/AHRI Standard 1251 (SI)-2014, Performance Rating of Walk-In Coolers and Freezers
This standard applies to mechanical refrigeration equipment consisting of an integrated single package refrigeration unit, or separate Unit Cooler and condensing unit sections, where the condensing section can be located either outdoor or indoor. Controls may be integral, or can be provided by a separate party as long as performance is tested and certified with the listed mechanical equipment accordingly.

ANSI/AHRI Standard 1270 (I-P)-2015, Requirements for Seismic Qualification of HVAC Equipment
This standard applies to the following Equipment: Fan Coil Units, Unit Ventilators, Air Handling Units, Coils, Air-to-Air Heat Exchangers, Vertical Packaged Air Conditioners and Heat Pumps, Packaged Terminal Equipment, Dehumidifiers, Flow and Contaminant Controls, Furnaces, Humidifiers, Liquid Chillers, Thermal Storage Equipment, Unitary Air Conditioners and Heat Pumps (including Ductless Equipment), and Water-Source Heat Pumps. This standard does not apply to any other products. This standard describes the methods for equipment qualification and the process to determine equipment Seismic Capacity.

ANSI/AHRI Standard 1271 (SI)-2015, Requirements for Seismic Qualification of HVAC Equipment
This standard applies to the following Equipment: Fan Coil Units, Unit Ventilators, Air Handling Units, Coils, Air-to-Air Heat Exchangers, Vertical Packaged Air Conditioners and Heat Pumps, Packaged Terminal Equipment, Dehumidifiers, Flow and Contaminant Controls, Furnaces, Humidifiers, Liquid Chillers, Thermal Storage Equipment, Unitary Air Conditioners and Heat Pumps (including Ductless Equipment), and Water-Source Heat Pumps. This standard does not apply to any other products. This standard describes the methods for equipment qualification and the process to determine equipment Seismic Capacity.

ANSI/AHRI Standard 1280-2015, Sound Power Rating of Water-cooled Chillers
This standard applies to commercial and industrial Water-cooled Chillers used for refrigerating or air-conditioning of spaces, as defined in Section 3 of this standard and covered by ANSI/AHRI Standards S50/S90 (I-P) and S51/S91 (SI), Performance Rating of Water Chilling Packages Using the Vapor Compression Cycle.

This standard applies to factory assembled Commercial Heat Pump Water Heaters (CHPWH) defined as equipment to provide potable or service hot water using alternate sources of energy as air, water and ground (geothermal) by means of electrically driven, mechanical vapor compression refrigerant systems. Different type of CHPWH are defined in Section 3.

This standard applies to factory assembled Commercial Heat Pump Water Heaters (CHPWH) defined as equipment to provide potable or service hot water using alternate sources of energy as air, water and ground (geothermal) by means of electrically driven, mechanical vapor compression refrigerant systems. Different type of CHPWH are defined in Section 3.

This standard applies to the following Commercial Refrigerated Display Merchandisers and Storage Cabinets, provided that the cases are equipped and designed to work with electrically driven, medium-temperature, single-phase secondary coolant systems: -Remote Commercial Refrigerated Display Merchandisers and Storage Cabinets. -Open and Closed Commercial Refrigerated Display Merchandisers.

This standard applies to the following Commercial Refrigerated Display Merchandisers and Storage Cabinets, provided that the cases are equipped and designed to work with electrically driven, medium-temperature, single-phase secondary coolant systems: -Remote Commercial Refrigerated Display Merchandisers and Storage Cabinets. -Open and Closed Commercial Refrigerated Display Merchandisers.

This standard applies to Infrared Heaters that are Gas fired High-intensity Infrared Heaters and Gas fired Low-intensity Infrared Heaters with inputs up to and including 117.5 kW per burner intended for installation in and heating of outdoor or indoor spaces.

ANSI/AHRI Standard 1350 (I-P)-2014, Mechanical Performance Rating of Central Station Air-handling Unit Casings
This standard applies to Central Station Air-handling Units (CSAHU) as defined in Section 3.5.

ANSI/AHRI Standard 1351 (SI)-2015, Mechanical Performance Rating of Central Station Air-handling Unit Casings
This standard applies to Central Station Air-handling Units (CSAHU) as defined in Section 3.5.

ANSI/AHRI Standard 1360 (I-P)-2016, Performance Rating of Computer and Data Processing Room Air Conditioners
This standard applies to floor mounted Computer and Data Processing Room Air Conditioners as defined in Section 3.

This standard applies to Ducted Equipment and specifies the methods for the determination of the sound power rating of the indoor sections of factory-made residential, commercial and industrial air-conditioning and heat pump equipment, which are electrically driven, with mechanical compression and containing fans, using mapped sound data for rating the various product Sound Components.

ANSI/AHRI Standard 261 (Si)-2010, Sound Rating of Ducted Air Moving and Conditioning Equipment

This standard applies to Ducted Equipment and specifies the methods for the determination of the sound power rating of the indoor sections of factory-made residential, commercial and industrial air-conditioning and heat pump equipment, which are electrically driven, with mechanical compression and containing fans, using mapped sound data for rating the various product Sound Components.


This standard applies to the outdoor sections of factory-made air-conditioning and heat pump equipment as defined in AHRI Standard 210/240 or AHRI Standard 340/360 (cooling capacity ratings of equal to or less than 135,000 Btu/h (40.0 kW)).


This standard applies to the outdoor sections of factory made air-conditioning and heat pump equipment with cooling capacities up to 40KW, in the scope of AHRI Standards 210/240 and 340/360 when rated in accordance with AHRI Standard 270.

ANSI/AHRI Standard 280-2012, Requirements for the Qualification of Reverberation Rooms in the 63 Hz Octave Band

This standard applies to products rated in the 63 Hz Octave Band (50, 63 and 80 Hz One-Third Octave Bands) where the sound power is determined from measurements made in a reverberation room by using the comparison method as specified per ANSI/ASA Standard S12.51/ISO: 3741.

ANSI/AHRI Standard 300-2015, Sound Rating and Sound Transmission Loss of Packaged Terminal Equipment

This standard applies to the indoor and outdoor sections of factory-made Packaged Terminal Equipment as defined in AHRI Standard 310/380 (CSA-C74).


This standard applies to factory-made Commercial and Industrial Unitary Air-Conditioning and Heat Pump Equipment as defined in Section 3.


This standard applies to the indoor portions of factory-made Non-ducted Air-conditioning and Heat Pump Equipment as defined in ANSI/AHRI Standards 210/240, 340/360, 310/380, 440 and 1230. Products covered include but are not limited to: fan coils, air-source unitary heat pumps and as unitary air-conditioners, water-source heat pumps, packaged terminal equipment, and variable refrigerant flow (VRF) systems.

ANSI/AHRI Standard 365-2010, Performance Rating of Commercial and Industrial Unitary Air-Conditioning Condensing Units

This standard applies to factory-made Commercial and Industrial Unitary Air-Conditioning Condensing Units greater than or equal to 135,000 Btu/h as defined in Section 3.

ANSI/AHRI Standard 366-2010, Performance Rating of Commercial and Industrial Unitary Air-Conditioning Condensing Units

This standard applies to factory-made Commercial and Industrial Unitary Air-Conditioning Condensing Units greater than or equal to 135,000 Btu/h as defined in Section 3.


This standard applies to the air-cooled outdoor portions of factory-made commercial and industrial Large Air-cooled Outdoor Refrigerating and Air-conditioning Equipment greater than 40KW cooling capacity.

ANSI/AHRI Standard 400 (I-P)-2015, Performance Rating of Liquid to Liquid Heat Exchangers

This standard applies to Liquid to Liquid Heat Exchangers as defined in Section 3, which includes the following types of heat exchangers: Plate heat exchangers; Shell-and-tube heat exchangers; Shell-and-coil heat exchangers; and Shell-and-U-Tube heat exchangers.


 Applies to Liquid-to-Liquid Heat Exchangers as defined in Section 3, which includes the following types of heat exchangers: (a) Plate heat exchangers; (b) Shell-and-tube heat exchangers, shell-and-U-tube heat exchangers, and shell-and-coil heat exchangers; and (c) Counter-flow shell-and-tube heat exchangers.

ANSI/AHRI Standard 401 (SI)-2015, Performance Rating of Liquid to Liquid Heat Exchangers

This standard applies to Liquid to Liquid Heat Exchangers as defined in Section 3, which includes the following types of heat exchangers: Plate heat exchangers; Shell-and-tube heat exchangers; Shell-and-coil heat exchangers; and Shell-and-U-Tube heat exchangers.


This standard applies to factory-made, Forced-Circulation, Free-Delivery Unit Coolers, as defined in Section 3, operating with a Volatile Refrigerant fed by either direct expansion or liquid overfeed at wet and/or dry conditions.

ANSI/AHRI Standard 430-2010, Central Station Air-Handling Units

This standard applies to central station air-handling units.

ANSI/AHRI Standard 440-2009, Performance Rating of Room Fan-Coils

This standard applies to room fan-coils having air delivery capacities of 1,500 cfm or less.


This standard applies to Remote Mechanical-Draft Air-Cooled Refrigerant Condensers.

ANSI/AHRI Standard 470-2006, Performance Rating of Desuperheater/Water Heaters

This standard applies to Desuperheater/Water Heaters supplied as separate components.

ANSI/AHRI Standard 490-2011, Performance Rating of Remote Mechanical-Draft Evaporatively-Cooled Refrigerant Condensers

This standard applies to Evaporative Condensers as defined in Section 3 of this standard and is limited to Halocarbon Refrigerants and ammonia (R-717), for use with or without external air resistance.


This standard applies to Evaporative Condensers as defined in Section 3 of this standard and is limited to Halocarbon Refrigerants and ammonia (R-717), for use with or without external air resistance.

ANSI/AHRI Standard 495-2005, Performance Rating of Refrigerant Liquid Receivers

This standard applies to separately installed Refrigerant Liquid Receivers for field-erected systems only.

ANSI/AHRI Standard 510-2006, Performance Rating of Positive Displacement Ammonia Compressors and Compressor Units

This standard applies to positive Displacement Ammonia Compressors (Ammonia Compressors) and Compressor Units (Ammonia Compressor Units) for use in commercial and industrial refrigeration applications.


This standard applies to electric motor driven, single and variable capacity positive displacement condensing units for air cooled, evaporatively cooled, and water cooled refrigeration applications.
ANSI/AHRI Standard 530-2011, Rating of Sound and Vibration for Refrigerant Compressors
This standard applies to External-drive, Hermetic, and Semi-Hermetic Positive Displacement Refrigerant Compressors. In the case of External-drive Refrigerant Compressors, the driving mechanism shall be excluded from the sound and vibration measurements. However, for Semi-Hermetic Refrigerant Compressors where the driving mechanism is an integral part of the compressor assembly as defined in Section 3, it shall be included in the measurements.

ANSI/AHRI Standard 540 (I-P and SI)-2016, Performance Rating of Positive Displacement Refrigerant Compressors and Compressor Units
This standard applies to positive displacement refrigerant compressors operating in subcritical applications at a fixed displacement. This standard also applies to the presentation of performance data for Compressors for air-cooled, evaporative-cooled or water-cooled air-conditioning, heat pump and refrigeration applications. The manufacturer is solely responsible for the determination of values to be used in published product information. This standard stipulates the minimum amount of information to be provided and suggests a method to be used to verify the accuracy of that information.

This standard applies to electric motor driven, single and variable capacity positive displacement refrigerant compressors and compressor units. This standard also applies to the presentation of performance data for positive displacement refrigerant compressors and compressor units for air-cooled, evaporatively-cooled or water-cooled air-conditioning, heat pump and refrigeration applications.

ANSI/AHRI Standard 550/590 (I-P)-2012 with Addendum 1, Performance Rating of Water-Chilling and Heat Pump Water-Heating Packages Using the Vapor Compression Cycle
This standard applies to factory-made vapor compression refrigeration Water-Chilling and Water-Heating Packages including one or more hermetic or open drive compressors.

This standard applies to factory-made vapor compression refrigeration Water-Chilling and Water-Heating Packages including one or more hermetic or open drive compressors. These Water-Chilling and Water-Heating Packages include: &8226; Water-Cooled, Air-Cooled, or Evaporatively-Cooled Condensers &8226; Water-Cooled heat reclaim condensers &8226; Air-to-water heat pump &8226; Water-to-water heat pumps with a capacity greater or equal to 135,000 Btu/h. Water-to-water heat pumps with a capacity less than 135,000 Btu/h are covered by the latest edition of AHRI Standard 320.

ANSI/AHRI Standard 570 (I-P)-2013, Performance Rating of Remote Mechanical-Draft Evaporatively-Cooled Refrigerant Condensers
This standard applies to electric motor driven, single and variable capacity, single and two stage Positive Displacement Refrigerant Compressors and Compressor Units operating with carbon dioxide in both subcritical and transcritical applications for refrigeration. This standard also applies to the presentation of performance data for Positive Displacement Compressor and Compressor Units operating with carbon dioxide.

ANSI/AHRI Standard 571 (SI)-2013, Performance Rating of Remote Mechanical-Draft Evaporatively-Cooled Refrigerant Condensers
This standard applies to electric motor driven, single and variable capacity, single and two stage Positive Displacement Refrigerant Compressors and Compressor Units operating with carbon dioxide in both subcritical and transcritical applications for refrigeration. This standard also applies to the presentation of performance data for Positive Displacement Compressor and Compressor Units operating with carbon dioxide.

ANSI/AHRI Standard 575-2009, Method of Measuring Sound Within an Equipment Space
This standard applies to water chilling systems, pumps and similar operating machines and parts thereof, which for reasons of size or operating characteristics are more practically evaluated in situ.

ANSI/AHRI Standard 580-2014, Performance Rating of Non-condensable Gas Purge Equipment For Use with Low Pressure Centrifugal Liquid Chillers
This standard applies to Non-condensable Gas Purge Equipment for use with Low Pressure Centrifugal Liquid Chillers as defined in Section 3. This standard defines general equipment requirements, test methods and analysis techniques used to determine the performance rating for Purge Equipment that removes Non-condensable gases from Low Pressure Centrifugal Liquid Chillers. This purge equipment is typically used in conjunction with chillers which operate with at least a portion of the system below atmospheric pressure.

ANSI/AHRI Standard 560-2005, Performance Rating of Commercial and Industrial Humidifiers
This standard applies to factory made Commercial and Industrial Humidifiers.

This standard applies to factory-made Central System Humidifiers, as defined in Section 3.

This standard applies to factory-made Central System Humidifiers, as defined in Section 3.

This standard applies to factory-made Self-contained Humidifiers for Residential Applications, as defined in Section 3.

ANSI/AHRI Standard 562-2004, Performance Rating of Self-Contained Humidifiers for Residential Applications
This standard applies to factory-made Self-contained Humidifiers for Residential Applications (formerly ANSI/ARI 620-2004)
This standard applies to residential self contained humidifiers.

This standard applies to factory-made Self-contained Humidifiers for Residential Applications, as defined in Section 3.

ANSI/AHRI Standard 564-2005, Performance Rating of Commercial and Industrial Humidifiers
This standard applies to factory made Commercial and Industrial Humidifiers.

This standard applies to factory-made Air Filter Equipment and Air Filter Media, as used in such equipment, for removing particulate matter, when used in environmental conditioning of inhabited spaces in residential facilities. The standard evaluates the 'combined' performance of Air Filter Equipment in all aspects: Initial Resistance, Final Resistance, Particle Size Efficiency, and Dust Holding Capacity. This offers both the user and specifier a complete view of the Air Filter Equipment for comparison purposes.
This standard applies to factory-made Air Filter Equipment and Air Filter Media, as used in such equipment, for removing particulate matter, when used in environmental conditioning of inhabited spaces in residential facilities. The standard evaluates the 'combined&8221; performance of Air Filter Equipment in all aspects: Initial Resistance, Final Resistance, Particle Size Efficiency, and Dust Holding Capacity. This offers both the user and specifier a complete view of the Air Filter Equipment for comparison purposes.

ANSI/AHRI Standard 700 with Addenda 1 and 2 -2011, Specification for Fluorocarbon Refrigerants

Specifies acceptable levels of contaminants (purity requirements) for fluorocarbon refrigerants regardless of source and lists acceptable test methods. These refrigerants are: R-11, R-12, R-13, R-22, R-23, R-32, R-113, R-114, R-115, R-12; R-123, R-124, R-125, R-134a, R-141b, R-142b; R-143a; R-152a; R-218; R-227ea; R-236fa; R-245fa; R-1234yf; R-401A; R-401B; R-402A; R-402B; R-403A; R-403B; R-404A; R-405A; R-406A; R-407A; R-407B; R-407C; R-407D; R-407F; R R-408A; R-409A; R-409B; R-410A; R-410B; R-411A; R-411B; R-412A; R-413A; R-414A; R-414B; R-415A; R-415B; R-416.


This standard applies to Liquid-line Driers utilizing solid Desiccants designed for use in the liquid line of all types of refrigeration and air-conditioning systems.


This standard applies to Liquid-line Driers utilizing solid Desiccants designed for use in the liquid line of all types of refrigeration and air-conditioning systems.

ANSI/AHRI Standard 715 (I-P)-2015, Performance Rating of Liquid-Line Filters

This standard applies to hermetic Liquid Line Filters designed for use in the liquid line of all types of refrigeration and air-conditioning systems employing the following refrigerants: R-22, R-134a, R-290, R-404a, R-407a, R-407c, R-410a, R-507a, R-600a, and R-744 as defined in ANSI/ASHRAE 34 with Addenda. This standard provides a means of determining the Overall Filter Efficiency and Contaminant Capacity of a Liquid Line Filter at specified conditions.

ANSI/AHRI Standard 716 (SI)-2015, Performance Rating of Liquid-Line Filters

This standard applies to hermetic Liquid Line Filters designed for use in the liquid line of all types of refrigeration and air-conditioning systems employing the following refrigerants: R-22, R-134a, R-290, R-404a, R-407a, R-407c, R-410a, R-507a, R-600a, and R-744 as defined in ANSI/ASHRAE 34 with Addenda. This standard provides a means of determining the Overall Filter Efficiency and Contaminant Capacity of a Liquid Line Filter at specified conditions.


This standard applies to Suction Line Filters and Suction Line Filter Driers for use in systems employing refrigerants, R-22, R-134a, R-290, R-404a, R-407a, R-407c, R-410a, R-507a, R-600a, and R-744 as defined in ANSI/ASHRAE 34 with Addenda.


This standard applies to Suction Line Filters and Suction Line Filter Driers for use in systems employing refrigerants, R-22, R-134a, R-290, R-404a, R-407a, R-407c, R-410a, R-507a, R-600a, and R-744 as defined in ANSI/ASHRAE 34 with Addenda.


This standard applies to equipment for recovering and/or recycling non-flammable (safety Class I), as per ASHRAE Standard 34, single refrigerants, azeotropes, zeotropic blends, and their normal contaminants from refrigerant systems. This standard defines the test apparatus, test gas mixtures, sampling procedures and analytical techniques that will be used to determine the performance of refrigerant Recovery Equipment and Recovery/Recycling Equipment.

ANSI/AHRI Standard 750-2007, Performance Rating of Thermostatic Refrigerant Expansion Valves

This standard applies to Thermostatic Refrigerant Expansion Valves for use with Refrigerants.


This standard applies to Solenoid Valves for use with volatile refrigerants as defined in Section 3.


This standard is intended for the guidance of the industry, including manufacturers, engineers, installers, contractors and users.


This standard applies to Solenoid Valves for use with volatile refrigerants as defined in Section 3.

ANSI/AHRI Standard 770 (I-P)-2014, Performance Rating of Refrigerant Pressure Regulating Valves

This standard applies to Refrigerant Pressure Regulating Valves controlling volatile refrigerant flow that primarily respond to pressure. The types of Refrigerant Pressure Regulating Valves are those that are responsive to inlet, to outlet, or to differential pressures sensed locally or remotely.

ANSI/AHRI Standard 770-2007, Refrigerant Pressure Regulating Valves

This standard applies to Refrigerant Pressure Regulating Valves controlling Volatile Refrigerant flow that primarily respond to pressure.

ANSI/AHRI Standard 771 (SI)-2014, Performance Rating of Refrigerant Pressure Regulating Valves

This standard applies to Refrigerant Pressure Regulating Valves controlling volatile refrigerant flow that primarily respond to pressure. The types of Refrigerant Pressure Regulating Valves are those that are responsive to inlet, to outlet, or to differential pressures sensed locally or remotely.
ANSI/AHRI Standard 880 (I-P)-2011 with Addendum 1-2011, Performance Rating of Air Terminals
This standard applies to air control devices used in air distribution systems.

ANSI/AHRI Standard 881 (SI), Adm1-2012, Performance Rating of Air Terminals
This standard applies to air control devices used in air distribution systems.

ANSI/AHRI Standard 900 (I-P)-2015, Performance Rating of Thermal Storage Equipment Used for Cooling
This standard applies to Thermal Storage Equipment used for cooling which may be charged and discharged with any of a variety of heat transfer fluids. The equipment, as further described in Sections 3 and 4, may be fully factory assembled; assembled on site from factory supplied components; or field erected in accordance with pre-established design criteria.

ANSI/AHRI Standard 900-2010, Performance Rating of Thermal Storage Equipment Used for Cooling
This standard applies to Thermal Storage Equipment used for cooling which may be charged and discharged with any of a variety of heat transfer fluids. The equipment, as further described in Sections 3 and 4, may be fully factory assembled; assembled on site from factory supplied components; or field erected in accordance with pre-established design criteria.

ANSI/AHRI Standard 901 (SI)-2015, Performance Rating of Thermal Storage Equipment Used for Heating
This standard applies to Thermal Storage Equipment used for heating which may be charged and discharged with any of a variety of heat transfer fluids. The equipment, as further described in Sections 3 and 4, may be fully factory assembled; assembled on site from factory supplied components; or field erected in accordance with pre-established design criteria.

ANSI/AHRI Standard 901-2010, Performance Rating of Thermal Storage Equipment Used for Heating
This standard applies to Thermal Storage Equipment used for heating which may be charged and discharged with any of a variety of heat transfer fluids. The equipment, as further described in Sections 3 and 4, may be fully factory assembled; assembled on site from factory supplied components; or field erected in accordance with pre-established design criteria.

ANSI/AHRI Standard 910-2011, Performance Rating of Indoor Pool Dehumidifiers
This standard applies to factory-made residential, commercial and industrial Indoor Pool Dehumidifiers, as defined in Section 3.

ANSI/AHRI Standard 911 (SI)-2014, Performance Rating of Indoor Pool Dehumidifiers
This standard applies to factory-made residential, commercial and industrial Indoor Pool Dehumidifiers, as defined in Section 3. This standard applies to electrically operated, vapor-compression refrigeration systems.

ANSI/AHRI Standard 920 (I-P)-2015, Performance Rating of DX-Dedicated Outdoor Air System Units
This standard applies to factory-assembled commercial or industrial DX-Dedicated Outdoor Air System Units as defined in Section 3.

ANSI/AHRI Standard 921 (SI)-2015, Performance Rating of DX-Dedicated Outdoor Air System Units
This standard applies to factory-assembled commercial or industrial DX-Dedicated Outdoor Air System Units as defined in Section 3.

This part of ISO 13256 establishes performance testing and rating criteria for factory-made residential, commercial and industrial, electrically-driven, mechanical-compression type, water-to-air and brine-to-air heat pumps. The requirements for testing and rating contained in this part of ISO 13256 are based on the use of matched assemblies.

This part of ISO 13256 establishes performance testing and rating criteria for factory-made residential, commercial and industrial, electrically-driven, mechanical-compression type, water-to-water and brine-to-water heat pumps. The requirements for testing and rating contained in this part of ISO 13256 are based on the use of matched assemblies.

AIAA (American Institute of Aeronautics and Astronautics)
This standard provides guidelines for selecting ionospheric models for engineering design or scientific research. It describes the content of the models, uncertainties and limitations, technical basis, databases from which the models are formed, publication references, and sources of computer codes for 45 ionospheric models.

This guide outlines the operational concept definition process and how it may be applied. The main emphasis of this document is to provide practical recommendations on how to perform an operational concept definition activity with the focus on the OCD because that is the physical product in which the results of the work are captured. This guide is applicable for the procurement of systems, including ground systems, and associated equipment/subsystems.

ANSI/AIAA S-017B-2015, Aerodynamic Decelerator and Parachute Drawings
Establishes terminology for 270 terms critical to communication about the design and function of parachutes. It further sets requirements for the graphic description of materials, stitching, seams, view, and projections, with related dimensions and tolerances, all of which are consistent with current procurement practice.

ANSI/AIAA S-102.1.4-2008, Performance-Based Failure Reporting, Analysis & Corrective Action System (FRACAS) Requirements
This Standard provides the basis for developing the performance-based Failure Reporting, Analysis & Corrective Action System (FRACAS) to resolve the problems and failures of individual products along with those of their procured elements. The requirements for contractors, the planning and reporting needs, along with the analytical tools are established. The linkage of this Standard to the other standards in the new family of performance-based Reliability and Maintainability (R&M) standards is described, and a large number of keyword data element descriptions (DED) for use in automating the FRACAS process are provided.

ANSI/AIAA S-102.1.5-2008, Performance-Based Failure Review Board (FRB) Requirements
This Standard provides the basis for developing the performance-based Failure Review Board (FRB), which is a group consisting of representatives from appropriate project organizations with the level of responsibility and authority to assure that root causes are identified and corrective actions are effected in a timely manner for all significant failures. Although good engineering practice suggests that most product development projects should include a formal FRB, the basic FRB functions may devolve to a single individual on small projects. Planning and reporting requirements and analytic tools are provided for contractors.

ANSI/AIAA S-102.2.11-2008, Performance-Based Anomaly Detection and Response Analysis
This Standard provides the basis for developing identification and response methods for system anomalies or faults that pose unacceptable risk. The requirements for contractors, the planning and reporting needs, along with the analytical tools are established. The linkage of this Standard to the other standards in the new family of performance-based reliability and maintainability standards is described.
ANSI/AIAA S-123-2007, Adaptations and Conversions of CCSDS Space Link Extension Forward Communications Link Transmission Unit Transfer Service

This document describes adaptations and conversions of the existing CCSDS standard Space Link Extension (SLE) Communications Link Transmission Unit (FCLTU) space vehicle command transfer service. Adaptations of FCLTU by the user and conversions of FCLTU by the provider provide standardized discrete and streaming ternary command services and streaming binary command services which are not otherwise provided by CCSDS SLE transfer services.

ANSI/AIAA S-124-2007, Adaptations and Conversions of CCSDS Space Link Extension Return All Frames Transfer Service

This document describes adaptations and conversions of the existing CCSDS standard Space Link Extension (SLE) Return All Frames (RAF) space vehicle telemetry transfer service. Adaptations of RAF by the user and conversions of RAF by the provider provide standardized time-correlated telemetry and command echo services which are not otherwise provided by CCSDS SLE transfer services. Time-correlated telemetry service supports satellites which use unframed bit streams or bit streams without provider-side frame synchronization. Command echo service supports systems which require an independent check of provider RF equipment.


Provides the broad astrodynamics and space operations community with technical standards and lays out recommended approaches to ensure compatibility between organizations. Applicable existing standards and accepted documents are leveraged to make a complete - yet coherent - document. These standards are intended to be used as guidance and recommended practices for astrodynamics applications in Earth orbit where interoperability and consistency of results is a priority.


This document is intended to serve as a standard and handbook for the prevention of multipactor and ionization breakdown in spacecraft components and systems. The document provides minimum requirements for risk definition, system analysis, and component analysis and test.


This standard defines terminology and establishes uniform processes, procedures, and methods for the management, control, monitoring, determination, verification, and documentation of mass properties during the design, development, and operational phases of space systems, including their components and subsystems.


This standard specifies an Extensible Markup Language (XML) vocabulary and schema (XSD) for the elements that are common and considered to be part of performance plans and reports. This is the second of a series of parts comprising the Strategy Markup Language (StratML) standard. Part 1 (ANSI/AIIM 21-2009) specifies the elements of strategic plans. Part 3 will specify extensions to the first two parts that may be useful but are not considered to be essential for the basic purposes of the standard.

ANSI/AIIM 25-2012, Assessing Trusted Systems for Compliance with Industry Standards and Best Practices

This industry standard identifies the activities and operations an organization shall perform in order to evaluate whether the electronically stored information is maintained in reliable and trustworthy Enterprise Content (or Records) Management ECM (also referenced as EDMS, ERM, ERMS) systems.

ANSI/AIIM MS23-2004 (R2010), Standard Recommended Practice - Production, Inspection, and Quality Assurance of First-Generation, Silver Microforms of Documents

This document identifies and discusses the qualitative characteristics of first-generation silver gelatin microforms and the methods to attain, maintain, and measure levels of quality. The scope of this document excludes COM, updateable, color, and thermally processed microforms.


This International Standard specifies how to use the Portable Document Format (PDF) 1.4 for long-term preservation of electronic documents. It is applicable to documents containing combinations of character, raster, and vector data. This International Standard does not apply to: - Specific processes for converting paper or electronic documents to the PDF/A format - Specific technical design, user interface, implementation, or operational details of rendering - Specific physical methods of storing these documents such as media and storage conditions - Required computer hardware and/or operating systems.


This International Standard specifies the essential performance characteristics of reader-printers designed for viewing and making hard copies from microfilm with a maximum width of 35 mm, whether in microfilm strips or in roll form, in open reels, cartridges or cassettes, microfiche, jackets and image cards. It applies to reader-printers with a magnification less than or equal to 50:1.
AISC (American Institute of Steel Construction)

AISC 303-2016, Code of Standard Practice for Steel Buildings and Bridges

This Code sets forth criteria for the trade practices involved in steel buildings, bridges, and other structures, where other structures are defined as those structures designed, fabricated, and erected in a manner similar to buildings with building-like vertical and lateral load resisting elements.

AISC 341-2016, Seismic Provisions for Structural Steel Buildings

These provisions are for the design and construction of structural steel members and connections in the Seismic Load Resisting Systems in buildings and other structures. The design forces in these structures shall result from earthquake motions determined on the basis of various levels of energy dissipation in the inelastic range of response.

AISC 358-2016, Prequalified Connections for Special and Intermediate Steel Moment Frames for Seismic Applications

AISC 358 is a specification for structural steel moment connections for use with special moment frames (SMF) and intermediate moment frames (IMF) in seismic applications. The 2016 edition combines and updates the existing AISC 358 standard and its supplements. It also includes two additional prequalified steel moment connections.

AISC 360-2016, Specification for Structural Steel Buildings

This Specification governs the design, fabrication and erection of structural steel-framed buildings. Structural steel includes hot-rolled W-, S-, and H-shapes, channels and angles listed in ASTM A6/A6M; structural tees split from the hot-rolled W-, S- and M-shapes listed in ASTM A6/A6M; hollow structural sections produced to ASTM A500, A501, A618 or A847, and steel pipe produced to ASTM A53/A53M. This specification is intended for the common building design in routine office practice.

AISC N690-2012, Specification for Safety-Related Steel Structures for Nuclear Facilities

This standard applies to the design of safety-related steel structures and steel elements in nuclear facilities. Structures and structural elements subject to this standard are those steel structures that are part of a safety-related system or that support, house, or protect safety-related systems or components, the failure of which would impair the safety-related functions of these systems or components.
This standard governs the design and installation of cold-formed steel framing for floor and roof systems in buildings.

This standard provides design and installation of cold-formed steel studs for structural walls in buildings.

ANSI/AISI S211-2007/S1-2012, Supplement 1 to the North American Standard for Cold-Formed Steel Framing - Wall Stud Design
This supplement 1 removes the provisions for the design of nonstructural members, and also updates the referenced documents.

This standard provides design and installation of cold-formed steel box and back-to-back headers, and double and single L-headers for load carrying purposes in buildings.

This standard provides the design requirements for cold-formed steel framed shear walls, diagonal strap bracing (that is part of a structural wall) and diaphragms to resist wind and seismic loads in buildings.

ANSI/AISI S214-2012, North American Standard for Cold-Formed Steel Framing - Truss Design
This standard governs the design of cold-formed steel trusses for load carrying purposes in buildings, including manufacturing, quality criteria, installation and testing as they relate to the design of cold-formed steel trusses.

ANSI/AISI S220-2015, North American Standard for Cold-Formed Steel Framing - Nonstructural Members
AISI S220 is used for design and installation of cold-formed steel nonstructural members in buildings.

ANSI/AISI S230-2015, Standard for Cold-Formed Steel Framing - Prescriptive Method for One and Two Family Dwellings
This Standard provides prescriptive method for design and construction of detached one- and two-family dwellings, townhouses, and other attached single-family dwellings not more than three stories in height using repetitive in-line framing practices.

ANSI/AISI S240-2015, North American Standard for Cold-Formed Steel Structural Framing
The American Iron and Steel Institute's (AISI's) Committee on Framing Standards (COFS) will develop this standard to address requirements for floor, wall and roof systems used in building construction with cold-formed steel structural framing. This standard will apply to the design and installation of cold-formed steel light-frame construction applications. Elements not specifically addressed by this standard shall be constructed in accordance with applicable building code requirements.

This Standard applies to diaphragms and wall diaphragms that contain profiled steel panels, which include fluted panels or deck, and cellular deck. This Standard determines the available strength and stiffness of steel panels and their connections in a diaphragm system, but does not address determination of available strength for the other components in the system. The design of other diaphragm components is governed by the applicable building code and other design standards.

ANSI/AISI S400-15/S1-2016, Supplement 1 to the North American Standard for Seismic Design of Cold-Formed Steel Structural Systems
This supplement is to revise the expected strength factors for cold-formed steel light frame shear walls sheathed with wood structural panels, steel sheet sheathing, gypsum board or fiberboard panel sheathing.

ANSI/AISI S400-2015, North American Standard for Seismic Design of Cold-Formed Steel Structural Systems
This North American Standard for Seismic Design of Cold-Formed Steel Structural Systems is applicable for the design and construction of cold-formed steel members and connections in seismic force resisting systems (SFRS) in buildings and other structures.

ANSI/AISI S901-2013, Rotational-Lateral Stiffness Test Method for Beam-to-Panel Assemblies
This is a test standard to determine the rotational-lateral stiffness of beam-to-panel assemblies. The test method is used primarily in determining the strength of beams connected to panels as part of a structural assembly.

ANSI/AISI S902-2013, Stub-Column Test Method for Effective Area of Cold-Formed Steel Columns
This test method covers the determination of the effective cross-sectional area of cold-formed steel columns. It primarily considers the effects of local buckling and residual stresses and is applied to solid or perforated columns that have holes (or hole patterns) in the flat and/or curved elements of the cross-section.

ANSI/AISI S903-2013, Standard Methods for Determination of Uniform and Local Ductility
This method covers the determination of uniform and local ductility from a tensile test. It is primarily used as an alternative method of determining if steel has adequate ductility as defined in the North American Cold-Formed Steel Specification. It is based on the method suggested by Dhalla and Winter.

ANSI/AISI S904-2013, Standard Test Methods for Determining the Tensile and Shear Strength of Screws
The performance test methods included in this standard establishes procedures for conducting tests to determine the tensile and shear strength of carbon steel screws. The screws may be thread-forming or thread-cutting, with or without a self-drilling point, and with or without washers. The intended application for these screws is to connect cold-formed sheet steel materials.

ANSI/AISI S905-2008/S1-2012, Supplement 1 to Test Methods for Mechanically Fastened Cold-Formed Steel Connections
Provides modification and clarification to the standard in response to comments received.

ANSI/AISI S905-2013, Test Methods for Cold-Formed Steel Connections
The standard includes several performance test methods that cover the determination of the strength and deformation of mechanically fastened or welded connections for cold-formed steel building components, and are based extensively on test methods used successfully in the past. Static and Cyclic tests for connections in which the fasteners are stressed in shear, tension or a combination of shear and tension are provided.

ANSI/AISI S906-2013, Standard Procedures for Panel and Anchor Structural Tests
This test procedure extends and provides methodology for interpretation of results of tests performed according to ASTM E1592.

ANSI/AISI S907-2013, Test Standard for Cantilever Test Method for Cold-Formed Steel Diaphragms
This standard applies to framed cold-formed steel panel floor, roof and wall diaphragm construction and provides requirements for static and cyclic testing of floor, roof and wall diaphragm assemblies.

ANSI/AISI S908-2013, Base Test Method for Purlins Supporting a Standing Seam Roof System
This test is to obtain the reduction factor to be used in determining the nominal flexural strength of a purlin supporting a standing seam roof system.

ANSI/AISI S909-2013, Standard Test Method for Determining the Web Crippling Strength of Cold-Formed Steel Beams
This performance test method establishes procedures for conducting tests to determine the web crippling strength of cold-formed steel flexural members.
ANSI/AISI S910-2013, Test Method for Distortional Buckling of Cold-Formed Steel Hat Shaped Compression Members
This test method establishes procedures for determining the distortional buckling strength of cold-formed steel hat shaped compression members with an open cross-section.

ANSI/AISI S911-2014, Method for Flexural Testing Cold-Formed Steel Hat Shaped Beams
This test method establishes procedures for determining the nominal flexural strength of an open hat shaped cross-section subject to negative bending moment.

ANSI/AISI S912-2013, Test Procedure for Determining a Strength Value for a Roof Panel-to-Purlin-To-Anchorage Device Connection
The purpose of this test is to obtain lower bound strength values for the roof panel-to-purlin-to-anchorage device connections in through-fastened and standing seam, multi-span, multi-purlin line roof systems. The test is not intended to determine the ultimate strength of the connections.

ANSI/AISI S913-2013, Test Standard for Hold-Downs Attached to Cold-Formed Steel Structural Framing
This standard provides two methods to determine both the strength and deformation of hold-downs used in light frame construction. One of the test methods is to determine the strength and deformation of the hold-down device and the other test method is to determine the strength and deformation of the hold-down assembly.

ANSI/AISI S914-2015, Test Standard for Joist Connectors Attached to Cold-Formed Steel Structural Framing
This standard provides a method to determine both the strength and deformation of joist connectors used in cold-formed steel light-frame construction.

ANSI/AISI S915-2015, Test Standard for Through-the-Web Punchout Cold-Formed Steel Wall Stud Bridging Connectors
The test standard provides the methodology to determine the strength and deformation behavior of through-the-web punchout bridging connectors for cold-formed steel wall stud bracing for structural and nonstructural walls in light-frame construction.

ANSI/AISI S916-2015, Test Standard for Cold-Formed Steel Framing - Nonstructural Interior Portions with Gypsum Board
This Standard applies to performance test methods for the determination of the strength and stiffness of nonstructural interior partition wall assemblies subjected to uniform static nominal pressure loads up to 15 pounds per square foot (0.72 kPa), framed with cold-formed steel nonstructural members, and sheathed on one or both sides with gypsum board panel products.

ANSI/AISI S917-2017, Test Standard for Determination of Fastener-Sheathing Local Translational Stiffness
This Standard applies for the determination of the local translational stiffness supplied by sheathing, fastened to cold-formed steel members.

ANSI/AISI S918-2017, Test Standard for Determination of Fastener-Sheathing Rotational Stiffness
This Standard applies for the determination of the rotational restraint supplied by sheathing, fastened to cold-formed steel members.

ALI (ASC A14) (American Ladder Institute)

ANSI A14.1-2007, Ladders - Wood - Safety Requirements
This standard prescribes rules and establishes minimum requirements for the construction, testing, care and use of common types of portable wood ladders described herein in order to ensure safety under normal conditions of usage. It does not cover step stools (furniture type) except ladder type step stools.

ANSI A14.2-2007, Ladders - Portable Metal - Safety Requirements
This standard prescribes rules governing the safe construction, design, testing, care and use of portable metal ladders of various types and styles. Ladders styles include ladder type step stools, portable extension, step, trestle, sectional, combination, single, platform, and articulating ladders, but excluding ladders in and on mines, the fire services, mobile equipment, hoisting equipment, work platforms, antenna communications towers, transmission towers, utility poles and chimneys. It does not cover special-purpose ladders that do not meet the general requirements of this standard.

ANSI A14.3-2008, Ladders – Fixed – Safety Requirements
This standard prescribes minimum requirements for design, construction, and use of fixed ladders, and sets forth requirements for cages, wells, and ladder safety systems used with fixed ladders, in order to minimize personal injuries. All parts and appurtenances necessary for a safe and efficient ladder shall be considered integral parts of the design. Comments must be sent on the comment from included in each A14.3 Standards Draft. Comments must include a rationale.

ANSI A14.4-2009, Safety Requirements for Job-Made Wooden Ladders
A4.4 prescribes minimum requirements and recommendations for the construction, design, installation and use of job-made wooden ladders on construction sites, in order to minimize personal injuries.

This standard prescribes rules governing the safe construction, design, testing, care and use of portable reinforced plastic ladders of various types and styles. Ladder styles include ladder type step stools, portable extension, step, trestle, sectional, combination, single, platform, and articulating ladders, but excluding ladders in and on mines, the fire services, mobile equipment, hoistng equipment, work platforms, antenna communications towers, transmission towers, utility poles and chimneys.

ANSI A14.7-2012, Mobile Ladder Stands & Mobile Ladder Stand Platforms
The development and increasing use of a variety of mobile ladder stands/mobile ladder stand platforms necessitates establishment of performance specifications for design and manufacture. This standard sets forth requirements that must be considered and built into the devices to provide for proper operation.

ANSI A14.8-2013, Safety Requirements for Ladder Accessories
The A14.8 Ladder Accessories Subcommittee was formed to develop a standard that includes the most commonly used and manufactured ladder accessories. The standard was written as a guide to both manufacturers and end users alike to guide them in the proper care, used and selection of these accessories.

ANSI A14.9-2010, Disappearing Attic Stairways
A14.9 develops rules to govern the safe design, construction, testing, care and use of permanently installed folding or collapsible fixed aluminum or wood attic ladders of various types.

ALI (Automotive Lift Institute)

This standard covers safety requirements for the design, construction, testing, and validation of automotive lifts of the following types: manually driven, power driven, stationary, and mobile. Lifts that are movable or are designed to tilt the superstructure, or are not ‘automotive vehicle service lifts’ are outside the scope of this standard. Exemplar automotive lifts intended to be covered by this standard are depicted in Appendix A.

ANSI/ALI ALIS:2009 (R2015), Standard for Automotive Lifts - Safety Requirements for Installation and Service
This standard provides guidance to the installer and service technician for the installation and service of automotive lifts, including required installation and service considerations and qualifications, training, reporting, and documentation for installers and service technicians.
ANSI/ALI ALOIM-2008 (R2013), Standard for Automotive Lifts - Safety Requirements for Operation, Inspection, and Maintenance

This standard provides guidance to the owner or employer for the operation, inspection, and maintenance of installed automotive lifts including the required qualifications, training, reporting, and documentation for operators, inspectors, and maintenance personnel. The standard also provides sample forms and checklists for use by owners or employers attempting to comply with this standard.

AMCA (Air Movement and Control Association)

ANSI/AMCA 204-2005 (R2012), Balance Quality and Vibration Levels for Fans

The purpose of this standard is to define appropriate fan balance quality and operating vibration levels to individuals who specify, manufacture, use, and maintain fans. Vibration is recognized to be an important parameter regarding the mechanical operation of fans. Balance quality is a precondition to satisfactory mechanical operation. This standard covers fans with rigid rotors, generally found in commercial heating, ventilating and air conditioning; industrial process applications; mine/tunnel ventilation applications, and power generation applications.

ANSI/AMCA 205-2012, Energy Efficiency Classification for Fans

Defines the energy efficiency classification for fans. The purpose of this standard is to define appropriate fan balance quality and operating vibration levels to individuals who specify, manufacture, use, and maintain fans. Vibration is recognized to be an important parameter regarding the mechanical operation of fans. Balance quality is a precondition to satisfactory mechanical operation. This standard covers fans with rigid rotors, generally found in commercial heating, ventilating and air conditioning; industrial process applications; mine/tunnel ventilation applications, and power generation applications.


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Changes included in this revision to AMCA 210/ASHRAE S51: 1. The measurement and reporting of electrical power into a driven fan was added, along with the corresponding wire-to-air efficiency for a driven fan. 2. A detailed description of fan outlet area examples of how it is measured for various fan types was added as a normative annex. 3. The revised use of symbols and subscripts for fan input power to clarify which drive components are included in the power measurement. 4. The procedure for checking the effectiveness of airflow settling means in chambers was modified.

ANSI/AMCA 220-2005 (R2012), Laboratory Methods of Testing Air Curtain Units for Aerodynamic Performance Rating

The purpose of this standard is to establish uniform methods for laboratory testing of air curtain units to determine aerodynamic performance in terms of airflow rate, outlet air velocity uniformity, power consumption, and air velocity projection for rating or guarantee purposes.

ANSI/AMCA 230-2015, Laboratory Methods of Testing Air Circulating Fans for Rating and Certification

This standard shall be used as the basis for testing air circulating fan heads, ceiling fans, box fans, table fans, portable personnel coolers or other air circulating devices when air is used as the test gas. The diameter of the fan being tested shall be limited by the minimum dimensions as shown in the applicable test figures.

ANSI/AMCA 240-2015, Laboratory Methods of Testing Positive Pressure Ventilators for Aerodynamic Performance Rating

This standard may be used as the basis for the test of a PPV when air is used as the test gas. Each test shall be limited to one PPV per test. A PPV tested in accordance with this standard shall be freestanding and without a ductwork connection to the test chamber, thereby allowing for the measurement of entrained airflow.

ANSI/AMCA 250-2012, Laboratory Methods of Testing Jet Tunnel Fans for Rating

This standard deals with the determination of those technical characteristics needed to describe all aspects of the performance of jet tunnel fans. It does not cover those fans designed for ducted applications or those designed solely for air circulation, e.g., ceiling fans and table fans. The test procedures described in this standard relate to laboratory conditions. The measurement of performance under in-situ conditions is not included.

ANSI/AMCA 260-2013, Laboratory Methods of Testing Induced Flow Fans for Rating

The purpose of this standard is to establish a uniform laboratory method for determining an induced flow fan's aerodynamic performance in terms of airflow rate, pressure developed, power consumption, air density, speed of rotation, and efficiency. This standard is an adjunct to ANSI/AMCA 210 in order to accommodate the induced flow fan's unique characteristics. This public review includes only the changes since the previous public review. Changes are marked with underlines and strikethroughs in the text.

ANSI/AMCA 320-2013, Laboratory Method of Sound Testing of Fans Using Sound Intensity

This standard is intended to apply to fans of all types and sizes. This standard is limited to the determination of airborne sound emission for the specified setups. Vibration is not measured, and the sensitivity of airborne sound emission to vibration effects is not determined.

ANSI/AMCA 500-D-2012, Laboratory Methods of Testing Dampers for Rating

The purpose of this standard is to establish uniform laboratory test methods for dampers. The characteristics to be determined include, as appropriate, air leakage, pressure drop, dynamic closure, and operational torque. This standard may be used as a basis for testing dampers when air is used as the test gas. This public review is limited to the changes made to the document since the previous public review.

ANSI/AMCA 540-2013, Test Method for Louvers Impacted by Wind Borne Debris

The scope of this standard is for impact testing of louvers used on the outside of buildings as required by the ICC International Building Code and the ICC International Residential Code.

ANSI/AMCA 610-2006 (R2012), Laboratory Methods of Testing Airflow Measurement Stations for Performance Rating

This standard covers field-installed airflow measurement stations for heating, ventilating and air conditioning applications. This standard establishes uniform test methods for the determination of the performance characteristics and accuracy of airflow measurement stations under varied airflow rates and conditions.

ANSI/AMCA 99-2016, Standards Handbook

This standard serves as a collection of information that can be used in the development of other AMCA documents.
ANSI/AMCA Standard 300-2014, Reverberant Room Methods for Sound Testing of Fans
Revised the microphone type from a free field to diffuse field type. Clarified that an aerodynamic performance test is necessary to determine the point of operation of the test subject. Revised the test procedure calculation assumptions from unenforceable language to a BV-3 vibration rating as per AMCA 204. Clarified that unweighted fan sound power levels shall be reported in each band with the accuracy of not more than one decimal place. Added a missing reference to equations used to calculate the end correction for a round duct terminated in a large wall. Revised the tables used to find the end correction factor for ducts terminating in a large area to agree with text.

ANSI/AMCA Standard 301-2014, Methods for Calculating Fan Sound Ratings from Laboratory Test Data
Changes include the following items: 1. Removal of end reflection corrections from the generalized and specific methods. 2. Revised the treatment of the blade passage frequency in both the generalized and specific methods. 3. Removal of the bandwidth term from generalized sound power, resulting in complete agreement with the specific sound power method. 4. Clarification of interpolation and extrapolation for geometrically similar fans. 5. Clarification of interpolation and extrapolation for non-geometrically similar fans. 6. Addition of spherical sones. 7. Allow calculation of spherical and hemispherical sones, as well as A-weighted sound power from full or 1/3 octaves.

ANSI/AMCA Standard 500-L-2015, Laboratory Methods of Testing Louvers for Rating
Additions were made to accommodate testing for louvers built to resist wind driven sand.

ANSI/AMCA Standard 550-2015, Test Method for High Velocity Wind Driven Rain Resistant Louvers
Changes included in this revision to BSR/AMCA 550:
1. In order to be able to test a louver to the AMCA 550 standard and then check test it under AMCA 500-L Wind Driven Rain, the louver size was changed from a 488#8221;x488#8221; to a 1000mm x 1000mm (39.37 in. x 39.37 in.) core area louver which is the standard size for the AMCA 500-L test. 2. The AMCA 550 test standard was developed to replicate the Dade County Test Standard, TAS-100a. Most louvers that were originally tested for this Dade County Test Standard required a damper behind the louver in the closed position. Changes have been made to this standard in order to address and call out when these dampers are use

AMCi (AMC Institute)
ANSI/AMCI A100.1-2014, AMC Standard of Good Practices for Association Management Companies
The AMC Institute Standard establishes requirements that provide a measurement for practices that can be utilized by all sizes and types of Association Management Companies (AMCs) in order to enhance the performance of the AMC and their staff.

AmericanHort (AmericanHort)
ANSI Z60.1-2014, Standard for Nursery Stock
Nursery crop growers, landscape architects, landscape designers, landscape contractors and design/build firms, retail nurseries, wholesale nursery distributors, and other trading in or specifying nursery plants have assisted in developing these standards for various kinds of nursery plants. The standards establish a common specification framework for nursery stock transactions between members of the trade. Illustrations, examples, and written descriptions have been included to clarify the standards.

ANS (American Nuclear Society)
ANSI/ANS 1-2000 (R2012), Conduct of Critical Experiments
This standard provides for the safe conduct of critical experiments. Such experiments study neutron behavior in a fission device where the energy produced is insufficient to require auxiliary cooling, and the power history is such that the inventory of long-lived fission products is insignificant.

ANSI/ANS 10.2-2000 (R2009), Portability of Scientific and Engineering Software
This standard provides recommended programming practices and requirements to facilitate the portability of computer programs prepared for scientific and engineering computations.

ANSI/ANS 10.4-2008 (R2016), Verification and Validation of Non-Safety-Related Scientific and Engineering Computer Programs for the Nuclear Industry
This standard provides guidelines for the verification and validation (V&V) of non-safety-related scientific and engineering computer programs developed for use by the nuclear industry. The scope is restricted to research and other non-safety-related, non-critical applications.

ANSI/ANS 10.5-2006 (R2016), Accommodating User Needs in Scientific and Engineering Computer Software Development
This standard presents criteria for accommodating user needs in the preparation of computer software for scientific and engineering applications.

ANSI/ANS 10.7-2013, Non-Real Time, High Integrity Software for the Nuclear Industry
This standard addresses rigorous, systematic development of high integrity, non-real time safety analysis, design, simulation software which includes calculations or simulations that have critical consequences if errors are not detected, but that are so complex that typical peer reviews are not likely to identify errors.

ANSI/ANS 10.8-2015, Non-Real-Time, High-Integrity Software for the Nuclear Industry
This standard establishes the minimum requirements for the acceptance and use of non-real-time, high-integrity software used for design and analysis in the nuclear industry. This standard is directly related to ANSI/ANS-10.7-2013, which provides requirements for the developer of non-real-time, high-integrity software.

This standard is for those involved in the design, operation, and review of fast pulse reactors. It has been formulated in general terms to be applicable to all current fast pulse reactors. This standard does not apply to periodically pulsed reactors or booster assemblies.

ANSI/ANS 15.1-2007 (R2013), The Development of Technical Specifications for Research Reactors
This standard identifies and establishes the content of technical specifications (TS) for research and test reactors. Areas addressed are definitions, safety limits, limiting safety system settings, limiting conditions for operation, surveillance requirements, design features, and administrative controls. Sufficient detail is incorporated so that applicable specifications can be derived or extracted.

ANSI/ANS 15.11-2016, Radiation Protection at Research Reactors
This standard establishes the elements of a radiation protection program and the criteria necessary to provide an acceptable level of radiation protection for personnel at research reactor facilities and the public consistent with keeping exposures and releases as low as reasonably achievable.

ANSI/ANS 15.16-2015, Emergency Planning for Research Reactors
This standard identifies the elements of an emergency plan which describes the approach to coping with emergencies and minimizing the consequences of accidents at research reactor facilities. The emphasis given each of these elements is commensurate with the potential risk involved. The emergency plan is implemented by emergency procedures.

ANSI/ANS 15.2-1999 (R2016), Quality Control for Plate-Type Uranium-Aluminum Fuel Elements
This standard sets forth general requirements for the establishment and execution of a program designed to verify that the quality of plate-type uranium-aluminum fuel elements being purchased for research reactors conforms to the requirements of the contract and applicable technical documents, including specifications, standards, and drawings.

ANSI/ANS 15.21-2012, Format and Content for Safety Analysis Reports for Research Reactors
Approval of substantive change. This standard identifies specific information and analyses for inclusion in the safety analysis report for research reactors and establishes a uniform format for the report. This standard provides the criteria for the format and content for safety analysis reports for research reactors.
This standard sets the qualification, training, and certification criteria for operations personnel at research reactors and establishes the elements of a program for periodic re-qualification and re-certification. The standard is predicated on levels of responsibility rather than on a particular organizational concept.

This standard provides criteria for quality assurance in the design, construction, operation, and decommissioning of research reactors.

This standard provides a uniform procedure to measure and index the release of radionuclides from waste forms as a result of leaching in demineralized water for five days. The results cannot be interpreted to apply to any specific environmental situation except through correlative studies of actual disposal site conditions.

Comments limited to substantive changes. This standard provides a set of typical radionuclide concentrations for estimating the radioactivity in the principal fluid systems of light water reactors for projecting the expected releases of radioactivity from nuclear plants. It is not intended that the values be used as the sole basis for design, but be used in environmental reports and elsewhere where expected operating conditions over the life of the plant would be appropriate.

Identifies and describes the specifications for developing, preparing, and documenting nuclear data sets to be used in reactor design calculations. The specifications include: (a) criteria for acceptance of evaluated nuclear data sets; (b) criteria for processing evaluated data and preparation of processed continuous data and averaged data sets; and (c) identification of specific evaluated, processed continuous, and averaged data sets that meet these criteria for specific reactor types.

This standard provides criteria for performing and validating the sequence of calculations required for the prediction of the fast neutron fluence at the reactor vessel. Applicable to PWR and BWR plants the standard addresses flux attenuation from the core through the vessel to the cavity and provides criteria for generating cross sections, spectra, transport and comparisons with in- and ex-vessel measurements, validation, uncertainties and flux extrapolation to the inside vessel surface.

This standard provides guidance and specifies criteria for determining the MTC in water moderated power reactors. Measurement of the isothermal temperature coefficient of reactivity (ITC) at hot zero power (HZP) conditions is covered in ANSI/ANS-19.6.1-2005, &quot;Reload Startup Physics Tests for Pressurized Water Reactors.&quot; This standard therefore addresses the calculation of the ITC at HZP and the calculation and measurement of the MTC at power. At present, this standard addresses the calculation and measurement of the MTC only in PWRs, because that is the only type of power reactor currently sited in the United States for which measurement of the MTC is required.

This standard provides guidance for performing and validating the sequence of steady-state calculations leading to prediction in all types of operating commercial nuclear reactors of the following: 1) reaction-rate spatial distributions; 2) reactivity; 3) change of nuclide compositions with time. The standard provides the following: 1) guidance for the selection of computational methods; 2) criteria for verification and validation of calculation methods used by reactor core analysts; 3) criteria for evaluation of accuracy and range of applicability of data and methods; 4) requirements for documentation of the preceding. Note that the use of mixed uranium-plutonium oxide (MOX) fuel has been taken as out of scope for this revision of the standard. It will be taken into account in the next revision.

This standard provides the following: 1) guidance for the energy allocation among the principal particles and photons produced in fission, both prompt and delayed; 2) adoption of appropriate treatment of heavy charged particle and electron slowing down in matter; 3) determination of the spatial energy deposition rates resulting from the interactions of neutrons; 4) calculation of the spatial energy deposition rates resulting from the various interactions of photons with matter; and 5) presentation of the results of such computations, including verification of accuracy and specification of uncertainty. This standard addresses the energy generation and deposition rates for all types of nuclear reactors where the neutron reaction rate distribution and photon and beta emitter distributions are known. Its scope is limited to the reactor core, including blanket zones, control elements and core internals, pressure vessel, and the thermal and biological shielding.

This standard specifies the minimum acceptable startup reactor physics test program to determine if the operating characteristics of the core are consistent with the design predictions, which provides assurance that the core can be operated as designed.

Recirculation of draft to approve substantive changes. The purpose of this document is thus to establish criteria for evaluating the atmospheric effects of routine radioactive releases at or beyond the facility site boundary. The criteria incorporate the numerous advances in technical capabilities, computer technology, data access, and information sharing.

This standard provides criteria for the determination of the concentration of radionuclides in the ground water resulting from both postulated accidents and routine releases from nuclear facilities.

This standard specifies the required earthquake instrumentation used for the recording of seismic data and evaluation of the possible effects after a seismic event for the site and Category I structures of light water cooled and load based nuclear power plants. It may be used for guidance at other types of nuclear facilities. This standard does not address the following: a) instrumentation to automatically shutdown a nuclear power plant at a predetermined ground acceleration and b) procedures for evaluating records obtained from seismic instrumentation and instructions for the treatment of data.

This Standard establishes criteria for use of meteorological data collected at nuclear facilities to evaluate the atmospheric effects from meteorological parameters (e.g., dry-bulb temperature/wet-bulb temperature differential, precipitation, wind speed, short wave radiation, incoming solar (short wave) radiation, surface water temperature, and atmospheric pressure) on ultimate heat sinks.

This standard is a major update of ANSI Standard 2.23-2002. It provides criteria that the owner of a nuclear power plant can adopt to prepare for, and respond to, an earthquake at his plant(s), including the need for plant shutdown, assessment of damage, and actions to determine the readiness of the plant to resume operation and to verify the long-term integrity of the plant. The criteria will be expanded to consider the severity of a felt and recorded earthquake as well as the level of any observed damage in defining a graded approach to determine the damage potential of an earthquake and the actions needed to demonstrate readiness of a plant to restart.
ANSI/ANS 2.26-2004 (R2010), Categorization of Nuclear Facility Structures, Systems, and Components for Seismic Design
This standard provides: (a) criteria for selecting the seismic design category (SDC) for nuclear facility structures, systems, and components (SSCs) to achieve earthquake safety and (b) criteria and guidelines for selecting Limit States for these SSCs to govern their seismic design. The Limit States are selected to ensure the desired safety performance in an earthquake. 1) The SDCs used in this standard are not the same as the SDCs referred to in the International Building Code (IBC).

ANSI/ANS 2.27-2008 (R2016), Criteria for Investigations of Nuclear Facility Sites for Seismic Hazard Assessments
This standard provides requirements and recommended practices for conducting investigations and acquiring data sets needed to evaluate seismic source characterization for probabilistic seismic hazard analysis (PSHA), site response and soil structure interaction (SSI) effects, and liquefaction. These data also are used to evaluate fault rupture and associated secondary deformation, and other seismically-induced ground failure hazards (i.e., ground settlement, slope failure, and subsidence and collapse).

ANSI/ANS 2.29-2008 (R2016), Probabilistic Seismic Hazard Analysis
This standard provides criteria and guidance for performing a probabilistic seismic hazard analysis for the design and construction of nuclear facilities.

ANSI/ANS 2.3-2011 (R2016), Estimating Tornado, Hurricane, and Extreme Straight Line Wind Characteristics at Nuclear Facility Sites
This standard defines site phenomena caused by (1) extreme straight winds, (2) hurricanes, and (3) tornadoes in various geographic regions of the U.S. These phenomena are used for the design of nuclear facilities.

ANSI/ANS 2.30-2015, Criteria for Assessing Tectonic Surface Fault Rupture and Deformation at Nuclear Facilities
This standard provides criteria and guidelines for investigations to assess potential for surface and near-surface faulting and associated near-fault deformation at nuclear facilities, referencing considerable new experience. The standard is an up-to-date compilation of techniques to evaluate fault offset potential and a valuable resource for planning and conducting site characterization studies for future nuclear facilities. It supplements a group of standards (i.e., ANSI-2.26, -2.27, -2.29, ASCE 43-05) whose focus is on vibratory ground motion rather than fault offset hazard.

ANSI/ANS 3.1-2014, Selection, Qualification, and Training of Personnel for Nuclear Power Plants
This standard provides criteria for the selection, qualification, and training of personnel for nuclear power plants. The qualifications of personnel in the operating organizations appropriate to safe and efficient operation of a nuclear power plant are addressed in terms of the minimum education, experience, and training requirements. Requirements of this standard may be applied to test, mobile, and research reactors and reactors not subject to U.S. Nuclear Regulatory Commission licensing at the users discretion.

ANSI/ANS 3.11-2015, Determining Meteorological Information at Nuclear Facilities
The standard includes the identification of which meteorological parameters should be measured relative to the program, meteorological parameter accuracies, meteorological tower siting considerations, data monitoring methodologies, data reduction techniques and quality assurance requirements.

ANSI/ANS 3.2-2012 (R2017), Managerial, Administrative, and Quality Assurance Controls for the Operational Phase of Nuclear Power Plants
This standard defines the managerial and administrative controls for operating commercial power plants. NQA-1 will be referenced to provide quality assurance requirements that are common to all phases (construction, design, and operations). The focus only on managerial and administrative controls will facilitate endorsement and increase application to both existing and new nuclear generation.

ANSI/ANS 3.4-2013, Medical Certification and Monitoring of Personnel Requiring Operator Licenses for Nuclear Power Plants
Comments on substantive changes. This standard defines the medical and psychological requirements for licensing of nuclear power plant reactor operators and senior operators. It also addresses the content, extent, methods of examination, and monitoring during the term of the license.

ANSI/ANS 3.5-2009, Nuclear Power Plant Simulators for Use in Operator Training and Examination
This standard establishes the functional requirements for full-scale nuclear power plant control room simulators for use in operator training and examination. The standard also establishes criteria for the scope of simulation, performance, and functional capabilities of simulators. This standard does not address simulators for test, mobile, and research reactors, or for reactors not subject to U.S. Nuclear Regulatory Commission licensing. This standard does not establish criteria for the use of simulators in training programs.

This standard provides design, fabrication, and performance criteria and guidance for Mobile Low-Level Radioactive Waste Processing (MRWP) systems (including components) for nuclear facilities. The purpose of this standard is to provide criteria to ensure that the MRWP systems are designed, fabricated, installed, and operated in a manner commensurate with the need to protect plant personnel and the health and safety of the public.

ANSI/ANS 41.5-2012, Verification and Validation of Radiological Data for Use in Waste Management and Environmental Remediation
This standard establishes criteria and processes for verification and validation of radioanalytical data for waste management and environmental remediation activities. It applies to the independent review of the data generation process for field measurements and radioanalytical laboratories. This standard sets the requirements for how the data are reviewed and qualified against the data quality requirements that are established by the project to meet their intended use. While this standard does not specifically address all nondestructive assays and in situ measurements, the general principles and some of the elements of this standard may apply.

ANSI/ANS 5.1-2014, Decay Heat Power in Light Water Reactors
This standard sets forth values for calculating the decay heat power of uranium fueled light water reactors (LWRS). The decay heat power from fission products is presented in tables and equivalent analytical representations. The methods account for reactor operating history, for the effect of neutron capture in fission products, the contributions from actinides activation products, and for assessing the uncertainty in the calculated decay heat power.

ANSI/ANS 5.10-1998 (R2012), Airborne Release Fractions at Non-Reactor Nuclear Facilities
This standard provides criteria for defining Airborne Release Fractions (ARFs) for radioactive materials under accident conditions (excluding nuclear criticalities) at non-reactor nuclear facilities. The criteria in this standard provide requirements for selecting ARFs based on the calculated or assumed forms of radioactive material released.

ANSI/ANS 5.4-2011, Method for Calculating the Fractional Release of Volatile Fission Products from Oxide Fuel
This standard provides an analytical method for calculating the release of volatile fission products from uranium dioxide fuel pellets during normal reactor operation. When used with nuclide yields, this method will give the release-to-birth ratio, R/B, or the so-called “gap release,” which is the inventory of volatile radioactive fission products that could be available for release from the fuel rod if the cladding were breached.
ANSI/ANS 51.10-1991 (R2008), Auxiliary Feedwater System for Pressurized Water Reactors
This standard sets forth the nuclear safety-related functional requirements, performance requirements, design criteria, design requirements for testing and maintenance, and interfaces for the nuclear safety-related portion of the auxiliary feedwater system (AFS) of pressurized water reactor (PWR) plants.

ANSI/ANS 53.1-2011 (R2016), Nuclear Safety Design Process for Modular Helium-Cooled Reactor Plants
This standard establishes the nuclear safety criteria, functional performance and design requirements of structures, systems, and components (SSCs) for modular helium reactor (MHR) plants applicable to performance-based, risk-informed regulation.

This standard sets forth the design, construction, and performance requirements for a solid radioactive waste processing system for light-water-cooled reactor plants. For the purposes of this standard, the solid radioactive waste processing system begins at the interface with the liquid radioactive waste processing system boundary and at the inlets to the spent resin, filter sludge, evaporator concentrate, and phase separator tanks. In addition, this standard pertains to dry active waste, mixed waste, and other solid radioactive waste forms that are generated as part of the operation and maintenance of light-water-cooled reactor plants. The system includes facilities f

ANSI/ANS 56.8-2002 (R2016), Containment System Leakage Test Requirements
This standard specifies acceptable primary containment leakage rate test requirements to assure valid testing. The scope includes 1) leakage test requirements; 2) test instrumentation; 3) test procedures; 4) test methods; 5) acceptance criteria; 6) data analysis; 7) inspection and recording of test results; and 8) definition and determination of Appendix J Pathways.

This standard sets forth the required functions of fuel handling systems at light water reactor nuclear power plants. It provides minimum design requirements for equipment and tools to handle nuclear fuel and control components safely.

ANSI/ANS 57.10-1996 (R2016), Design Criteria for Consolidation of LWR Spent Fuel
This standard provides design criteria for the process of consolidating LWR spent nuclear fuel in either a wet or a dry environment. It addresses processes for consolidating fuel either horizontally or vertically. The standard sets forth requirements for utilizing equipment and systems to perform consolidation, handle fuel rods and nonfuel-bearing components, and handle broken fuel rods. This standard also contains requirements for facility or installation interfaces, nuclear safety, structural design, thermal design, accountability, safeguards, decommissioning, and quality assurance. The standard is not concerned with the storage of the identified fuel characterized as either new or fuel that has been out of service for 5 years or more after the consolidation process. These areas are covered in the following American National Standards: Design Requirements for Light Water Reactor Spent Fuel Facilities at Nuclear Power Plants, ANSI/ANS-57.2-1992. Design Criteria for an Independent Spent Fuel Storage Installation (Water Pool Type), ANSI/ANS-57.7-1992. Design Criteria for an Independent Spent Fuel Storage Installation (Dry Storage Type), ANSI/ANS-57.9-1992.

ANSI/ANS 57.8-1995 (R2017), Fuel Assembly Identification
This standard describes requirements for the unique identification of fuel assemblies utilized in nuclear power plants. It defines the characters and proposed sequence to be used in assigning identification to fuel assemblies. This standard was developed primarily for commercial light-water reactor fuel, but may be used for any reactor fuel contained in discrete fuel assemblies that are identified by a serial number as prescribed by this standard. Additionally, this standard describes requirements for a matrix system for identification in mapping the location of fuel rods within a fuel assembly. The matrix system establishes unique y-x coordinates for each possible rod location.

ANSI/ANS 58.14-2011 (R2017), Safety and Pressure Integrity Classification Criteria for Light Water Reactors
This standard specifies deterministic criteria for the safety classification of items (i.e., SSCs and parts (including consumables)) in a LWR NPP as either safety-related (Q), supplemented grade (S), or non-safety-related (N). Criteria provide and establish a procurement subclassification within Class Q, called commercial grade (C). In addition, pressure integrity classification criteria provide for the assignment of Classes 1 to 5 to the pressure-retaining portion of items.

ANSI/ANS 58.16-2014, Safety Categorization and Design Criteria for Non-Reactor Nuclear Facilities
This standard specifies criteria for categorization of SSCs and SACs that have a safety function based on radiological and/or chemical dose and exposure levels for the public, and workers. The safety categorization leads to codes and standards that are needed for reliable design, construction and operations commensurate with the safety categorization. (Comments accepted on substantive changes only.)

ANSI/ANS 58.3-1992 (R2008), Physical Protection for Nuclear Safety-Related Systems and Components
This standard sets forth physical protection criteria for nuclear safety-related systems and components in stations using light water reactors (LWRs). This standard includes an identification of potential hazards to nuclear safety-related systems and components and acceptable means of ensuring the protection of this equipment from these hazards.

This standard establishes time response design criteria for safety-related operator actions to be used in the design of light water reactor (LWR) nuclear power plants. The criteria are used to determine the minimum response time intervals for safety-related operator actions that are taken to mitigate design basis events (DBEs) which result in an automatic reactor trip. This standard specifies time requirements that are to be met to receive credit in the safety analysis for operator actions that initiate or control safety-related functions.

This standard provides criteria for the designer which interpret the requirements of Title 10, Code of Federal Regulations, Part 50, “ Licensing of Production and Utilization Facilities,” Appendix A, “General Design Criteria for Nuclear Power Plants,” with respect to design against single failures in safety-related Light Water Reactor (LWR) fluid systems. Means of treating both active and passive failures are addressed for safety-related fluid systems following various initiating events. Current acceptable practice is used as a basis for these criteria.

This standard provides functional, performance, and initial design requirements for the fuel oil system for diesel generators that provide safety-related emergency onsite power for light water reactor nuclear power plants. This standard addresses the mechanical equipment associated with the fuel oil system, with the exception of the engine mounted components. These components, which are mounted directly to the engine structure itself, are excluded except to define interface requirements. It also includes the instrumentation and control functional requirements. The standard excludes motors, motor control centers, switchgear, cables, and other electrical equipment.
ANSI/ANS 59.52-1998 (R2015), Lubricating Oil Systems for Safety-Related Emergency Diesel Generators

This standard provides functional, performance, and design requirements for lubricating oil systems for diesel generators that provide emergency onsite power for light water reactor nuclear power plants. The standard addresses all mechanical equipment associated with the lubricating oil system, with the exception of engine mounted components. These components, which are mounted directly to engine structure itself, are excluded, except to define interface requirements. This standard also includes the lubricating oil system instrumentation and control functional requirements. It excludes motors, motor control centers, switchgear, cables, and other electrical equipment.

ANSI/ANS 6.1.2-2013, Neutron and Gamma-Ray Cross Sections for Nuclear Radiation Protection and Shielding Calculations for Nuclear Power Plants

This standard specifies neutron and gamma-ray cross sections and related group-averaged or derived data for the energy range and materials of importance in nuclear radiation protection and shielding calculations for nuclear power plants.

ANSI/ANS 6.3.1-1987 (R2015), Program for Testing Radiation Shields in Light Water Reactors (LWR)

This standard describes a test program to be used in evaluating biological radiation shielding in nuclear reactor facilities under normal operating conditions including anticipated operational occurrences. The program encompasses examining and testing to be performed before startup, during startup, and testing subsequent to the startup phase. Post startup tests are required for the shielded components which do not contain sufficient radioactivity during the startup phase to allow valid testing. Shielding of these components is to be tested when radiation sources develop or are introduced into sufficient strength to allow meaningful measurements.

ANSI/ANS 6.4-2006 (R2016), Nuclear Analysis and Design of Concrete Radiation Shielding for Nuclear Power Plants

The standard contains methods and data needed in design of concrete shielding required for protection of personnel and equipment against the effects of gamma rays and neutrons. Specific guidance is given regarding attenuation calculations, shielding design, and standards of documentation.

ANSI/ANS 6.4.2-2006 (R2016), Specification for Radiation Shielding Materials

The standard sets forth physical and nuclear properties that shall be reported by the supplier as appropriate for a particular application in order to form the basis for the selection of radiation shielding materials.

ANSI/ANS 6.6.1-2015, Calculation and Measurement of Direct and Scattered Radiation from LWR Nuclear Power Plants

This standard defines calculational requirements and discusses measurement techniques for estimates of dose rates near light water reactor (LWR) nuclear power plants due to direct and scattered gamma-rays from contained sources on-site. On-site locations outside plant buildings and locations in the offsite unrestricted area are considered. The standard includes normal operation and shut-down conditions but does not address accident or normal operational transient conditions.

ANSI/ANS 8.1-2014, Nuclear Criticality Safety in Operations with Fissionable Materials Outside Reactors

This standard is applicable to operations with fissionable materials outside reactor reactors, except for the assembly of these materials under controlled conditions, such as in critical experiments. Generalized basic criteria are presented and limits are specified for some single fissionable units of simple shape containing 233U, 235U, or 239Pu, but not for multi-unit arrays. Requirements are stated for establishing the validity and areas of applicability of any calculational method used in assessing nuclear criticality safety.


This standard provides criteria that may be used for operations outside of nuclear reactors with 235U, 233U, 239Pu, and other fissile and fissionable materials in which shielding and confinement are provided for protection of personnel and the public, except for the assembly of these materials under controlled conditions (e.g., critical experiments).


This standard provides guidance for operations with plutonium-uranium oxide fuel mixtures outside nuclear reactors. The principal objective of this standard is to provide subcritical configuration data for MOX fuel for various isotopic compositions and powder/pellet densities.

ANSI/ANS 8.14-2004 (R2016), Use of Soluble Neutron Absorbers in Nuclear Facilities Outside Reactors

The Standard provides guidance for the use of soluble neutron absorbers for criticality control. The Standard addresses neutron absorber selection, system design and modifications, safety evaluations, and quality control programs.

ANSI/ANS 8.15-2014, Nuclear Criticality Control of Selected Actinide Nuclides

This standard is applicable to operations with the following nuclides: 232U, 234U, 237Np, 236Pu, 238Pu, 240Pu, 241Pu, 242Pu, 241Am, 242mAm, 243Am, 242Cm, 243Cm, 244Cm, 245Cm, 246Cm, 247Cm, 249Cf and 251Cf. Subcritical mass limits are presented for isolated units. The limits are not applicable to interacting units.


This standard provides nuclear criticality safety criteria for the handling, storage, and transportation of LWR fuel rods and units outside reactor cores.


Recirculation of draft to approve substantive change. This standard provides criteria for the administration of a nuclear criticality safety program for operations with fissile materials outside of nuclear reactors in which there exists a potential for nuclear criticality accidents. This standard addresses the responsibilities of management, supervision, and nuclear criticality safety staff. It also addresses operating procedures, nuclear criticality safety evaluations, and materials control.

ANSI/ANS 8.20-1991 (R2015), Nuclear Criticality Safety Training

This standard provides criteria for nuclear criticality safety training for personnel associated with operations outside reactors where a potential exists for criticality accidents. It is not sufficient for the training of nuclear criticality safety staff.

ANSI/ANS 8.21-1995 (R2011), Use of Fixed Neutron Absorbers in Nuclear Facilities Outside Reactors

This standard provides guidance for the use of fixed neutron absorbers, including Rasmig Rings or similar absorbers as an integral part of nuclear facilities or fissionable material process equipment outside reactors, where such absorbers provide criticality safety control.

ANSI/ANS 8.22-1997 (R2016), Nuclear Criticality Safety Based on Limiting and Controlling Moderators

This standard applies to limiting and controlling moderators to achieve criticality safety in operations with fissionable materials in a moderator control area. This standard does not apply to concentration control of fissionable materials.

ANSI/ANS 8.23-2007 (R2012), Nuclear Criticality Accident Emergency Planning and Response

This standard provides criteria for minimizing risks to personnel during emergency response to a nuclear criticality accident outside reactors. This standard applies to facilities for which a criticality accident alarm system, as specified in American National Standard Criticality Accident Alarm System, ANSI/ANS-8.3.1997, is in use. This standard does not apply to nuclear power plant sites or to those licensed research reactor facilities, which are addressed by other standards.


Provides requirements and recommendations for validation, including establishing applicability, of neutron transport calculational methods used in determining critical or subcritical conditions for nuclear criticality safety analyses.
ANSI/ANS 8.26-2007 (R2016), Criticality Safety Engineer Training and Qualification Program
This standard presents the fundamental elements of a training and qualification program for individuals with responsibilities for performing the various technical aspects of criticality safety engineering. The standard presents a flexible array of competencies for use by management to develop tailored training and qualification programs applicable to site-specific job functions, facilities and operations.

ANSI/ANS 8.27-2015, Burnup Credit for LWR Fuel
This standard provides criteria for accounting for reactivity effects of fuel irradiation and radioactive decay in criticality safety control of storage, transportation, and disposal of commercial LWR UO2 fuel assemblies. This standard assumes the fuel and any fixed burnable absorbers are contained in an intact assembly. Additional considerations could be necessary for fuel assemblies that have been disassembled, consolidated, damaged, or reconfigured in any manner.

ANSI/ANS 8.3-1997 (R2012), Criticality Accident Alarm System
This standard is applicable to operations with fissionable materials in which inadvertent criticality could occur leading to an excessive radiation dose to personnel. This standard is not applicable to nuclear reactors or critical experiments.

ANSI/ANS 8.5-1996 (R2012), Use of Borosilicate-Glass Raschig Rings as a Neutron Absorber in Solutions of Fissile Material
This standard provides guidance for the use of borosilicate-glass raschig rings as a neutron absorber for criticality control in ring-packed vessels containing solutions of 235U, 239Pu, or 233U. The chemical and physical environment, properties of the rings and packed vessels, maintenance inspection procedures, and operating guidelines are specified.

ANSI/ANS 8.6-1983 (R2010), Safety in Conducting Subcritical Neutron Multiplication Measurements in Situ
This standard provides safety guidance for conducting subcritical neutron-multiplication measurements where physical protection of personnel against the consequences of a criticality accident is not provided. The objectives of in situ measurements are either to confirm an adequate safety margin or to improve an estimate of such a margin. The first objective may constitute a test of the criticality safety of a design that is based on calculations. The second may effect improved operating conditions by reducing the uncertainty of safety margins and providing guidance to new designs.

ANSI/ANS 8.7-1998 (R2012), Nuclear Criticality Safety in the Storage of Fissile Materials
This standard is applicable to the storage of fissile materials. Mass and spacing limits are tabulated for uranium containing greater than 30 wt-% 235U, for 233U, and for plutonium, as metals and oxides. Criteria for the range of application of these limits are provided.

APA (APA - The Engineered Wood Association)

ANSI 405-2013, Standard for Adhesives for Use in Structural Glued Laminated Timber
This standard provides minimum performance requirements for evaluating adhesives for use in structural glued laminated timber (glulam).

ANSI A190.1-2017, Standard for wood products - Structural Glued Laminated Timber
This standard contains requirements for the manufacture and quality control of structural glued laminated timber.

This standard provides basic design information for structural glued laminated timber (glulam)

This standard covers manufacturing, qualification, quality assurance, design, and installation requirements for performance-rated cross-laminated timber products

ANSI/APA PRP 210-2014, Standard for Performance-rated Engineered Wood Siding
Covers manufacturing, qualification, and quality assurance requirements for engineered wood siding products

ANSI/APA PRR 410-2016, Standard for Performance-rated Engineered Wood Rim Boards
This standard provides dimensions and tolerances, performance requirements, test methods, quality assurance, and trademarking for engineered wood rim boards.

ANSI/APA PRS 610.1-2013, Standard for Performance-rated Structural Insulated Panels in Wall Applications
This standard covers manufacturing, qualification, quality assurance, and trademarking requirements for structural insulated panels used in wall applications

APCPO (Association of Public-Safety Communications Officials-International)

ANSI/APCPO 1.101.3-2015, Standard for Public Safety Telecommunicators When Responding to Calls of Missing, Abducted and Sexually Exploited Children
This standard is a reference specifically for public safety telecommunicators to present the missing, abducted and/or sexually exploited child response process in a logical progression from the first response (initial call intake and information entry) through ongoing incident and case support (data query, entry and management in support of field/investigative work).

ANSI/APCPO 1.103.2-2013, Wireless 9-1-1 Deployment & Management Effective Practices Guide
Designed to increase the Public Safety Answering Point (PSAP) Managers Understanding of the technology application and the ability to better manage wireless calls, as well as public and responder expectations.

This standard defines the recommended minimum components of a Quality Assurance/Quality Improvement (QA/QI) program within a public safety communications center. It recommends best practices for implementing the QA/QI program to evaluate the performance of public safety communications personnel.

ANSI/APCPO 1.110.1-2015, Multi-Functional Multi-Discipline Computer Aided Dispatch (CAD) Minimal Functional Requirements
This document will include a detailed, comprehensive and unified list of functional requirements for CAD systems that may be used by public safety communications centers to assist with the Request for Proposal (RFP) Process. Each CAD function will be identified along with a visual flag to indicate what service(s) (law enforcement, fire, EMS) the function applies to. Sample requirements for each function will be provided that can be incorporated in a RFP when a public safety communications center has a need to conduct a solicitation for a new CAD system.
Additionally, minimum requirements for multi functional multi discipline CAD systems will be identified.

ANSI/APCPO 1.111.1-2013, Public Safety Communications Common Disposition Codes for Data Exchange
This document is intended to provide a list of Common Incident Disposition Codes that could be used when disparate PSAPs/authorized agencies are sharing incident information. This standard was drafted, in part, to complement the work being done for the Emergency Incident Data Document (EIDD) that will provide a NIEM conformant data exchange standard for sharing comprehensive incident information. The standard does not require an agency to change any internal codes; it simply provides a list of common codes to which the agency can map their internal data.

ANSI/APCPO 1.112.1-2014, Best Practices for the Use of Social Media by Public Safety Communications
Social media is a common form of communication used by agencies and agency employees. This standard provides guidance on the use of social media for developing specific local procedures (ex: Facebook, Twitter, Instagram, Google+, etc).
ANSI/APCO 1.116.1-2015, Public Safety Communications Common Status Codes for Data Exchange

This document is intended to provide a list of Common Status Codes to be used when disparate authorized agencies share incident information. This standard will complement the work being done for the Emergency Incident Data Document (EIDD) that will provide a NIEM conformant data exchange standard for sharing incident information. The standard does not require an agency to change any internal codes; it simply provides a list of common codes to which the agency can map their internal data.

ANSI/APCO 2.103.1-2012, Public Safety Communications Common Incident Types for Data Exchange

To provide a comprehensive list of terms and associated acronyms that can be used to classify the situation (incident) that Public Safety Answering Points (PSAPs) and emergency responders are engaged in. The list of terms, Incident Type Codes will encompass situations that involve a multi-discipline combination of resources. The standardized Incident Types will be used whenever a PSAP shares incident information externally with other PSAPs, emergency service responders or other authorized agencies.

ANSI/APCO 3.101.2-2013, Core Competencies and Minimum Training Standards for Public Safety Communications Training Officer (CTO)

To identify core competencies and minimum training requirements for Public Safety Communications Training Officers.

ANSI/APCO 3.102.1-2012, Core Competencies and Minimum Training Standards for Public Safety Communications Supervisor

This candidate standard identifies the core competencies and minimum training requirements for Public Safety Communications Supervisors. This position is typically tasked with managing daily operations, performing administrative duties and maintaining employee relations. This position provides leadership and guidance to employees in order to achieve the Agency’s mission, while providing service to the public and emergency responders.

ANSI/APCO 3.104.1-2012, Core Competencies and Minimum Training Standard for Public Safety Communications Training Coordinator

Identifies the core competencies and minimum training requirements for Public Safety Communications Training Coordinators. This position is typically tasked with the planning, development, coordination, implementation, and administration of training within the Agency. This document seeks to define the knowledge, skills, competencies, and minimum training requirements of the individual responsible for the training program, as well as the agency’s responsibilities for providing training to individuals in this critical function.

ANSI/APCO 3.105.1-2015, Minimum Training Standard for TTY/TDD Use in the Public Safety Communications Center

This standard defines the minimum training requirements in the development of a comprehensive training program for providing equal access to emergency services for the Deaf, Deaf-blind and Hard of hearing through a TTY/TDD or similar device.

ANSI/APCO 3.106.1-2013, Core Competencies and Minimum Training Standards for Public Safety Communications Quality Assurance Evaluator (QAE)

To identify the core competencies and minimum training standards for Public Safety Communications quality assurance evaluators.


To identify core competencies and minimum training requirements for various technical support positions in Public Safety Communications.

ANSI/APCO 3.108.1-2014, Core Competencies and Minimum Training Standards for Public Safety Communications Instructor

To identify core competencies and minimum training requirements for Public Safety Communications instructors.

ANSI/APCO 3.109.1-2014, Core Competencies and Minimum Training Standards for Public Safety Communications Manager/Director

This standard revision identifies the core competencies and minimum training requirements for the Public Safety Communications Manager/Director, referred to as Manager/Director in this standard. This position is typically tasked with managing and directing all aspects of a public safety communications center, while effectively utilizing leadership skills, resources, and partnerships in order to successfully provide emergency communications service.

ANSI/APCO/CSAA 2.101.2-2014, Alarm Monitoring Company to PSAP CAD

Automated Secure Alarm Protocol (ASAP) This standard provides the technical documentation for creating a data exchange to transmit information between an Alarm Monitoring Company and a Public Safety Answering Point (PSAP). The primary uses include: 1. Initial notification of an alarm event by an alarm monitoring company to a PSAP 2. Update of status by the PSAP’s CAD system to the alarm monitoring company 3. Bi-directional update of other events between an alarm monitoring company and a PSAP The standard also includes case examples and best practices for user agencies and organizations.

ANSI/APCO/NENA 1.102.1-2010, Service Capability Criteria Rating Scale

To assist PSAP Managers and their Governing Authorities to identify their current level of service capability. An assessment tool is provided to facilitate an objective review of the current capabilities of the PSAP against models representing the best level of preparedness, survivability and sustainability amidst a wide range of natural and man-made events. The self-evaluation assessment tool is also intended to provide the basis for discussion with funding bodies concerning the PSAP status in regard to their current technological position, and readiness or effectiveness to survive certain risks associated with local vulnerabilities.

ANSI/APCO/NENA 1.105.2-2015, Standard for Telecommunicator Emergency Response Taskforce (TERT) Deployment

This document includes information to provide guidance and helpful information regarding the development, maintenance, and deployment of a Telecommunicator Emergency Response Taskforce (TERT).


This standard will develop and implement the NIEM-conformant NG9-1-1 EIDD Exchange Standard to be used by NG9-1-1 systems to exchange incident information between disparate vendor systems. It will define specific incident elements, attributes, and data structures in a NIEM-conformant XML schema and associated documents.

ANSI/APCO/NPSTC 1.104.2-2017, Standard Channel Nomenclature for the Public Safety Interoperability Channels

Standard nomenclature for interoperability channels within the public safety 700 MHz narrowband channels. Common/interoperable public safety radio channel naming protocols and procedures.

APCO ANSI 3.103.2-2015, Minimum Training Standards for Public Safety Telecommunicators

This standard identifies minimum training requirements for both new and veteran Public Safety Telecommunicators. This position is typically tasked with receiving, processing, transmitting, and conveying public safety information to dispatchers, law enforcement officers, firefighters, emergency medical and emergency management personnel. This document seeks to define training in certain knowledge and skills for the Agency to provide to Telecommunicators. The 2013 revision will include defined training needs for Telecommunicators on new and emerging technologies, including text-to-911.

API (American Petroleum Institute)

ANSI/API 11D2/ISO 15136-1-2010, Specification for Progressive Cavity Pump Systems for Artificial Lift - Pumps

Provides design validation, manufacturing and data control performance ratings and repair of progressive cavity pumps for use in the petroleum and natural gas industry.
ANSI/API 13M/ISO 13503-1-2004 (R2010), Recommended Practice for the Measurement of Viscous Properties of Completion Fluids

Provides consistent methodology for determining the viscosity of completion fluids used in the petroleum and natural gas industries. For certain cases, methods are also provided to determine the rheological properties of a fluid.


Establishes requirements and provides guidelines for configuration, installation, test, operation and documentation of subsurface safety valve (SSSV) systems. In addition, this standard establishes requirements and provides guidelines for selection, handling, redress and documentation of SSSV Downhole production equipment.


This recommended practice provides informative documentation to assist the user/purchaser and the supplier/manufacturer in specification, design, selection, testing, calibration, reconditioning, installation and use of side-pocket mandrels, flow-control devices and associated latches and installation tools.

ANSI/API 521-2006, Petroleum, Petrochemical, and Natural Gas Industries - Pressure Relieving and Depressurising Systems (ISO 23251)

Applicable to pressure-relieving and vapor-depressurising systems. Although intended for use primarily in oil refineries, it is also applicable to petrochemical facilities, gas plants, liquefied natural gas (LNG) facilities and oil and gas production facilities. The information provided is designed to aid in the selection of the system that is most appropriate for the risks and circumstances involved in various installations.

ANSI/API 613-2002 (R2010), Special Purpose Gear Units for Petroleum, Chemical, and Gas Industry Services

API 613 covers the minimum requirements for special-purpose, enclosed, precision single- and double-helical one- and two-stage increasers and reducers of parallel-shaft design for refinery services. This standard is primarily intended for gears that are in continuous service without installed spare equipment.

ANSI/API 671/ISO Standard 10441-2007 (R2010), Special Purpose Couplings for Petroleum, Chemical and Gas Industry Services

Specifies the requirements for couplings for the transmission of power between the rotating shafts of two machines in special-purpose applications in the petroleum, petrochemical and natural gas industries. Such applications are typically in large and/or high speed machines, in services that can be required to operate continuously for extended periods, are often unspered and are critical to the continued operation of the installation.

ANSI/API 689/ISO 14224-2007, Petroleum, petrochemical and natural gas industries - Collection and exchange of reliability and maintenance data for equipment

This International Standard provides a comprehensive basis for the collection of reliability and maintenance (RM) data in a standard format for equipment in all facilities and operations within the petroleum, natural gas and petrochemical industries during the operational life cycle of equipment.

ANSI/API 6DX-201/ISO 12490-2011, Mechanical integrity and sizing of actuators and mounting kits for pipeline valves

This International Standard defines the requirements for mechanical integrity and sizing of actuators used on valves manufactured under ISO 14313 and API Specification 6D. This International Standard is applicable to all types of electric, pneumatic and hydraulic actuators, inclusive of mounting kit, installed on pipeline valves.

ANSI/API Bulletin 100-3-2014, Community Engagement Guidelines

These guidelines outline what communities can expect from operators. It is designed to acknowledge challenges and impacts that occur during the industry's presence in a given region. It provides flexible and adaptable strategies, recognizing that application will vary from operator to operator and community to community.


This standard provides a single reference for engineering equations, uncertainty estimations, construction and installation requirements, and standardized implementation recommendations for the calculation of flow rate through concentric, square-edged, flange-tapped orifice meters. Both U.S. customary (U.S.C), inch pound (IIP) and international system of units (SI) units are included.

ANSI/API MPMS CH. 14.3.3-2012, Orifice Metering of Natural Gas and Other Related Hydrocarbon Fluids, Natural Gas Applications

This part of API MPMS Chapter 14.3 has been developed as an application guide for the calculation of natural gas flow through a flange-tapped, concentric orifice meter.

ANSI/API MPMS Ch. 21.1-2011, Electronic Gas Measurement

Describes the minimum specifications for electronic gas measurement systems used in the measurement and recording of flow parameters of gaseous phase hydrocarbons.

ANSI/API MPMS Ch. 5.8-2011, Measurement of Liquid Hydrocarbons by Ultrasonic Flowmeters Using Transit Time Technology

The scope of this document will define the application criteria for UFMs and address the appropriate considerations regarding the liquids to be measured. This document will address the installation, operation, and maintenance of UFMs in liquid hydrocarbon service.


This document establishes design and installation parameters for measurement of fluid flow using concentric, square-edged, flange-tapped orifice meters.


Describes the calibration of vertical cylindrical tanks by means of optical triangulation using theodolites. The method is an alternative to other methods such as strapping (MPMS Chapter 2.2A) and the optical-reference-line method (MPMS Chapter 2.2B). This edition of Chapter 2.2C is the modified national adoption of ISO 7507-3:1993.


 Specifies manual methods for the calibration of nominally horizontal cylindrical tanks, installed at a fixed location. It is applicable to horizontal tanks up to 4 m (13 ft) in diameter and 30 m (100 ft) in length. The methods are applicable to insulated and non-insulated tanks, either when they are above-ground or underground. The methods are applicable to pressurized tanks, and to both knock-down-end and flat-end cylindrical tanks as well as elliptical and spherical head tanks. This Chapter is applicable to tanks inclined by up to 10 % from the horizontal provided a correction is applied for the measured tilt.


Specifies a method for the calibration of horizontal cylindrical tanks having diameters greater than 2 m (6 ft) by means of internal measurements using an electro-optical distance-ranging instrument, and for the subsequent compilation of tank-capacity tables.

This document is for the development of testing protocols and to serve as a guideline to document performance characteristics of hydrocarbon fluid measurement related devices.

ANSI/API MPMS Chapter 22.3, 1st Edition-2015, Flare Gas Meters

The scope of the standard is to describe a testing protocol for flare gas meters. This includes a discussion of the testing to be performed, how the test data should be analyzed, and how an uncertainty is determined from the testing of the meter.

ANSI/API MPMS Chapter 5.6, 1st Edition-2007 (R2015), Measurement of Liquid Hydrocarbons by Coriolis Meters

Describes methods for achieving custody transfer levels of accuracy when a Coriolis meter is used to measure liquid hydrocarbons. Topics covered include: applicable API standards used in the operation of Coriolis meters; proving and verification using both mass- and volume-based methods; installation, operation, and maintenance. Both mass and volume-based calculation procedures for proving and quantity


This International Standard specifies the essential requirements and verification procedures for automatic tank thermometers (ATTs) consisting of platinum resistance thermometers (PRT) and an indicating device used for custody transfer measurement of liquefied natural gas, liquefied petroleum and chemical gases on board ships. Temperature detectors other than PRT are considered acceptable for use in the custody transfer service of liquefied gases if they meet the performance requirements of this International Standard and are approved by national regulations.


This standard covers the continuous on-line determination and application of flowing liquid densities for custody transfer. This standard covers liquid and dense phase fluids including: natural gas liquids, refined products, chemicals, crude oil and other liquid products commonly encountered in the petroleum industry. This document does not apply to the density measurement of natural gas, LNG, multiphase mixtures, semi-solid liquids such as asphalt, and solids such as coke and slurries. This standard also provides criteria and procedures for designing, installing, operating and proving continuous on-line density measurement systems for custody transfer.

ANSI/API Recommended Practice 2EQ-2014, Seismic Design Procedures for Offshore Structures

This standard contains requirements for defining the seismic design procedures and criteria for offshore structures. The requirements are applicable to fixed steel structures and fixed concrete structures. The effects of seismic events on floating structures and partially buoyant structures are also briefly discussed. The site-specific assessment of jack-ups in elevated condition is only covered to the extent that the requirements are applicable.

ANSI/API Recommended Practice 2GEO-2014, Geotechnical and Foundation Design Considerations

This document contains requirements and recommendations for those aspects of geoscience and foundation engineering that are applicable to a broad range of offshore structures, rather than to a particular structure type. Such aspects are site characterization, soil and rock characterization, design and installation of foundations supported by the seabed (shallow foundations), identification of hazards, and design of pile foundations. Aspects of soil mechanics and foundation engineering that apply equally to offshore and onshore structures are not addressed. The user of this part of this document is expected to be familiar with such aspects.

ANSI/API Recommended Practice 2MOP-2010 (R2015), Marine Operations

API 2MOP provides requirements and guidance for the planning and engineering of marine operations, encompassing the design and analysis of the components, systems, equipment and procedures required to perform marine operations, as well as the methods or procedures developed to carry them out safely. This standard is applicable to marine operations for offshore structures.

ANSI/API Recommended Practice 2N-2015, Planning, Designing, and Constructing Structures and Pipelines for Arctic Conditions

This standard specifies requirements and provides recommendations and guidance for the design, construction, transportation, installation and removal of offshore structures, related to the activities of the petroleum and natural gas industries in arctic and cold regions. While this standard does not apply specifically to mobile offshore drilling units, the procedures relating to ice actions and ice management contained herein are applicable to the assessment of such units.


This recommended practice (RP) identifies leading and lagging process safety indicators useful for driving performance improvement. As a framework for measuring activity, status or performance, this document classifies process safety indicators into four tiers of leading and lagging indicators. Tiers 1 and 2 are suitable for nationwide public reporting and Tiers 3 and 4 are intended for internal use at individual facilities. Guidance on methods for development and use of performance indicators is also provided.

ANSI/API RP 100-2-2015, Environmental Aspects Associated with E&P Operations including Hydraulic Fracturing

This document provides recommended practices applicable to the planning and operation of wells, and hydraulically fractured wells. Topics covered include recommendations for managing environmental aspects during planning; site selection; logistics; mobilization, rig-up, and demobilization; and stimulation operations. Also, this document includes guidance for managing environmental aspects during well construction.

ANSI/API RP 10B-3/ISO 10426-3-2010 (R2015), Recommended Practice on Testing of Deepwater Well Cement Formulations

Provides procedures for testing well cements and cement blends for use in the petroleum and natural gas industries in a deepwater environment.

ANSI/API RP 10B-4/ISO 10426-4-2010 (R2015), Recommended Practice on Preparation and Testing of Foamed Cement slurries at Atmospheric Pressure

Defines the methods for the generation and testing of foamed cement slurries and their corresponding unfoamed base cement slurries at atmospheric pressure.

ANSI/API RP 10B-5/ISO 10426-5-2010 (R2015), Recommended Practice on Determination of Shrinkage and Expansion of Well Cement Formulations at Atmospheric Pressure

Provides the methods for the testing of well cement formulations to determine the dimension changes during the curing process (cement hydration) at atmospheric pressure only. This is a base document, because under real well cementing conditions shrinkage and expansion take place under pressure and different boundary conditions.

ANSI/API RP 10B-6/ISO 10426-6-2010 (R2015), Recommended Practice on Determining the Static Gel Strength of Cement Formulations

Specifies requirements and provides test methods for the determination of static gel strength (SGS) of cement slurries and related materials under simulated well conditions.

ANSI/API RP 10B-2/ISO 10427-2-2004 (R2015), Recommended Practice for Centralizer Placement and Stop Collar Testing

Provides calculations for determining centralizer spacing, based on centralizer performance and desired standoff, in deviated and dogleg holes in wells for the petroleum and natural gas industries. It also provides a procedure for testing stop collars and reporting test results.
ANSI/API RP 10F/ISO 10427-3-2010 (R2015),
Recommended Practice for Performance
Testing of Cementing Float Equipment
Describes testing practices to evaluate the
performance of cementing float equipment for the
petroleum and natural gas industries. This
recommended practice is applicable to float
equipment that will be in contact with water based
fluids used for drilling and cementing wells. It is not
applicable to float equipment performance in non-
water-based fluids.

ANSI/API RP 1173-2015, Pipeline Safety
Management Systems
This recommended practice (RP) establishes a
framework of pipeline safety management systems
for organizations that operate hazardous liquids and
gas pipelines jurisdictional to the US DOT. This RP
provides pipeline operators with safety management
system requirements that when applied provide a
framework to reveal and manage risk, promote a
learning environment, and continuously improve
pipeline safety and integrity. This RP provides a
comprehensive framework and defines the elements
needed to identify and address safety for a pipeline’s lifecycle

ANSI/API RP 13B-1/ISO 10414-1-2008,
Recommended Practice for Field Testing
Water-Based Drilling Fluids
Covers equipment and standard procedures for field
testing water-based drilling fluids.

ANSI/API RP 13I/ISO 10416-2008,
Recommended Practice for Laboratory
Testing Drilling Fluids
Provides procedures for the laboratory testing of both
drilling fluid materials and drilling fluid physical,
chemical and performance properties. It is applicable
to both water-based and oil-based drilling fluids, as
well as the base or ‘make-up’ fluid.

ANSI/API RP 13M/ISO 13503-4-2006,
Recommended Practice for Measuring
Stimulation and Gravel-pack Fluid Leakoff
Under Static Conditions
Provides for consistent methodology to measure fluid
loss of stimulation and gravel-pack fluid under static
conditions. Excludes fluids that react with porous media.

ANSI/API RP 17G/ISO 13628-7-2006 (R2016),
Recommended Practice for
Completion/Workover Riser Systems
This part of ISO 13628 gives requirements and
recommendations for the design, analysis, materials,
fabrication, testing and operation of subsea
completion / workover (C/WO) riser systems run from a
floating vessel.

ANSI/API RP 17P/ISO 13628-15-2011,
Recommended Practice for Manifolds and
Structures on Subsea Production Systems
Addresses specific requirements and
recommendations for subsea structures and
manifolds, within the frameworks set forth by
recognized and accepted industry specifications and
standards. As such, this standard does not supersede or
eliminate any requirement imposed by any other
industry specification.

ANSI/API RP 19C-ISO 13503-2, 1st Edition-2007,
Recommended Practice for Measurement of Properties of Proppants
Used in Hydraulic Fracturing and Gravel-pack Operations
Provides standard testing for evaluating proppants
used in hydraulic fracturing and gravel-pack operations
and a consistent methodology for testing performed on hydraulic fracturing and/or gravel-
packagin proppants.

ANSI/API RP 19D/ISO 13503-5, 1st Edition-2007,
Recommended Practice for Measuring the Long-term Conductivity of Proppants
Provides standard testing procedures for evaluating proppants used in hydraulic fracturing and gravel-
packagin operations.

ANSI/API RP 19F/ISO 13678, 1st Edition-2009,
Recommended Practice on Thread Compounds for Casing, Tubing, Line Pipe, and Drill Stem Elements
This International Standard provides requirements, recommendations and methods for the testing of thread compounds intended for use on ISO/API thread forms, as well as proprietary casing, tubing, line pipe and drill stem elements with rotary
shouldered connections. The tests outlined are used to evaluate the critical performance properties and
physical and chemical characteristics of thread compounds under laboratory conditions.

ANSI/API RP 19G/ISO 13629-2008,
Recommended Practice for Measuring Proppants Used in Gravel-pack Operations
Specifies the required inspection for each level of
loading of rail tank cars. The document also provides
guidance on the documentation of measurement results. This document identifies the criteria for
determining the frequency that the crude oil should be sampled and tested. This document applies only to petroleum crude oil classified as Hazard Class 3 flammable liquids under the U.S. Code of Federal Regulations (CFR) at the time of publication.

(R2015), Recommended Practice on Thread
Compounds for Casing, Tubing, Line Pipe, and Drill Stem Elements
This International Standard provides requirements, recommendations and methods for the testing of thread compounds intended for use on ISO/API thread forms, as well as proprietary casing, tubing, line pipe and drill stem elements with rotary
shouldered connections. The tests outlined are used to evaluate the critical performance properties and
physical and chemical characteristics of thread compounds under laboratory conditions.

ANSI/API RP 5A5/ISO 15463-2010 (R2015), Field
Inspection of New Casing, Tubing, and Plain-
end Drill Pipe
Reaffirmation of API RP 5A5/ISO 15463. International
Standard covers the practices and technology
commonly used in field inspection; however, certain
practices may also be suitable for mill inspections.
Covers the qualification of inspection personnel, a
description of inspection methods and apparatus
calibration and standardization procedures for
various inspection methods. The evaluation of
imperfections and marking of inspected OCTG is
included. Applies to field inspection of OCTG and is
not applicable for use as a basis for acceptance or
rejection.

Report on Equations and Calculations for
Casing, Tubing, and Line Pipe used as Casing or Tubing; and Performance Tables for Casing and Tubing
Provides formulas used in the calculations of various pipe properties, and background information
regarding their development and use.

-2009 (R2015), Recommended Practice for
Drill Stem Element Inspection
Specifies the required inspection for each level of
inspection and testing for the loading of drill stem elements. For the purpose of this
standard, drill stem elements include drill pipe
body, tool joints, rotary-shouldered connections, drill
collar, HWDP and the ends of drill stem elements that
make up with them. This standard has been prepared to
address the practices and technology commonly
used in inspection.

ANSI/API RP-780-2013, Security Risk
Assessment Methodology for the Petroleum and Petrochemical Industries
Provides guidance to the petroleum and
petrochemical industries in understanding security
risk assessment and in conducting SVA’s.

-2010 (R2015), Specification for Cements and
Materials for Well Cementing
This standard specifies requirements and gives
recommendations for six classes of well cements,
including their chemical and physical requirements
and procedures for physical testing. This part of
ISO 10426 is applicable to well cement classes A, B, C and
D, which are the products obtained by grinding
Portland cement clinker and, if needed, calcium
sulfate as an interground additive. Processing
additives can be used in the manufacture of cement
of these classes. Suitable set-modifying agents can be
interground or blended during manufacture of class D
cement. This is applicable to well cement classes G
and H.
ANSI/API Spec 10D/ISO 10427-1-2010 (R2015), Specification for Bow-Spring Casing Centralizers
Provides minimum performance requirements, test procedures and marking requirements for bow-spring casing centralizers for the petroleum and natural gas industries. The procedures provide verification testing for the manufacturer's design, materials and process specifications, and periodic testing to confirm the consistency of product performance.

This specification provides requirements and guidelines for packers and bridge plugs as defined herein for use in the petroleum and natural gas industry. This specification provides requirements for the functional specification and technical specification, including design, design verification and validation, materials, documentation and data control, repair, shipment, and storage. In addition, products covered by this specification apply only to applications within a conduit. Installation and maintenance of these products are outside the scope of this specification. Note: The new annexes pertain to HPHT and external flow testing requirements.

Provides requirements for the design, design verification and validation, manufacturing and data control, performance tests and repair of progressing cavity pump surface-drive systems for use in the petroleum and natural gas industry. It is applicable to those products meeting the definition of surface-drive systems.

This International Standard covers physical properties and test procedures for materials manufactured for use in oil- and gas-well drilling fluids. The materials covered are barite, haematite, bentonite, non-treated bentonite, OCMA grade bentonite, attapulgite, sepiolite, technical grade low-viscosity carboxymethylcellulose (CMC-LVT), technical grade high-viscosity carboxymethylcellulose (CMC-HVT), starch, low-viscosity polyacrylic cellulose (PAC-LV), high-viscosity polyacrylic cellulose (PAC-HV) and drilling grade Xanthomonas campestris (Xanthan gum). This International Standard is intended for the use of manufacturers of named products.

Provides the requirements for lock mandrels and landing nipples within the production/injection conduit for the installation of flow control or other equipment used in petroleum and natural gas industries. It includes the interface connections of the flow control or other equipment, but does not cover the connections to the well conduit.

ANSI/API Spec 16A/ISO 13533-2001 (R2016), Specification for Drill-through Equipment
This Standard specifies requirements for performance, design, materials, testing and inspection, welding, marking, handling, storing and shipping of drill-through equipment used for drilling for oil and gas. It also defines service conditions in terms of pressure, temperature and wellbore fluids for which the equipment will be designed.

This part of ISO 13628 provides specifications for subsea wellheads, mudline wellheads, drill-through mudline wellheads and both vertical and horizontal subsea trees. Note: Proposed US Regional Annex to 13628-4

Provides the specification for safe, dimensionally and functionally interchangeable subsea wellhead, mudline, and tree equipment. Technical content includes requirements for: - performance; - design; - materials; - testing; - inspection; - welding; - marking; - handling; - storing; and - shipping.

 Specifies requirements and gives recommendations for the design, material selection, manufacture, design verification, testing, installation and operation of subsea control, chemical injection, gas lift, utility and service umbilicals and associated ancillary equipment for the petroleum and natural gas industries. Ancillary equipment does not include top side hardware. Toppiece hardware refers to any hardware which is not permanently attached to the umbilical, above the toppiece hang-off termination.

ANSI/API Spec 17K (ISO 13628-10)-2005 (R2016), Specification for Bonded Flexible Pipe
This part of ISO 13628 defines the technical requirements for safe, dimensionally and functionally interchangeable bonded flexible pipes that are designed and manufactured to uniform standards and criteria.

This International Standard specifies the technical delivery conditions for corrosion-resistant alloy seamless tubulars for casing, tubing and coupling stock for two product specification levels: PSL-1, which is the basis of this International Standard; PSL-2, which provides additional requirements for a product that is intended to be both corrosion resistant and cracking resistant for the environments and qualification method specified in ISO 15156-3 and Annex G of this International Standard. At the option of the manufacturer, PSL-2 products can be provided in lieu of PSL-1.

This International Standard specifies the technical delivery conditions for steel drill-pipes with upset pipe-body ends and weld-on tool joints for use in drilling and production operations in petroleum and natural gas industries for three product specification levels (PSL-1, PSL-2 and PSL-3). This International Standard covers the following grades of drill-pipe: grade E drill-pipe, and high-strength grades of drill-pipe, grades X, G and S. This International Standard can also be used for drill-pipe with tool joints not specified by ISO or API standards. This International Standard is based on API Spec 5D and API Spec 7.

ANSI/API Spec 6A/ISO 10423-2010, Specification for Wellhead and Christmas Tree Equipment
Specifies requirements and gives recommendations for the performance, dimensional and functional interchangeability, design, materials, testing, inspection, welding, marking, handling, storing, shipment, purchasing, repair, and remanufacture of wellhead and christmas tree equipment for use in the petroleum and natural gas industries. This document does not apply to field use, field testing or field repair of wellhead and christmas tree equipment.

This International Standard specifies requirements and gives recommendations for the design, manufacturing, testing and documentation of ball, check, gate and plug valves for subsea application in offshore pipeline systems meeting the requirements of ISO 13623 for the petroleum and natural gas industries. This International Standard is not applicable to valves for pressure ratings exceeding PN 420 (Class 2500).

ANSI/API Spec 7-1-2006, Specification for Rotary Drill Stem Elements
To define the design and the mechanical properties of the material required for rotary drill stem elements.

This International Standard provides requirements and guidelines for completion accessories, as defined herein for use in the petroleum and natural gas industry. This International Standard provides requirements for the functional specification and technical specifications including: design, design verification and validation, materials, documentation and data control, quality requirements, redess, repair, shipment, and storage. This International Standard covers the pressure containing, non-pressure containing, load bearing, disconnect/reconnect, tubing movement, and opening a port functionalities of completion accessories.
ANSI/API Specification 1961-2010, Side-pocket Mandrels
Provides requirements for side-pocket mandrels used in the petroleum and natural gas industry. This specification includes specifying, selecting, designing, manufacturing, quality control, testing, and preparation for shipping of side-pocket mandrels.

This specification provides requirements for subsurface flow-control devices used in side-pocket mandrels intended for use in the petroleum and natural gas industry. This includes requirements for specifying, selecting, designing, manufacturing, quality-control, testing and preparation for shipping of flow-control devices. Additionally, it includes information regarding performance testing and calibration procedures.

Provides requirements and guidelines for running tools, pulling tools, kick-over tools and latches used for the installation and retrieval of flow control and other devices to be installed in side-pocket mandrels for use in the petroleum and natural gas industries. This includes requirements for specifying, selecting, designing, manufacturing, quality control, testing and preparation for shipping of these tools and latches. Additionally, it includes information regarding performance testing and calibration procedures.

ANSI/API Specification 19V/ISO 28781-2013, Subsurface Barrier Valves and Related Equipment
Provides the requirements for subsurface barrier valves and related equipment as they are defined herein for use in the petroleum and natural gas industries. Included are the requirements for design, design validation, manufacturing, functional evaluation, repair, redress, handling and storage. Subsurface barrier valves provide a means of isolating the formation or creating a barrier in the tubular to facilitate the performance of pre- and/or post-production/injection operational activities in the well.

This standard specifies requirements for the following drill stem elements: upper and lower Kelly valves; square and hexagonal Kellys; drill stem sub; standard steel and non-magnetic drill collars; drilling and coring bits. This standard is not applicable to drill pipe and tool joints, rotary shouldered connection designs, thread gauging practice, or grand master, reference master and working gauges.

ANSI/API Standard 2350-2012, Overfill Protection for Storage Tanks in Petroleum Facilities
Assists in the prevention of tank overfills by implementation of a comprehensive Overfill Prevention Process. Intended for storage tanks associated with marketing, refining, pipeline and terminals containing Class I or II petroleum liquids.

ANSI/API Standard 521, Addendum 1-2008, Pressure-relieving and Depressurizing Systems
API 521 is applicable to pressure-relieving and vapor-depressurizing systems. Although intended for use primarily in oil refineries, it is also applicable to petrochemical facilities, gas plants, liquefied natural gas (LNG) facilities and oil and gas production facilities. API 521 specifies requirements and gives guidelines for determining the principal causes of overpressure determining individual relieving rates; and selecting and designing disposal systems, including such component parts as piping, vessels, flares, and vent stacks. This Standard does not apply to direct-fired steam boilers.

ANSI/API Standard 537-2016, Flare Details for Petroleum, Petrochemical and Natural Gas Industries
Specifies requirements and gives guidance for the selection, design, specification, operation and maintenance of flares and related combustion and mechanical components used in pressure-relieving and vapor-depressurizing systems for petroleum, petrochemical and natural gas industries. This standard is primarily for onshore facilities, but guidance for offshore applications is included. Annexes A, B, C and D provide further guidance for the selection, specification and mechanical details for flares and on the design, operation and maintenance of flare combustion and related equipment. Annex E explains how to use the data sheets provided in Annex F.

ANSI/API Standard 610-2009, Centrifugal Pumps for Petroleum, Petrochemical and Natural Gas Industries
Specifies requirements for centrifugal pumps for use in petroleum, petrochemical, and gas industry process services. Applicable to overhung pumps, between bearing pumps, and vertically suspended pumps.

ANSI/API Standard 618-2008 (R2016), Reciprocating Compressors for Petroleum, Chemical, and Gas Industry Services
This standard covers the minimum requirements for reciprocating compressors and their drivers for use in petroleum, chemical, and gas industry services for handling process air or gas with either lubricated or non-lubricated cylinders.

ANSI/API Standard 619-2008, Rotary-Type Positive Displacement Compressors for Petroleum, Petrochemical and Natural Gas Industries
This standard covers the minimum requirements for dry and oil-flooded helical-lobe rotary compressors used for vacuum or pressure or both in petroleum, chemical, and gas industry services. In the past, it has been intended for compressors that are in general-purpose applications, and is not applicable to engines designed for air compressors, liquid-ring compressors, or vane-type compressors.

It is intended for proposed ANSI/API 661 to replace without technical changes, API Standard 661, 7th Ed. Editions of Std. 661 prior to the 7th were American National Standards. This proposed ANSI will give requirements and recommendations for the design, materials, fabrication (including welding), inspection, testing, noise levels and preparation for shipment of air-cooled heat exchangers with horizontal bundles used in the petroleum, petrochemical, and natural gas industries. It should be used by equipment manufacturers, vendors and purchasers to develop and define specifications that must be conveyed when building, selling, and buying air-cooled heat exchangers.

Gives requirements and recommendations for the mechanical design, materials selection, fabrication, inspection, testing, and preparation for shipment of plate-and-frame heat exchangers for use in petroleum, petrochemical and natural gas industries. It is applicable to gasketed, semi-welded and welded plate-and-frame heat exchangers.

Gives requirements and recommendations for the mechanical design, materials selection, fabrication, inspection, testing, and preparation for shipment of brazed aluminum plate-fin heat exchangers for use in petroleum, petrochemical and natural gas industries.

Develops fatigue prevention guidelines for the refining and petrochemical industries.

This part specifies general requirements for lubrication systems, oil-type shaft-sealing systems, dry-gas face-tie systems and control-oil systems for general- or special-purpose applications. General-purpose applications are limited to lubrication systems.

This part, in conjunction with part 1, specifies requirements for oil systems for special-purpose applications. These oil systems can provide lubrication oil, seal oil or both.
Applications. These oil systems can provide ships and onshore. (Identical national adoption of ISO requirements for those involved in the LNG trade on and processes in the measurement of LNG for all measurement systems used on board LNG carriers, accounting for the total quantity of the cargo on vapor volume, temperature and pressure, and is not limited to, the measurement of liquid volume, and compressibility factor.

Outlines the procedure for calculating, from compositional analysis, the following properties of natural gas mixtures: heating value, specific gravity, and compressibility factor.

Establishes all of the steps needed to properly measure and account for the quantities of cargoes on liquefied natural gas (LNG) carriers. This includes, but is not limited to, the measurement of liquid volume, vapour volume, temperature and pressure, and accounting for the total quantity of the cargo on board. This Standard describes the use of common measurement systems used on board LNG carriers, the aim of which is to improve the general knowledge and processes in the measurement of LNG for all parties concerned. This Standard provides general requirements for those involved in the LNG trade on ships and onshore. (Identical national adoption of ISO 10976)

Public swimming pools to be used for swimming, bathing, competitive activities, or recreational activities that are operated by an owner, lessee, operator, licensee, or concessionaire, regardless of whether a fee is charged for use. Public swimming pools covered by this standard include class A, B, C, and F pools.

This standard provides recommended specifications for chemical operational parameters for water treatment and quality for public pools and spas.

This standard covers energy efficiency requirements for permanently installed residential aboveground/onground and inground swimming pools and inground spas operated by the property owner and used for bathing. This standard is intended to cover certain aspects of the swimming pool filtration -system design; equipment, including pool and spa heaters; installation; and operational capabilities, for the purpose of minimizing energy consumption while maintaining water quality and temperature.

This Standard establishes materials, testing, and marking requirements for suction fittings that are designed to be totally submerged for use in swimming pools, wading pools, spas, and hot tubs, as well as other aquatic facilities

This standard is intended to cover permanently installed residential spas and swim spas. This standard refers to a "permanently installed residential spa and swim spa."
ANSI/ASA S1.1-2013, Acoustical Terminology

This standard provides definitions for a wide variety of terms, abbreviations, and letter symbols used in acoustics and electroacoustics. Terms of general use in all branches of acoustics are defined, as well as many terms of special use for architectural acoustics, acoustical instruments, mechanical vibration and shock, physiological and psychological acoustics, underwater sound, sonics and ultrasonics, and music.

ANSI/ASA S1.11-2014/Part 1 / IEC 61260

Proposed identical national adoption provides performance requirements for analog, sampled-data, and digital implementations of bandpass filters that comprise a filter set or spectrum analyzer for acoustical measurements. Differs from previous versions of ANSI/ASA S1.11 in that IEC61260 has been adopted in full: 1) the original test methods of IEC61260 cl. 5 that was moved to an informative was replaced as normative, 2) the term band number was replaced, and 3) some references were removed.

ANSI/ASA S1.11-2016/Part 2 / IEC 61260

This part provides details of the tests necessary to verify conformance to all mandatory specifications given in ANSI/ASA S1.11-2014/Part 1/IEC 61260
-1:2014 for octave-band and fractional-octave-band filters. Tests and test methods are applicable to class 1 and class 2 bandpass filters. The aim is to ensure that all testing laboratories use consistent methods to perform pattern-evaluation tests.


This part describes procedures for periodic testing of octave-band and fractional-octave-band filters that were designed to conform to the class 1 or class 2 specifications given in ANSI/ASA S1.11-2014/Part 1/IEC 61260-1:2014. The aim of this standard is to ensure that periodic testing is performed in a consistent manner by all laboratories.

ANSI/ASA S1.13-2005 (R2010), Measurement of Sound Pressure Levels in Air

This standard specifies requirements and procedures for measurement of sound pressure levels in air at a single point in space. It is mainly applicable to measurements performed indoors but may be used in outdoor measurements under specified conditions. It is applicable to a wide range of measurements and to sounds that may differ widely in temporal and spectral characteristics. A classification of the types of sound generally encountered, and the preferred descriptor for each type is identified.


This Standard provides recommendations for specifying and testing the susceptibility of acoustical instruments to radiated radio-frequency electromagnetic fields. It does not contain recommendations regarding the susceptibility of an instrument to conducted electromagnetic fields, or recommendations to limit the emission of electromagnetic fields from instruments. It covers two ranges of radio frequencies for the carrier signal: 25 MHz to 500 MHz, and an extended range from 25 MHz to 1 GHz.


This Standard specifies mechanical dimensions and certain electroacoustical characteristics for capacitor (condenser) microphones used as laboratory standards for sound pressure measurements of the highest attainable accuracy. The specifications are intended to ensure that primary calibration by the reciprocity method can be readily carried out. This Standard establishes a system to classify laboratory standard microphones into a number of types according to their dimensions and properties.

ANSI/ASA S1.15-2005/Part 2 (R2015), Measurement Microphones - Part 2: Primary Method for Pressure Calibration of Laboratory Standard Microphones by the Reciprocity Technique

Specifies a primary method for calibration of microphones by the reciprocity technique. The specifications are intended to ensure that primary calibration with the reciprocity technique can attain the highest accuracy. Technical requirements of this standard are identical to IEC 61094-2:1992 Measurement microphones -- Part 2: Primary method for pressure calibration of laboratory standard microphones by the reciprocity technique. Improvements have been made to include recent technical information.

ANSI/ASA S1.16-2000 (R2015), Method for Measuring the Performance of Noise Discriminating and Noise Canceling Microphones

Describes procedures for measuring performance of noise-discriminating and noise-canceling microphones. The signal-to-noise ratio is measured at 1/3 octave band intervals with the desired test source in a diffuse noise field. The noise canceling performance of the microphone is defined as the noise canceling index (NCI), a weighted summation of signal-to-noise ratios. The NCI of the microphone under test can be compared to the required baseline NCI of a laboratory standard pressure microphone.

ANSI/ASPC ICC/NPC 12-2015, Standard for the Plastering of Swimming Pools and Spas

This standard covers the material and application for the plastering of cementitious finish coatings for in-ground swimming pools or other cementitious water-containment vessels.

ASA (ASC S1) (Acoustical Society of America)

ANSI ASA S1.6-2016, Preferred Frequencies and Filter Band Center Frequencies for Acoustical Measurements

Defines preferred frequencies and nominal filter band center frequencies to be used for acoustical measurements. Exact filter center frequencies for constant percent bandwidth filter banks are calculated using ordinal integer band numbers. The differences between the preferred frequencies for pure tone measurements and constant percent bandwidth filter center frequencies are described.
ANSI/ASA S1.17-2014/Part 1, Microphone Windscreens - Part 1: Test Procedures for Measurements of Insertion Loss in Still Air
This standard describes test procedures for determining the insertion loss of windscreens mounted on measurement microphones. Insertion loss is determined over a specified frequency range and for still-air conditions in the test facility.

ANSI/ASA S1.18-2010, Method for Determining the Acoustic Impedance of Ground Surfaces
This Standard describes procedures for obtaining the acoustic impedance of ground surfaces from in-situ measurements of the magnitudes and relative phase of the sound pressures at two vertically separated microphones using specified geometries. It extends and revises the template method published as ANSI S1.18-1999 to enable the user to obtain impedance spectra that result entirely from measurements and are independent of any model for the acoustic impedance of the ground.

ANSI/ASA S1.20-2012, Procedures for Calibration of Underwater Electroacoustic Transducers
Establishes measurement procedures for calibrating underwater electroacoustic transducers. Both primary and secondary calibration procedures are specified for frequencies from a few Hz to a few MHz. Procedures are specified to determine measurable characteristics of free-field receive voltage sensitivity, transmitting response, directional response, voltage coupling loss, impedance, and equivalent noise pressure. Measurement uncertainty analysis is introduced and identifies common error sources.

ANSI/ASA S1.25-1991 (R2017), Specification for Personal Noise Dosimeters
Contains specifications for performance characteristics of personal noise dosimeters that measure the percentage criterion sound exposure. Makes provision for 3 exchange rates: 3db, 4db & 5db per doubling of exposure time. Provides tolerances for instrument including frequency response, exponential averaging (employing SLOW and FAST) threshold, dynamic range, etc. Specifies these tolerances be attained by instrument in a random incidence sound field without the presence of a person wearing it.

ANSI/ASA S1.26-2014, Methods for Calculation of the Absorption of Sound by the Atmosphere
This Standard provides the means to calculate atmospheric absorption losses of sound from any source, over a wide range of meteorological conditions. Attenuation coefficients for pure-tone sounds are calculated by means of equations (or a table) for the frequency of the sound, and the humidity, pressure, and temperature of the atmosphere. For sounds analyzed by fractional-octave-band filters, alternative methods to calculate the attenuation caused by atmospheric absorption are provided.

ANSI/ASA S1.4-2014/Part 1 / IEC 61672-1:2013, Electroacoustics - Sound level meters - Part 1: Specifications
This part gives electroacoustical performance specifications for 3 kinds of sound measuring instruments: a time-weighting sound level meter that measures exponential-time-weighted, frequency-weighted sound levels; an integrating-averaging sound level meter that measures time-averaged, frequency-weighted sound levels; and an integrating sound level meter that measures frequency-weighted sound exposure levels. An informational annex is proposed to be added to this part.

ANSI/ASA S1.4-2014/Part 2 / IEC 61672-2:2013, Electroacoustics - Sound level meters - Part 2: Pattern evaluation tests
This part provides details of the tests necessary to verify conformance to all mandatory specifications given in Part 1 for time-weighting, integrating-averaging, and integrating sound level meters. Pattern-evaluation tests apply for each channel of a multi-channel sound level meter as necessary. Tests and test methods are applicable to class 1 and 2 sound level meters. The aim is to ensure that all laboratories use consistent methods to perform pattern-evaluation tests.

ANSI/ASA S1.4-2014/Part 3 / IEC 61672-3:2013, Electroacoustics - Sound level meters - Part 3: Periodic tests
This part describes procedures for periodic testing of time-weighting, integrating-averaging, and integrating sound level meters that were designed to conform to the class 1 or class 2 specifications of the second edition of IEC 61672-1. The aim of the standard is to ensure that periodic testing is performed in a consistent manner by all laboratories.

ANSI/ASA S1.40-2006 (R2016), Specifications and Verification Procedures for Sound Calibrators
This standard specifies performance requirements for coupler-type sound calibrators in regard to sound pressure level, frequency, and total distortion generated. It also gives requirements for environmental conditions, electromagnetic compatibility, and instrument marking and documentation. It details the tests necessary to verify that a model of sound calibrator conforms to all the requirements as well the method for periodic testing.

ANSI/ASA S1.42-2001 (R2016), Design Response of Weighting Networks for Acoustical Measurements
Provides the design criteria for both the frequency-domain response (amplitude and phase) and time-domain of the A- and C-weighting networks used in acoustical measurements. The poles and zeros for each weighting network are given, along with equations for computing the amplitude and phase responses as functions of frequency and impulse and step responses as functions of time. B-, D- and E-weightings are listed in the Annexes for reference.

ANSI/ASA S1.8-2016, Reference Values for Levels Used in Acoustics and Vibrations
Provides reference values to be used for acoustical & vibratory levels. Levels refer to a descriptor of mathematical calculation in which a ratio is used. The reference value is the denominator of that ratio. Reference values are stated in International System of Units (SI). The descriptor of most acoustical levels is the decibel. Levels are equal to 10 times the common (base-10) logarithm (lg) of an appropriate nondimensional ratio of a variable quantity to a reference value of the same kind.

ASA (ASC S12) (Acoustical Society of America)

ANSI/ASA S12.5-2016/ISO 6926-2016, Acoustics - Requirements for the Performance and Calibration of Reference Sound Sources Used for the Determination of Sound Power Levels
Specifies the acoustical performance requirements for reference sound sources (RSS): temporal steadiness of the sound power output, spectral characteristics & directivity. Specifies procedures for providing level calibration data and uncertainty on a sound source intended for use as a RSS in terms of its sound power level under reference meteorological conditions in octave and in one-third octave bands, and with frequency weighting A. Specifies methods to calibrate RSS.

ANSI/ASA S12.51-2012/ISO 3741-2010 (R2017), Acoustics - Determination of sound power levels and sound energy levels of noise sources using sound pressure - Precision methods for reverberation test rooms
Specifies methods for determining sound power level or sound energy level of a noise source from sound pressure levels measured in a reverberation test room. The sound power level produced by the noise source, in frequency bands of width 1/3-octave, is calculated using those measurements, including corrections to allow for any differences between the meteorological conditions at the time and place of the test and those corresponding to a reference characteristic impedance.

Describes a method for determining sound power levels of noise sources that emit broadband sound and/or discrete frequency sounds/tones using reverberation rooms. Applies when it's undesirable or unfeasible to move the source to decrease uncertainty of measurement. Described method requires reverberation room pre-qualification through test and requires use of comparison method to determine sound power levels. Specifies environment, procedures and equipment used to qualify the room by test.
This standard describes noise measurement procedures to characterize the noise emissions from high performance (supersonic jet flow) military aircraft. Specific detailed noise measurement procedures are described for characterizing noise for environmental documents such as environmental impact statements and environmental assessments, and for quantifying aircraft noise emissions.

This standard provides requirements and methods for measuring low frequency noise levels and infrasonic plus low frequency noise levels outdoors in the presence of wind and indoors in occupied spaces. The most common application anticipated is the measurement of outdoor emission levels either near or far from sound emission sources or emission levels near a source.

Standard contains guidelines for preparation of standard procedures to determine the noise emission from sources. Standard contains guidelines for preparation of procedures (standards, test codes, recommended practices, etc.) for determination of noise emission from sources. Included are general questions that need to be considered during development of a measurement procedure. Guidelines on the following subjects are included: prefatory material, measurement conditions, measurement operations, data reduction, preparation of a test report, and guidelines for selection of a descriptor for noise emission.

This part covers vibration levels from small air-moving devices with mounting footprints of less than 0.48 m × 0.90 m for the full AMD would induce in an average structure used in moving devices, such as those applying for explosive masses between 50 g and 1000 kg.

This part covers vibration levels from small air-moving devices, such as those used for cooling electronic, electrical, and mechanical equipment where the sound power level of the AMD is of interest. Describes the test apparatus and methods for determining the airborne noise emitted by small AMDs as a function of the volume flow rate and the fan static pressure developed by the AMD on the test apparatus.

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ANSI/ASA S12.2-2008, Criteria for Evaluating Room Noise

This Standard provides three primary methods for evaluating room noise: a survey method that employs the A-weighted sound level; an engineering method that employs expanded noise criteria (NC) curves; and a method for evaluating low frequency fluctuating noise using room noise criterion (RNC) curves.


Standard describes a method for expressing the noise emission of machinery and equipment in a convenient manner. Standard applies to all machinery and equipment that is essentially stationary in nature and for which overall A-weighted sound power is a meaningful descriptor of noise emission. Standard is intended to facilitate preparation of equipment specifications, labels or other documentation that expresses in quantitative terms the noise emission of machinery or equipment.

ANSI/ASA S12.3-1985 (R2016), Statistical Methods for Determining and Verifying Stated Noise Emission Values of Machinery and Equipment

This standard defines the preferred methods for determining and verifying noise emission values for machinery and equipment which are stated in product literature or labeled by other means.


This standard provides two methods for measuring the insertion loss of any hearing protection device (HPD) that envelopes the ears, covers the ears, or occludes the earcanals. It contains information on instrumentation, calibration, electroacoustic requirements, subject selection and training, procedures for locating ear-mounted microphones and HPDs to measure sound pressure levels at the ear, specifications describing suitable ATFs, and methods for reporting the calculated insertion-loss values.

ANSI/ASA S12.43-1997 (R2012), Standard Methods for Measurement of Sound Emitted by Machinery and Equipment at Workstations and Other Specified Positions

Specifies 3 methods for measuring sound pressure levels from machinery and equipment, at a workstation and at other specified positions nearby, differentiated primarily by the acoustical environment in which they are made. Measurements by: Method A in an essentially free field over a reflecting plane; Method B in any environment that meets certain qualification requirements specified; Method C in a semi reverberant field for which the accuracy implied by msmts under Method A or B isn't required.

ANSI/ASA S12.44-1997 (R2012), Standard Methods for Calculation of Sound Emitted by Machinery and Equipment at Workstations and Other Specified Positions from Sound Power Level

Provides a method for determining emission sound pressure levels from the sound power level produced by all types of machinery and equipment at workstations and other specified locations. These sound pressure levels are, in general, less than those that would be measured when the machinery or equipment is operating in its normal surroundings where the environment may influence the measurement of an emission sound pressure level.

ANSI/ASA S12.50-2002/ISO 3740-2000 (R2012), Standard Acoustics - Determination of sound power levels of noise sources - Guidelines for the use of basic standards

Gives guidance for the use of a series of 9 International Standards describing various methods for determining sound power levels from all types of machinery and equipment. Provides: brief summaries of these basic International Standards; guidance on selection of one or more of these standards. Applies only to airborne sound. For use in preparation of noise test codes (ISO 12001) and noise testing where no specific noise test code exists.


Specifies a relatively simple engineering method for determining the sound power levels of small, movable noise sources. The measurements are carried out when the source is installed in a specially designed room having a specified reverberation time over the frequency range of interest. The A-weighted sound power level of the source under test is determined from a single A-weighted sound pressure level measurement at each microphone position, rather than a summation of octave-band levels.


Specifies methods for determining sound power level or sound energy level of a noise source by comparing measured sound pressure levels emitted by this source (machinery or equipment) mounted in a hard-walled test room, the characteristics of which are specified, with those from a calibrated reference sound source. The sound power level (or, in the case of noise bursts or transient noise emission, the sound energy level) produced by noise source is calculated using those measurements.

ANSI/ASA S12.54-2011/ISO 3744-2010 (R2016), Acoustics - Determination of sound power levels and sound energy levels of noise sources using sound pressure - Engineering methods for an essentially free field over a reflecting plane

Specifies methods for determining sound power level or sound energy level of a noise source from sound pressure levels measured on a surface enveloping the noise source (machinery or equipment) in a space that approximates an acoustic free field near one or more reflecting planes. Sound power level or in the case of noise bursts or transient noise emission, sound energy level produced by the noise source in frequency bands or with A-weighting applied is calculated using those measurements.

ANSI/ASA S12.55-2012, ISO 3745:2012, Acoustics - Determination of sound power levels and sound energy levels of noise sources using sound pressure - Precision methods for anechoic rooms and semi-anechoic rooms

This Nationally Adopted International Standard specifies methods for measuring the sound pressure levels on a measurement surface enveloping a noise source (machinery or equipment) in an anechoic room or a semi-anechoic room.

ANSI/ASA S12.56-2011 / ISO 3746:2010 (R2016), Acoustics - Determination of sound power levels and sound energy levels of noise sources using sound pressure - Survey method using an enveloping measurement surface over a reflecting plane

Methods for determining the sound power level or sound energy level of a noise source from sound pressure levels measured on a surface enveloping a noise source (machinery or equipment) in a test environment for which requirements are given. The sound power level (or, in the case of noise bursts or transient noise emission, the sound energy level) produced by the noise source with frequency A-weighting applied is calculated using those measurements.

ANSI/ASA S12.57-2011/ISO 3747-2010 (R2016), Acoustics - Determination of sound power levels and sound energy levels of noise sources using sound pressure - Engineering/survey methods for use in situ in a reverberant environment

Specifies a method for determining sound power level or sound energy level of a noise source by comparing measured sound pressure levels emitted by a noise source (machinery or equipment) mounted in situ in a reverberant environment, with those from a calibrated reference sound source. Sound power level (or in the case of noise bursts or transient noise emission, the sound energy level) produced by the noise source, in frequency bands of width one octave, is calculated using those measurements.
ANSI/ASA S12.6-2016, Methods for Measuring the Real-Ear Attenuation of Hearing Protectors

- Specifies lab-based procedures for measuring, analyzing & reporting passive noise-reducing capabilities of hearing protectors. Procedures consist of psychophysical tests on humans to determine real-ear attenuation measured at hearing threshold.
- Provides 2 fitting procedures: trained-subject fit to describe capabilities of devices fitted by carefully trained users, and inexperienced-subject fit to approximate protection that can be attained by users as reported in real-world occupational studies.


- Provides a relocatable-classroom-specific supplemental version of ANSI S12.60. Includes siting requirements, acoustical performance criteria & design rms for relocatable classrooms. Annex A provides commentary info on this standard. Annex B provides procedures for determining compliance with background sound rms. Seeks to provide design flexibility without compromising goal of obtaining adequate speech intelligibility for students & teachers in learning spaces within the standard's scope.


- This standard specifies acoustical performance criteria, and design requirements for classrooms and other learning spaces, excluding relocatable classrooms and modular core learning spaces. Annex A (normative) provides procedures for optional testing to determine conformance with the source background noise requirements and the noise isolation requirements of this standard. Annex B (informative) provides commentary information.


- Specifies an engineering method for calculating the attenuation of sound during propagation outdoors in order to predict the levels of environmental noise at a distance from a variety of sources. The method predicts the equivalent continuous A-weighted sound pressure level (as described in parts 1 to 3 of ISO 1996) under meteorological conditions favorable to propagation from sources of known sound emission. Modified NAIS.


- Describes the measurement systems, procedures & methodologies used for the beam aspect measurement of underwater sound pressure levels from ships at given operating conditions. Resulting quantities are nominal source level values. Does not require use of specific ocean location, but provides requirements for an ocean test site. Underwater SPL measurements are performed in the far-field & then corrected to a reference distance of 1 m. Applicable to all surface vessels manned or unmanned.

ANSI/ASA S12.65-2006 (R2011), Rating Noise with Respect to Speech Interference

- This standard defines a simple numerical method for rating the expected speech-interfering aspects of noise using acoustical measurements of the noise. The relevant acoustical characteristics of the noise are summarized in terms of a single-valued index known as the speech interference level. The application of the measure is intended for natural speech.

ANSI/ASA S12.67-2008 (R2013), Pre-Installation Airborne Sound Measurements and Acceptance Criteria of Shipboard Equipment

- Describes instrumentation and procedures for pre-installation measurement and analysis of airborne noise generated by shipboard equipment. Maximum noise level criteria are presented for several types of equipment. May be used in achievement of shipboard noise goals through the timely and affordable airborne noise testing of shipboard equipment before it is delivered and installed. This standard is based on MIL-STD-740-1 and MIL-STD-1474D (Requirement 5, Shipboard Equipment Noise).

ANSI/ASA S12.68-2007 (R2012), Standard - Methods of Estimating Effective A-Weighted Sound Pressure Levels When Hearing Protectors are Worn

- Specifies 3 methods, in ascending order of complexity of use and potential accuracy, for estimation of sound pressure levels that are effective when a hearing protector is worn: 1) Noise Level Reduction Statistic for use with A-weighting (NRSA), 2) Noise level Reduction Statistic, Graphical (NRSG), and 3) the octave-band method. Also specifies, in the case of NRSA and NRSG, that values will be presented for both 80th and 20th percentiles to reflect the range of attenuation that can be anticipated.

ANSI/ASA S12.69-2010 (R2015), Procedure for Testing Railroad Horns ex situ

- Federal regulations require the testing of sound emissions from horns located on railroad locomotives. This standard specifies an alternate method for compliance with the Federal requirements in metropolitan areas where tests cannot be conducted in an outdoor space free of obstructions. The data that result from this procedure are equivalent to those that derive from the procedure promulgated by the Federal Railroad Administration as described in 49 CFR Part 229.129.

ANSI/ASA S12.7-1986 (R2015), Methods for Measurement of Impulse Noise

- Describes methods for measurement of impulse noise and presentation of data. Its scope applies to all kinds of impulse noise, whether discrete event sources, such as quarry and mining explosions or sonic booms, or from multiple event sources such as pile drivers, riveting, or machine-gun firing, but not to sounds from other sources which have specific measurement standards based on the general methods for measurement of quasisteady noise.

ANSI/ASA S12.70-2016, Criteria for Evaluating Speech Privacy in Health Care Facilities

- Provides acoustical performance criteria, design requirements, and design guidelines to meet the speech privacy needs for both new design and retrofits of health care facilities. Provides a method for selecting speech privacy goals based on occupant needs, by type of space and use; design requirements and guidelines for developing a strategy for the architectural design and acoustical materials selection; and a method for verifying and analyzing speech privacy design performance.

ANSI/ASA S12.72-2015, Procedure for Measuring the Ambient Noise Level in a Room

- Specifies requirements and describes procedures for measurement of ambient noise in a room. Measurements may be made at a specified point in the room, in a defined region of the room, or to represent the space average sound pressure level throughout the room. Two methods offered: a survey method for quick evaluation and engineering method for more precise assessment of ambient noise level. Fixed and moving measurement microphones are allowed. Includes all types of ambient noise.


- Describes procedures to measure jet noise from uninstalled military aircraft engines with supersonic exhaust flows. Methods pertain to propulsion systems mounted on outdoor test stands with appropriate inlets and nozzles. Describes detailed measurement procedures for near-field acoustical characterization. Describes far-field measurement procedures to provide data for community noise estimates. Describes required measurement instrumentation, signal processing, data formatting & smnt uncertainty.


- This Standard adopts insertion loss - the difference between acoustical levels before and after a noise-barrier installation - as the basis for evaluating the acoustical effectiveness of an outdoor noise barrier. Methods are provided to determine the insertion loss of outdoor noise barriers at selected receiver locations and under conditions of interest. It covers insertion loss determination, by measurement or by the combination of measurement and prediction, for outdoor noise barriers of all types.
This standard describes recommended procedures for measurement of long-term, average environmental sound outdoors at one or more locations in a community for environmental assessment or planning for compatible land uses and for other purposes such as noise prediction validation and regulation. Its purpose is to provide for a commonality for measurement of outdoor environmental sound as it may affect people in and around dwellings.


Specifies methods to assess environmental sounds and to predict the annoyance response of communities to long-term noise from any and all types of environmental sounds produced by one or more distinct or distributed sound sources. The sources may be separate or in various combinations. Application of the method is limited to areas where people reside and related long-term land uses.


Provides guidance on the compatibility of various human uses of land with the acoustical environment, using the yearly average total day-night adjusted sound exposure or the yearly average adjusted day-night average sound level to characterize the acoustical environment. An informative annex provides guidance to local authorities for designation of land uses compatible with existing or predicted yearly average total day-night adjusted sound exposure or yearly average adjusted day-night average sound level.


This standard provides basic quantities for description of sound in community environments and general procedures for measurement of these quantities. Based on these quantities and procedures, compliance limits of sound may be specified by cognizant authorities and conformance with the limits controlled for purposes of environmental assessment, regulation, and land use planning.

ANSI/ASA S12.9-2013/Part 3, Quantities and Procedures for Description and Measurement of Environmental Sound - Part 3: Short-term Measurements with an Observer Present

Describes recommended procedures for measurement of short-term, time-average environmental sound outdoors at 1 or more locations in a community for environmental assessment or planning for compatible land uses and other purposes such as demonstrating compliance with a regulation. These measurements are distinguished by the requirement to have an observer present. Methods are given to correct the measured levels for the influence of background sound.

ASA (ASC S2) (Acoustical Society of America)

ANSI ASA S2.75-2017/Part 1, Shaft Alignment Methodology, Part 1: General Principles, Methods, Practices, and Tolerances

Establishes methodology consistent with industry best practices for measurement, analysis and correction of alignment of shafts on rotating machinery coupled by means of a flexible coupling where such shafts are supported by two bearings in independent, horizontally mounted machine cases. Addresses conditions for machinery mounting that directly affects shaft alignment, methods for measuring amount of shaft misalignment and practices for relocating machine cases to achieve proper shaft alignment.


This Nationally Adopted International Standard defines terms and expressions unique to the areas of mechanical vibration, shock and condition monitoring.

ANSI/ASA S2.16-1997 (R2016), Vibratory Noise Measurements and Acceptance Requirements for Shipboard Equipment

This standard contains guidelines for limiting the machinery and operating equipment vibration on board ships for the purposes of habitability and mechanical suitability. The mechanical guidelines result in a suitable environment for installed equipment and precludes many major vibration problems such as unbalance, misalignment, or other damage to the machinery and operating equipment.

ANSI/ASA S2.2-1959 (R2016), Methods for the Calibration of Shock and Vibration Pickups

This standard is designed to acquaint the user with the general principles of calibration of shock and vibration pickups and to describe concisely several standard methods which have proven to give reliable and reproducible results. Further details concerning these methods are given in the Appendix. Also, other methods that have not as yet reached the stage of development of the standard methods are described briefly in the Appendix.


Provides consensus quantitative definitions of explosion characteristics for a single-point explosion in air, along with methodologies for scaling these characteristics for a wide range of yield and ambient air conditions. Factors for use with common solid explosives are also included. Methods are provided for predictions of long-range propagation under atmospheric refractive influences. Target damage estimation procedures are provided for use in explosion operation planning and evaluation.

ANSI/ASA S2.21-1998 (R2012), Standard Method for Preparation of a Standard Material for Dynamic Mechanical Measurements

This Standard applies to the preparation of a standard material for calibration of instruments for measuring the dynamic mechanical properties of viscoelastic materials. The purpose of this Standard is to assist users of dynamic mechanical test equipment in preparing the standard material from its basic components. The standard material is used for the calibration of new instruments in comparison with other instruments and in checking the operation of the same instrument at different times.


This Standard defines a procedure for measurement and analysis of the dynamic properties of viscoelastic materials using a resonance method. The Standard applies to materials used in sound and vibration damping systems operating at frequencies from a fraction of a hertz to about 20 kHz.


This Standard defines a method for measuring the dynamic mechanical properties of viscoelastic materials using a cantilever beam technique. The dynamic mechanical properties are expressed in terms of the frequency dependence of Young's modulus and loss factor at a given reference temperature. The Standard provides information for constructing such equipment and analyzing the results obtained.
ANSI/ASA S2.24-2001 (R2016), Graphical Presentation of the Complex Modulus of Viscoelastic Materials
The mechanical properties of most viscoelastic materials depend on frequency, temperature, and strain amplitude at large strains. This Standard is restricted to small total strain and linear behavior. It does not cover the effects of static pre-strain or of dynamic strain amplitude. This Standard applies to presentation of modulus and loss factor data of viscoelastic materials as functions of temperature and frequency.

This standard contains guidelines for limiting the hull and superstructure vibration of ships for the purposes of habitability and mechanical suitability. The mechanical suitability guidelines result in a suitable environment for installed equipment and preclude many major vibration problems, such as unbalance, misalignment, and other damage to the propulsion system. To obtain data to compare with the guidelines, this standard also specifies data acquisition and processing procedures.

This standard describes procedures for vibration testing of shipboard equipment, specifying amplitude, frequency, and endurance requirements.

ANSI/ASA S2.27-2002 (R2014), Guidelines for the Measurement and Evaluation of Vibration of Ship Propulsion Machinery
This standard contains guidelines for the measurement and evaluation of vibration of ship propulsion systems including limits for acceptability. It is applicable to all ocean-going ships and inland vessels. Test conditions, instrumentation, data analysis and evaluation, and reporting requirements are described.

This document provides guidance for assessing the severity of vibrations measured on bearing housings of shipboard machinery so as to ensure reliable mechanical operation. The criteria apply to the vibration of all non-reciprocating machinery on board surface ships, except for main propulsion machinery. They apply to broadband vibration measurements taken on the bearing housings, of machines under steady-state operating conditions with normal operating conditions of speed and load.

Contains procedures for the measurement and evaluation of mechanical vibration of nonreciprocating machines, as measured on rotating shafts. Contains criteria for evaluating new machines and for vibration monitoring. This standard is related to various parts of the ISO 7919 series that provides guidelines for the evaluation of different types of machines. Type of machinery covered in this part is shipboard machinery. There is, at present, no ISO version of this standard.

ANSI/ASA S2.31-1979 (R2014), Standard Methods for the Experimental Determination of Mechanical Mobility, Part 1: Basic Definitions and Transducers
This document provides basic definitions with comments and identifies the calibration tests, environmental tests, and physical measurements necessary to determine the suitability of impedance heads, force transducers, and accelerometers for use in measuring mechanical mobility.

This standard includes measurement of mobility, acceleration, or dynamic compliance, either as a driving point measurement, or as a transfer measurement. It also applies to the determination of the arithmetic reciprocals of those ratios as free effective mass. Although excitation is applied at a single point, there is no limit on the number of points at which simultaneous measurements of the motion response may be made. Multiple response measurements are required, for example, for modal analyses.

ANSI/ASA S2.34-1984 (R2015), Standard Guide to the Experimental Determination of Rotational Mobility Properties and the Complete Mobility Matrix
This guide delineates the methods and procedures which may be used to determine the structural mobility properties, translational and rotational, of a system of points on a structure. This guide is to be used for guidance only, since the state of the art is still in flux.

ANSI/ASA S2.4-1976 (R2014), Method for Specifying the Characteristics of Auxiliary Analog Equipment for Shock and Vibration Measurements
This standard provides uniform terminology and format for presentation of the performance of auxiliary analog equipment for shock and vibration measurements. It provides the manufacturer with a format to be used in presenting the performance of equipment and the user with a standard terminology for requesting information from the manufacturer so that the user will obtain a uniform, accurate, and more concise description of the characteristics of the auxiliary equipment.

ANSI/ASA S2.46-1989 (R2015), Standard Characteristics to be Specified for Seismic Transducers
This standard specifies rules for the presentation of important characteristics for electro-mechanical shock and vibration transducers (seismic pick-ups), the electrical outputs of which are known functions of the uniaxial, multiaxial, or angular accelerations, velocities, or displacements of objects the motions of which are being measured.

ANSI/ASA S2.61-1989 (R2015), Guide to Mechanical Mounting of Accelerometers
Describes the mounting characteristics of accelerometers to be specified by the manufacturer and makes recommendations to the user for mounting accelerometers. The application of this standard is limited to the mounting of electromechanical transducers of the type that are attached on the surface of the structure in motion. It does not cover other types, such as relative motion pickups.

ANSI/ASA S2.62-2009 (R2014), Shock Test Requirements for Equipment in a Rugged Shock Environment
Standard to be used for testing equipment that will be subjected to shock. It defines test requirements and severity thresholds for a large range of shock environments, including but not limited to shipping, transport, and rugged operational environments. This standard allows vendors to better market and users to more easily identify equipment that will operate or simply survive in rugged shock environments.

ANSI/ASA S2.70-2006 (R2016), Guide for the Measurement and Evaluation of Human Exposure to Vibration Transmitted to the Hand
Specifies recommended method for measurement, data analysis, vibration and health risk assessments, and reporting of human exposure to hand-transmitted vibration. Specifies format for measurement, data analysis, vibration and health risk assessments, and reporting of hand-transmitted vibration, periodic or random, in three orthogonal axes, in the frequency range from 5.6 Hz to 1,000 Hz. Three normative annexes address risk assessments, mitigation, training, and medical surveillance.

Reactions of humans to vibrations of 1 to 80 Hz inside buildings are assessed in this Standard by use of degrees of perception and associated vibration levels and durations. Accelerations or velocities inside buildings may be measured to assess perceptibility and possible adverse reactions from those inside. A variety of building types and situations are covered by the use of multiplying factors applied to the basic curves. Responses are related to the event durations, frequencies of vibration, and body orientation with respect to the vibration.

Defines methods for the measurement of periodic, random and transient whole-body vibration. Indicates the principal factors that combine to determine the degree to which a vibration exposure will be acceptable. Informative annexes indicate current opinion and provide guidance on the possible effects of vibration on health, comfort and perception and motion sickness. The frequency range considered is: 0.5 Hz to 80 Hz for health, comfort and perception; and 0.1 Hz to 0.5 Hz for motion sickness

ANSI/ASA S2.72-2003/Part 4 (R2012)/ISO 2631-4:2001 (R2012), Mechanical vibration and shock - Evaluation of human exposure to whole-body vibration - Part 4: Guidelines for the evaluation of the effects of vibration and rotational motion on passenger and crew comfort in fixed-guideway transport systems

Aids in the design and evaluation of fixed guide way passenger systems, with regard to the impact of vibration and repetitive motions on passenger comfort. Fixed-guideway vehicles provide a predictable but complex multi-axis motion environment that is a function of the guideway, vehicle and seat or berth.

ANSI/ASA S2.72/Part 1 Amd. 1:2010/ISO 2631-1 Amd. 1:2010 (R2012), Mechanical vibration and shock - Evaluation of human exposure to whole-body vibration - Part 1: General requirements, AMENDMENT 1

This amendment to ANSI S2.72-2002/Part 1/ISO 2631-1:1997 provides numerous updates and corrections throughout the document.

ANSI/ASA S2.72/Part 4 Amd. 1:2010/ISO 2631-4 Amd. 1:2010 (R2012), Mechanical vibration and shock - Evaluation of human exposure to whole-body vibration - Part 4: Guidelines for the evaluation of the effects of vibration and rotational motion on passenger and crew comfort in fixed-guideway transport systems, AMENDMENT 1

This amendment to ANSI S2.72-2003/Part 4/ISO 2631-4:2001 (R201x) incorporates a new Annex B “Statistical analysis method.” This annex cancels and replaces ISO 10056-2001 Mechanical vibration - Measurement and analysis of whole-body vibration to which passengers and crew are exposed in railway vehicles.

ANSI/ASA S2.73-2013/ISO 10819:2013, Mechanical Vibration and shock - Hand-arm vibration - Measurement and evaluation of the vibration transmissibility of gloves at the palm of the hand

This Standard specifies a method for the laboratory measurement, data analysis, and reporting of the vibration transmissibility of a glove with a vibration-reducing material that covers the palm, fingers, and thumb of the hand. This Standard specifies vibration transmissibility in terms of vibration transmitted from a handle through a glove to the palm of the hand in one-third-octave frequency bands with centre frequencies of 25 Hz to 1 250 Hz.

ANSI/ASA S2.75-2017/Part 2, Shaft Alignment Methodology, Part 2: Vocabulary

The purpose of this standard is to define terminology unique to the alignment of machinery that has been in common use among engineers and technicians working in the field. Words and phrases are presented in alphabetical order. This vocabulary is intended to be used with the BSR/ASA S2.75 series Shaft Alignment Methodology.

ANSI/ASA S2.8-2007 (R2017), Technical Information Used for Resilient Mounting Applications

Establishes the requirements to promote appropriate exchange of information regarding the application and selection of isolation for the reduction of vibrations generated by equipment and machines. Use of this standard can improve communication among engineers, manufacturers and end-users concerned with vibration isolation.

ANSI/ASA S2.9-2008 (R2013), Standard Parameters for Specifying Damping Properties of Materials and System Damping

Presents required nomenclature to improve communications among technological fields concerned with material damping used for resilient mountings to enable a clear understanding by both user & manufacturer. Intention is to encourage better communication between manufacturer & user. Should be regarded as nomenclature for specifying damping properties of the resilient materials. Outlines information to enable the experienced designer to select resilient material for machine mountings correctly.

ASA (ASC 53) (Acoustical Society of America)

ANSI ASA S3.22-2014, Specification of Hearing Aid Characteristics

Describes air-conduction hearing aid measurement methods particularly suitable for specification & tolerance purposes. Some test methods described are output sound pressure level (SPL) with 90-dB input SPL, full-on gain, frequency response, harmonic distortion, equivalent input noise, current drain, & induction-coil sensitivity. Configurations are given for measuring input SPL to a hearing aid. Allowable tolerances in relation to values specified by manufacturer are given for certain parameters.

ANSI ASA S3.41-2015, Audible Emergency Evacuation (E2) and Evacuation Signals with Relocation Instructions (ESRI)

Specifies the characteristics of acoustic signals to be used for audible emergency evacuation (E2) and audible evacuation signals with relocation instructions (ESRI). It applies to the audible signal only and not to the signaling system components or equipment. The use of these signals either as the only audible means of signaling or as part of a voice message is subject to the requirements of governing laws, codes or other standards.

ANSI ASA S3.50-2013, Method for Evaluation of the Intelligibility of Text-to-Speech Synthesis Systems

It specifies an experimental method for evaluation of the speech intelligibility of text-to-speech synthesis systems. The test yields an objective measure of the listener’s accuracy in recovering the intended phonetic content of the speech under real-world conditions. It can be used to assess a single system against an ideal or to compare systems against one another. A word list is not provided since these systems could be tuned in advance to optimize performance for a set of test items.

ANSI ASA S3.52-2016, Measurements of the Threshold of Hearing and Signal Detectability in a Sound Field

Covers requirements, conditions and procedures for threshold-of-hearing measurements in a sound field. May also be used for conducting other sound-field hearing tests and as a research tool for assessing the effects of listening conditions and headphone worn by the listener on detectability of various test signals. 3 sound fields are references: free, quasi-free and diffuse sound fields. Test signals include frequency-modulated/warble tones and narrow-band noises.

ANSI ASA S3.7-2016, Method for Measurement and Calibration of Earphones

Describes measurement methods for earphones and earphone transducers using couplers or ear simulators. Guidance is provided for the selection of the appropriate coupler or ear simulator for a given earphone and application. Methods for measurement of calibrated frequency response, input-output linearity, electrical impedance, and non-linear distortion are described.

ANSI/ASA S3.1-1999 (R2013), Maximum Permissible Ambient Noise Levels for Audiometric Test Rooms

Gives maximum permissible ambient noise levels allowed in audiometric test rooms that produce negligible masking of test signals presented at reference equivalent threshold levels specified in ANSI S3.6-1996. MPANLs are specified from 125-8000 Hz in octave and 1/3 octave band intervals for 2 audiometric testing conditions (ears covered/not covered) and 3 test frequency ranges. For use by persons testing hearing and distributors, installers, designers and manufacturers of audiometric test rooms.
ANSI/ASA S3.2-2009 (R2014), Method for Measuring the Intelligibility of Speech over Communication Systems

This standard includes measurement of speech intelligibility over entire communication systems, evaluation of the contributions of elements of speech communication systems, and evaluation of factors that affect the intelligibility of speech. Speech intelligibility over a communication system is measured by comparing the monosyllabic words trained listeners receive and identify with the words trained talkers speak into a communication system that connects the talkers with the listeners.

ANSI/ASA S3.37-1987 (R2012), Preferred Earhook Nozzle Thread for Postauricular Hearing Aids

This standard describes a preferred thread for earhook nozzles on postauricular hearing aids. The need for such a standard arises from the wide variety of earhooks that hearing aid dispensers are required to keep in inventory to utilize different postauricular hearing aids from several manufacturers. This standard applies only to those postauricular hearing aids which utilize screw-on threads.

ANSI/ASA S3.39-1987 (R2012), Specifications for Instruments to Measure Aural Acoustic Impedance and Admittance (Aural Acoustic Impedance)

Provides specifications for instruments designed to measure acoustic impedance, acoustic admittance, or both quantities, within the human external ear canal. Terms that apply to these instruments and to related measurements are defined. Four types of instruments are classified. Characteristics, specifications, and recommended calibration procedures are then provided.

ANSI/ASA S3.4-2007 (R2012), Procedure for the Computation of Loudness of Steady Sounds

A procedure for calculating the monaural and binaural loudness of steady sounds as perceived by listeners with normal hearing. Sounds include simple and complex tones, bands of noise and mixtures of tones and noise. Spectra can be specified exactly, in terms of the frequencies and levels of individual spectral components, or approximately, in terms of the levels in 1/3 octave bands. It is applicable to sounds presented in free field with a frontal incidence, in a diffuse field, or by headphones.


The purpose of this document is to define a test method with which to characterize the steady-state frequency response and input/output characteristics of hearing aids as the input level varies. This method is particularly useful for those hearing aids that have automatic gain control or other types of adaptive circuitry.

Provides methods for evaluation of hearing assistance device/systems (HADS) that are packaged for individual use and deliver the signal via air conduction to a user. Among the test methods described are family of response curves, output sound pressure curve for 90dB sound pressure level input, frequency range, total harmonic distortion, noise level with no input, static and dynamic AGC characteristics and gain control linearity. Measurements are similar to those described in ANSI/ASA S3.22-2009.

ANSI/ASA S3.5-1997 (R2012), Methods for Calculation of the Speech Intelligibility Index

Defines a method for computing a physical measure that is highly correlated with the intelligibility of speech as evaluated by speech perception tests given a group of talkers and listeners. This measure is called the Speech Intelligibility Index (SIi). The SIi is calculated from acoustical measurements of speech and noise.


This part of IEC 60318 specifies an ear simulator for the measurement of supra-aural and circumaural earphones (used for example in audiometry and telephonometry) applied to the ear without acoustical leakage, in the frequency range from 20 Hz to 10 kHz. The same device can be used as an acoustic coupler at additional frequencies up to 16 kHz.

ANSI/ASA S3.55-2014/Part 5/IEC 60318-5:2006 (MOD), Electroacoustics - Simulators of Human Head and Ear - Part 5: 2 cm3 coupler for the measurement of hearing aids and earphones coupled to the ear by means of ear inserts

This part describes an acoustic coupler for loading an earphone or hearing aid with a specified acoustic impedance when determining its physical performance characteristics, in the frequency range 125 Hz to 8 kHz. It is suitable for air-conduction hearing aids and earphones, coupled to the ear by means of ear inserts, e.g. ear molds or similar devices.


Specifies an acoustic coupler for measurement of supra-aural audiometric earphones in the frequency range from 125 Hz to 8000 Hz. The sound pressure developed by an earphone is not, in general, the same in the coupler as in a person’s ear. However, the acoustic coupler can be used as an objective and reproducible means of measuring the output of supra-aural earphones. It can be used for specifying reference equivalent threshold sound pressure levels (RETSPL) for the calibration of audiometers.

ANSI/ASA S3.6-2010, Specification for Audiometers

The audiometers covered in this specification are devices designed for use in determining the hearing threshold level of an individual in comparison with a chosen standard reference threshold level. This standard provides specifications and tolerances for pure tone, speech, and masking signals and describes the minimum test capabilities of different types of audiometers.

ANSI/ASA S3/SC1.100-2014 / ANSI/ASA S12.100-2014, Methods to Define and Measure the Residual Sound in Protected Natural and Quiet Residential Areas

This standard was developed as a joint project between ANSI-Accredited Standards Committee S3/SC 1, Animal Bioacoustics, and ANSI-Accredited Standards Committee S12, Noise. It comprises a part of a group of definitions, standards, and specifications for use in the field of environmental acoustics as it affects both humans and animals.

ASA (American Society of Agricultural and Biological Engineers)

ANSI/ASABE AD10448-2014, Agricultural tractors - Hydraulic pressure for implements

Specifies the characteristics of the hydraulic pressure from agricultural tractors to connect hydraulic devices on implements, to permit interchangeable use of various types of implements using remote cylinders and other hydraulic devices. It applies to agricultural tractors intended for interchangeable implements.


Specifies the essential dimensions for the attachment of three-point hitch implements to agricultural wheeled and track-lying tractors equipped with a three-point free link hitch according to ISO 730 or ISO 8759-1 and a U-frame coupler.

ANSI/ASABE AD11684-1995 APR2011 (R2016), Tractors, machinery for agricultural and forestry, powered lawn and garden equipment - Safety signs and hazard pictorials - General principles

Establishes general principles for the design and application of safety signs and hazard pictorials permanently affixed to tractors, machinery for agriculture, and powered lawn and garden equipment. This standard outlines safety sign objectives, describes the basic sign formats and colours and provides guidance on developing the various panels that together constitute a safety sign.

ANSI/ASABE AD20966-2016, Automatic milking installations - Requirements and testing

Updated to more clearly articulate that the 'fit and finish' standards for US milking systems are different than with ISO and to update the 3-A references that are used for 'fit and finish' on US milking systems to be in a format that infers 'the most recent edition'
ANSI/ASABE AD4254-11-JAN2012 (R2017), Agricultural machinery - Safety - Part 11: Pick-up balers

Provides the safety requirements and their verification for the design and construction of self-propelled and trailed pick-up balers, including the combination of pick-up balers with wrappers, independent of the shape or size of the bales formed.

It describes methods for the elimination or reduction of hazards arising from the intended use and reasonably foreseeable misuse of these machines by one person (the operator) in the course of normal operation and service. In addition, it specifies the type of information on safe working practices to be provided by the manufacturer.

ANSI/ASABE AD4254-12-JUL2016, Agricultural machinery - Safety - Part 12: Rotary disc and drum mowers and flail mowers

When used with ISO 4254-1, specifies the safety requirements and their verification for the design and construction of rotary disc mowers, rotary drum mowers, as used for forage crop harvesting in agriculture only, and flail mowers with a horizontal axis for use in agriculture only, that are mounted, semi-mounted, trailed or self-propelled. It describes methods for the elimination or reduction of hazards arising from the intended use and reasonably foreseeable misuse of these machines by one person (the operator) in the course of normal operation and service. In addition, it specifies the type of information on safe working practices to be provided by the manufacturer.

ANSI/ASABE AD4254-13-2013, Agricultural machinery - Safety - Part 13: Large rotary mowers

Provides the safety requirements, verification for the design & construction of towed, semi-mounted, or mounted large rotary mowers with single or multiple cutting elements that have a cutting diameter of 1000 mm or greater for a single cutting element assembly, mounted on a propelling tractor/machine, intended for agriculture & designed for shredding crop residue, grass & small brush by impact. Describes methods for the elimination or reduction of hazards arising from the intended use & reasonable foreseeable misuse of these machines in the course of normal operation & service. Specifies type of information on safe working practices to be provided by the manufacturer.

ANSI/ASABE AD4254-6-2013, Agricultural machinery - Safety - Part 6: Sprayers and liquid fertilizer distributors

Provides the safety requirements and their verification for the design and construction of mounted, semi-mounted, trailed and self-propelled agricultural sprayers for use with pesticide products and liquid fertilizer application, designed for use by one operator only. In addition, it specifies the type of information on safe working practices (including residual risks) to be provided by the manufacturer.

ANSI/ASABE AD500-2-OCT2016, Agricultural tractors - Rear-mounted power take-off types 1, 2, 3 and 4

- Part 2: Narrow-track tractors, dimensions for master shield and clearance zone

This part of ISO 500 specifies the dimensions of the master shield and clearance zones for rear-mounted power take-offs (PTO) of types 1 and 2 on narrow-track (track width 1 150 mm or less) agricultural tractors.


Provides the PTO drive shafts of a tractor or self-propelled machine used in agriculture & the power-input connection (PIC) of its implement, establishing a method for determining PTO static & dynamic torsional strength while giving manufacturing & safety requirements. Applicable only to those PTO drive shafts & guards mechanically linked to the shaft by at least two bearings. Not applicable to PTO drive shafts guarded by location or to the mechanical characteristics of overrun devices & torque limiters, environmental aspects not considered; not applicable to PTO drive shafts & their guards manufactured before the date of its publication.


Gives the forms and applications of power take-off (PTO) drive shafts for tractors and self-propelled machines used in agriculture, and specifies the dimensions for, and clearance zone around, the implement power-input connection (PIC) for a variety of attachments. Its intent is to ensure proper clearance between the PTO drive line and adjacent components on the implement and tractor when both implement and tractor have compatible power levels.

ANSI/ASABE AD5674-2015, Tractors and machinery for agricultural and forestry - Guards for power take-off (PTO) drive shafts - Strength and wear tests and acceptance criteria


ANSI/ASABE AD5675-2016, Agricultural tractors and machinery - General purpose quick-action hydraulic couplers

Provides the essential interface dimensions, as defined in ISO 7241-1, and the operating requirements for hydraulic couplers employed to transmit hydraulic power from agricultural tractors to agricultural machinery. It is applicable to couplers used in hydraulic lines other than those used for braking circuits.
Methods of estimating the grain pressures within centrally loaded and unloading bins used to store free-flowing, agricultural whole grain.

This Engineering Practice provides guidelines for biosecurity, environmentally acceptable, and economically sustainable disposal of livestock and poultry carcasses and carcass parts via composting. It covers planning, construction, operation, and maintenance of mortality composting operations using naturally ventilated, static pile bin or windrow systems of the type typically used for routine or emergency mortality management on farms or ranches. Guidelines for in-vehicle or mechanically ventilated composting systems are not covered.

ANSI/ASABE S276.8-2016, Slow-Moving Vehicle Identification Emblem (SMV Emblem)
Establishes specs that define a unique identification emblem, the Slow-Moving Vehicle Emblem (SMV), to be used only for slow-moving machines (vehicles), when operated or traveling on public roads. Requirements & applications of the standard are defined in the standard. The purpose is to communicate to third parties the slower speed capabilities of the slow-moving vehicle to other vehicle(s) using public roads. Primary application of the SMV emblem will be with implements of husbandry but may be used with other machines or vehicles that travel at speeds less than 40 km/h (25 mile/h).

ANSI/ASABE S516-2014, Terminology for Forest Operations and Equipment
This standard specifies terminology for operations and equipment commonly used to establish, tend, and harvest forest stands. The intent of this Standard is to establish uniform terminology to describe forest operations and equipment in technical papers, specifications, standards, and general use.

ANSI/ASABE S588.1-NOV16, Uniform Terminology for Air Quality
The purpose of this Standard is to establish uniformity in terms used within the field of outdoor rural air quality. This Standard is also to serve as a focal point for the development of new useful terms associated with air quality in rural areas.

ANSI/ASABE S592.1-2016, Best Management Practices for Boom Spraying
The standard codifies the most basic of spray application best management practices (BMPs). In discussions with EPA, there is a need for BMPs to fill a gap that is not addressed on product labels. Future product labels may reference the standard. The benefit to mankind is to improve the knowledge level of the “average person” who uses sprayers. This should lead to improved environmental stewardship.

ANSI/ASABE S593.1-JAN2011 (R2015), Terminology & Definitions for Biomass Production, Harvesting and Collection, Storage, Processing, Conversion and Utilization
The standard provides terminologies that are used in biomass feedstock production, harvesting, collection, handling, storage, processing and conversion, bioenergy, biofuels, biopower, and bioproducts.

ANSI/ASABE S596-2006 (R2015), Recycling Plastic Containers from Pesticides and Pesticide-Related Products
Guide agricultural chemical manufacturers, distributors and applicators; plastic recyclers; and regulatory agencies in the effective handling, storage, disposal and recycling of non-refillable, high-density polyethylene (HDPE) containers for agricultural pesticides and surfactants while enhancing safety.

ANSI/ASABE S598 JAN2010 (R2014), Procedure for Sampling, Measuring and Reporting Commingled Crop in Combine Harvest of a Subsequent Crop
This standard establishes a method to estimate the percentage of commingled grain or seed from a previously harvested crop present in that of the next crop subsequently harvested by a combine harvester.

ANSI/ASABE S599-2010 (R2015), Standardized Deployment Performance of an Automatically Deployable ROPS for Turf & Landscape Equipment
The purpose of this standard is to establish the performance requirements of an automatically deployable protective structure for ride-on turf & landscape equipment. This standard specifies design and testing requirements for the installation of automatically deploying roll over protective structures (AD-ROPS).

ANSI/ASABE S600-2011 (R2016), Manually Handled Collapsible Reusable Plastic Containers for Handling of Fruits and Vegetables
Provides uniform design and performance specifications for a manually handled collapsible reusable plastic container for handling fresh horticultural produce during post-harvest processing, storage, and transportation.

ANSI/ASABE S602.2 MONYEAR-2015, General Safety Standard for Agricultural Tractors in Scrapper Applications
Provides safety requirements for agricultural scraper tractors as defined in ASAE S390, when used in construction environments, as defined in ISO 6165. This standard does not apply to agricultural tractors used in traditional agricultural applications, such as land leveling. Agricultural scraper tractors that meet the requirements of this standard are suitable for use in traditional agricultural tractor applications.

ANSI/ASABE S604.1-2014, Safety for Power Take-off (PTO), PTO Drive Shafts, and Power Input Connection (PIC) for Agricultural Field Equipment
Guide to provide a reasonable degree of personal safety during normal operation & servicing of the power take-off drive shafts of a tractor/self-propelled machine used in agriculture & the power input connection of its implement, in addition to what is given in ANSI/ASABE AD5673-1. Applicable only to those PTO drive shafts & guards mechanically linked to the shaft by at least two bearings. Not applicable to PTO drive shafts guarded by location or to the mechanical characteristics of overrun devices & torque limiters, nor are environmental aspects considered; neither is it applicable to PTO drive shafts & their guards manufactured before the date of it.

ANSI/ASABE S607 OCT2007 (R2014), Ventilating Manure Storages to Reduce Entry Risk
Specifies forced-ventilation times required to evacuate contaminant gases H2S, CH4, and CO2 from on-farm, confined-space, manure storages with either solid, totally slotted or partially slotted covers to concentrations below American Conference of Governmental Industrial Hygienists (ACGIH) recommended 8-hr. Threshold Limit Values (TLVs).

ANSI/ASABE S608-2008 (R2013), Headlamps for Agricultural Equipment
Provides performance and general design requirements and related test procedures for headlamps for use on agricultural equipment that may be operated on public roads.

ANSI/ASABE S612 JUL2009 (R2015), Performing On-farm Energy Audits
This Standard is intended to support energy audits of all types of farming operations (which includes ranching) typically found in North America. Energy audits shall exclude the farm residence, except where it is not practical to separate base line data.

ANSI/ASABE S613-1-FEB2009 (R2013), Tractors and self-propelled machinery for agriculture - Air quality systems for cabs - Terminology and overview
This standard is intended for application to agricultural self propelled machinery including tractors as defined by ASABE Standard ASAE S390.4. It covers terminology, definitions and an overview of how cabs may be used in contaminated environments as part of an Occupational Health and Safety Management System.
ANSI/ASABE S613-2.1-JUN-2013, Tractors and self-propelled machinery for agriculture - Air quality systems for cabs - Part 2: Cab and HVAC design

This part of the S613 standard series is concerned with the generally accepted design principles that define a robust cab and HVAC system used in contaminated environments as part of an Occupational Health and Safety Management System (OHSMS). This document is intended to be a guide for engineers who are responsible for designs used in agricultural applications. Information provided by this part of the standard series should help engineers provide cab and HVAC system designs that can be used as an engineering control within a program of risk management.

ANSI/ASABE S613-3-JUN2013, Tractors and self-propelled machinery for agriculture - Air quality systems for cabs - Part 3: Filters for environmental cab HVAC systems

Contains generally accepted design principles and test procedures that define and qualify a filter for an HVAC system used in contaminated environments as part of an Occupational Health and Safety Management System (OHSMS). This document is intended to be a guide for engineers who are responsible for designs used in agricultural applications and for application specialists who are looking for a filter to be used when operating in a specific hazardous environment.

ANSI/ASABE S618 DEC2010 (R2016), Post Frame Building System Nomenclature

Nomenclature for all primary frame components (post types, trusses, headers, rafters, etc.), secondary framing components (girt types, purlin types, bracing, etc.), diaphragm and shear wall elements (fastener types, shear blocking, chords, wind frames, etc.), and foundation types (piers, poles, posts, walls, slabs, uplift mechanisms, etc.). Diagrams and designations would be included for different roof framing variations (post-truss, post-rafter, post-header-truss/rafter).

ANSI/ASABE S619-2014, Safety for Tractor-Mounted, Boom-Type Post Hole Diggers

Establishes the safety requirements for tractor-mounted, boom-type post hole diggers. Applies to boom-type post hole diggers designed and intended for digging vertical, cylindrical holes. Applies to boom-type post hole diggers designed for attachment to the three-point hitch of agricultural tractors as specified in ASAE S390, equipped with Category I or Category II three-point linkage as specified in ASAE S217, and powered by a 540-rpm power take-off or by the agricultural tractor’s hydraulic power.

ANSI/ASABE S620-MAR2017, Safety for Anhydrous Ammonia Application Equipment

The purpose of this standard is to establish the safety requirements for implements of husbandry used in the local transport and application of anhydrous ammonia for agricultural fertilizer. This standard does not cover bulk storage and handling equipment, manufacture of, or over-the-road bulk transport equipment (other than implements of husbandry) for anhydrous ammonia. This standard is applicable to new equipment manufactured and assembled after the publication of this standard.

ANSI/ASABE S623.1-JAN2017, Determining Landscape Plant Water Demands

To provide science-based guidelines for determination of the minimum plant water demands for mixed species landscapes that maintain adequate aesthetic quality. Plant water demands can be met by any combination of precipitation and irrigation.

ANSI/ASABE S625-2015, Drawbar Pin Dimensions and Requirements for Towed Equipment

Establishes dimensional & minimum strength requirements for agricultural drawbar hitch pins used in the single-point attaching of towed machine to towing machines or leading machines. Application assumes there is a clevis on towing machine conforming to ANSI/ASABE AD6489-3-2004 and a ring-on-towed machine conforming to ANSI/ISO 21244:2008. This standard defines loading conditions for drawbar pin retention systems. When the towing machine doesn’t conform to either of the aforementioned standards, fit and performance of pins designed to standard may be affected. Usage of applicable specs derived from standard is encouraged for such cases.

ANSI/ASABE S626-SEPT2016, Landscape Irrigation System Uniformity and Application Rate Testing

This standard will define and establish a set of procedures to evaluate and measure the performance of irrigation emission devices once installed in the landscape including but not limited to: turfgrass lawn areas and landscape planting beds.

ANSI/ASABE S629-2016, Framework to Evaluate the Sustainability of Agricultural Production Systems

The scope of the ballot is limited to blue text indicating revision from the previously approved draft based on comment resolution. The Standard is intended to define frameworks for sustainability certification of all types of farming operations (which include ranching). It does not constitute a certification framework per se but rather serves as a criterion for development of certification.

ANSI/ASABE S639-JUN-2016, Safety Standard for Large Row Crop Flail Mowers

Specifies safety requirements & verification for the design & construction of row-crop flail mowers with a cutting width longer than 3m used exclusively in agricultural row-crop applications which have a rear part that can be opened for particular field use operations (equipped with adjustable material discharge gates or deflectors located on the rear of the mower). It describes methods for the elimination or reduction of hazards arising from the intended use & reasonably foreseeable misuse of these machines by one person (the operator) in the course of normal operation & service. Specifies type of information on safe working practices to be provided by the manufacturer.

ANSI/ASABE/ISO 12140:2014, Agricultural machinery - Agricultural trailers and trailed equipment - Drawbar jacks

Specifies terms & definitions, establishes test procedures, defines minimum performance requirements for telescopic mechanical screw-type jacks or hydraulic jacks mounted on ag implements as original equipment and/or replacement jacks. Defines terms, establishes test procedures, & creates minimum acceptance criteria for use of telescopic mechanical screw-type jacks or hydraulic jacks mounted on ag implements as original equipment jacks or jacks fitted with a jack attachment mounts (weld-on or removable). Specifies minimum markings & information to be provided by the jack manufacturer.

ANSI/ASABE/ISO 12188-2-2015, Tractors and machinery for agriculture and forestry - Test procedures for positioning and guidance systems in agriculture - Part 2: Testing of satellite-based auto-guidance systems during straight and level travel

Specifies the process for evaluating/reporting performance of ag vehicles equipped with automated guidance systems based on global navigation satellite system when operating in an automatic steering mode. Main performance criterion is the lateral deviation of a representative point on the vehicle from desired trajectory for that point. Performance criterion integrates uncertainties associated with performance of components of the vehicle guidance system including positioning device(s), automated steering components, & vehicle mechanisms & dynamics. Focuses on steady-state tracking performance of automated guidance while travelling on straight paths over a level s.

ANSI/ASABE/ISO 14269-1-2006 (R2017), Tractors and self-propelled machines for agriculture and forestry - Operator enclosure environment - Part 1: Vocabulary

Specifies test methods and criteria for the evaluation of the operator enclosure in agricultural and forestry tractors (Agricultural tractors used in forestry applications), and self-propelled agricultural machines. This part of ISO 14269 gives terms and definitions used in other parts of ISO 14269.
ANSI/ASABE/ISO 14269-2-2006 (R2017),
Tractors and self-propelled machines for agriculture and forestry - Operator enclosure environment - Part 2: Heating, ventilation and air-conditioning test method and performance

 Specifies a uniform test method for measuring the contribution to operator environmental temperature and humidity provided by an air-conditioning, heating and ventilation system operating in a specific ambient environment for tractors and self-propelled machines for agriculture and forestry.

 ANSI/ASABE/ISO 14269-3-2006 (R2017),
Tractors and self-propelled machines for agriculture and forestry - Operator enclosure environment - Part 3: Determination of effect of solar heating

 Specifies a test method for simulating solar heating in the laboratory and measuring the radiant heat energy from a natural or simulated source. This standard is applicable to tractors and self-propelled machines for agriculture and forestry when equipped with an operator enclosure.

 ANSI/ASABE/ISO 14269-4-2006 (R2017),
Tractors and self-propelled machines for agriculture and forestry - Operator enclosure environment - Part 4: Air filter element test method

 Specifies a uniform test method for determining performance levels of operator enclosure panel-type air filters. It is applicable to tractors and self-propelled machines for agriculture and forestry when equipped with an operator enclosure with a ventilation system.

 ANSI/ASABE/ISO 14269-5-2006 (R2017),
Tractors and self-propelled machines for agriculture and forestry - Operator enclosure environment - Part 5: Pressurization system test method

 Specifies a test procedure which will provide for uniform measurement of the pressurization inside an operator enclosure of tractors and self-propelled machines for agriculture and forestry when equipped with a ventilation system.

 ANSI/ASABE/ISO 15077-2008 (R2013),
Tractors and self-propelled machinery for agriculture - Operator controls - Actuating forces, displacement, location and method of operation

 Specifies the preferred method of operation and requirements related to operator controls actuated by hand and foot, installed in agricultural tractors and self-propelled agricultural machinery and used by a seated operator as intended and under the conditions foreseen by the manufacturer. It also gives recommendations for the maximum control actuating forces, direction of motion and location of these controls.

 ANSI/ASABE/ISO 17101-1:2012 JUN2016,
Agricultural machinery - Thrown-object test and acceptance criteria - Part 1: Rotary mowers

 Contains specifications and acceptance criteria for thrown-object testing of rotary mowers used in agriculture. Not applicable to the following: flail mowers; mowers with an articulated arm; mowers with one or more vertical axis designed for mulching; pedestrian-controlled motor mowers; lawn mowers or machines designed as lawn mowers; inter-row mowing units; machines designed for highway and road maintenance only.

 ANSI/ASABE/ISO 17101-2:2012 JUN2016,
Agricultural machinery - Thrown-object test and acceptance criteria - Part 2: Flail mowers

 This part of ISO 17101 gives specifications and acceptance criteria for the thrown-object testing of flail mowers used in agriculture. It is not applicable to the following: large rotary mowers; rotary mowers; mowers with an articulated arm; mowers with one or more vertical axis designed for mulching; pedestrian controlled motor mowers; lawn mowers or machines designed as lawn mowers; inter-row mowing units; machines designed for highway and road maintenance only; flail mowers that have the rear part which can be opened for particular field use operations (e.g. rowcrop mowers)

 ANSI/ASABE/ISO 21244-2008 JAN2011 (R2016),
Agricultural equipment - Mechanical connections between towed and towing vehicles - Implement hitch rings and attachment to tractor drawbars

 Specifies dimensional requirements for the hitch rings of agricultural trailers and trailed implements designed to be attached to agricultural tractor drawbars of clevis type according to ISO 6489-3.

 ANSI/ASABE/ISO 23205-2016, Agricultural tractors - Instructional seat

 Specifies the minimum design and performance requirements for an instructional seat and restraint designed for limited use by a trainer or trainee or service person inside an enclosed cab of an agricultural tractor.

 ANSI/ASABE/ISO 26322-2-2012, Tractors for agriculture and forestry - Safety- Part 2: Narrow-track and small tractors

 Specifies general safety requirements & verification for design & construction of narrow-track & small tractors used in agriculture & forestry. Specifies type of information on safe working practices, to be provided by the manufacturer. Provides technical means for improving levels of personal safety of operators & others involved in the course of normal operation, maintenance & use of these tractors. Applicable to narrow-track tractors with at least two axles for pneumatic-tyred wheels, or having tracks with a smallest fixed or adjustable track width of not more than 1150 mm, and small tractors having an unladen mass not greater than 600 kg.

 ANSI/ASABE/ISO 27850-2016, Tractors for agriculture and forestry - Falling object protective structures - Test procedures and performance requirements

 Standard sets forth the test procedure and performance requirements for a falling object protective structure, in the event such a structure is installed on an agricultural or forestry tractor. The standard is applicable to agricultural and forestry tractors having at least two axles for pneumatic-tyred wheels or having tracks instead of wheels. It does not apply to forestry machinery as defined in ISO 6814.

 ANSI/ASABE/ISO 3767-1-1998 MAY2006 (R2016), Tractors, machinery for agriculture and forestry, powered lawn and garden equipment - Symbols for operator controls and other displays - Part 1: Common symbols

 Establishes the common symbols for use on operator controls and other displays on tractors and machinery for agriculture and forestry, and powered lawn and garden equipment as defined in ISO 3339-0 and ISO 5395. The symbols given apply to controls and displays common to tractors and machinery for agriculture and forestry, and powered lawn and garden equipment, as well as to other types of self-propelled work machines designed to operate off public roads, such as earthmoving machines, powered industrial trucks and mobile cranes.

 ANSI/ASABE/ISO 3767-1-APR17, Tractors, machinery for agriculture and forestry, powered lawn and garden equipment - Symbols for operator controls and other displays - Part 1: Common symbols

 Standardizes symbols for use on operator controls and other displays applicable to multiple types of agricultural tractors and machinery, forestry machinery, and powered lawn and garden equipment.

 ANSI/ASABE/ISO 3767-2-1991, W/Amd. 1-3 MAY2006 (R2016), Tractors, machinery for agriculture and forestry, powered lawn and garden equipment - Symbols for operator controls and other displays - Part 2: Symbols for agricultural tractors and machinery

 Establishes symbols for use on operator controls and other displays on tractors and machinery for agriculture as defined in ISO 3339-0. The symbols given are for controls and displays specific to agricultural tractors and machinery such as combine harvesters, cotton pickers, balers and forage harvesters.

 ANSI/ASABE/ISO 3767-2-APR17, Tractors, machinery for agriculture and forestry, powered lawn and garden equipment - Symbols for operator controls and other displays - Part 2: Symbols for agricultural tractors and machinery

 Standardizes symbols for use on operator controls and other displays on agricultural tractors and machinery.
ANSI/ASABE/ISO 3776-1-2006 (R2016), Tractors and machinery for agriculture - Seat belts - Part 1: Anchorage location requirements
Specifies the location, relative position and threaded hole dimensions of the anchorages for pelvic restraint (seat) belt assemblies intended to be used by the operators of agricultural tractors and self-propelled machinery.

ANSI/ASABE/ISO 3776-2-2016 , Tractors and machinery for agriculture - Seat belts - Part 2: Anchorage strength requirements
This part of ISO 3776 specifies the strength of the anchorages for pelvic restraint (seat) belts intended to be used by the operators of agricultural tractors and self-propelled machinery.

Specifies the requirements for pelvic restraint (seat) belt assemblies intended to be used by the operators of agricultural tractors and self-propelled machinery.

ANSI/ASABE/ISO 4252-MAY2012 (R2017), Agricultural tractors - Operator’s workplace, access and exit - Dimensions
Specifies the design dimensions of agricultural tractors having a minimum track width exceeding 1 150 mm in respect of: a) the minimum dimensions of their access doorways, b) the number, location and minimum dimensions of their emergency exits, and c) their minimum internal clearance dimensions.

ANSI/ASABE/ISO 500-3:2015, Agricultural tractors - Rear-mounted power take-off types 1, 2, 3 and 4 - Part 3: Main PTO dimensions and spline dimensions, location of PTO
Specifies manufacturing requirements for, and the location of, rear-mounted power take-offs (PTOs) of types 1, 2, 3 and 4 on agricultural tractors.

Specifies, in accordance with ISO 10326-1:1992, a laboratory method for measuring and evaluating the effectiveness of the suspension of operator seats on agricultural wheeled tractors. It also specifies acceptance criteria based on the test results, while defining the input spectral classes relating to three classes of agricultural tractor with rubber tyres, unsprung rear axles and no low-frequency cab isolation - those of up to 3 600 kg (class 1), those of from 3 600 kg to 6 500 kg (class 2), and those of over 6 500 kg (class 3).

ANSI/ASABE/ISO 5008-2002 W/Cor. 1 MAY2006 (R2015), Agricultural wheeled tractors and field machinery - Measurement of whole-body vibration of the operator
Specifies methods for measuring and reporting the whole body vibration to which the operator of an agricultural wheeled tractor or other field machine is exposed when operating on a standard test track.

ANSI/ASABE/ISO AD500-1:2015, Agricultural tractors - Rear-mounted power take-off types 1, 2, 3 and 4 - Part 1: General specifications, safety requirements, dimensions for master shield and clearance zone
Gives general specifications, including speeds, safety requirements, the dimensions for the master shield, and clearance zones for rear-mounted power take-offs (PTO’s) of types 1, 2, 3, 4 and 4 on agricultural tractors with a track setting of more than 1 150mm (those with a track setting width of 1 150mm or less are covered in ANSI/ISO 500-2:2004. This scope is identical to the scope of ISO 500-1 except for the inclusion of over speed requirements and Referencing ASABE/ISO 500-2:2004 in place of ISO 500-2.

ANSI/ASABE/ISO TS 28924-2015, Agricultural machinery - Guards for moving parts of power transmission - Guard opening without tool
Nationally adopt without deviations ISO TS 28924 Agricultural machinery - Guards for moving parts of power transmission - Guard opening without tool

ANSI/ASABE D241.4-REFERENCING (R2013), Density, Specific Gravity, and Mass-Moisture Relationships of Grain for Storage
Provides recommendations for density, specific gravity and moisture for grain storage.

Many natural, man-made, and unexpected events (i.e., power interruptions, equipment failures, extreme weather conditions, storms, and natural disasters) occur requiring temporary emergency ventilation and care of livestock and poultry. These events may require either short term (i.e., minutes to days) or long term (i.e., weeks to months) temporary emergency ventilation. The purpose of this Engineering Practice is to provide data and guidelines to assist designing emergency ventilation, feeding, watering, and lighting systems for livestock and poultry.

This Engineering Practice is intended to improve the design, construction and maintenance of surface drainage systems which are adapted to modern farm mechanization. It is limited to agricultural or farm-size areas, 259 ha (640 ac) or less, in the humid region of the eastern USA.

ANSI/ASABE EP364.4-FEB-2013, Installation and Maintenance of Farm Standby Electric Power
Provides information to assist installers, maintenance personnel, operators and others in the proper installation, operation, and maintenance of farm standby electrical systems. This Engineering Practice covers both engine-driven and tractor-driven generators for farm standby electrical power service as defined in EGSA-101G, EGSA-101S, and EGSA -101P.

ANSI/ASABE EP378.4 JUN2010 (R2014), Floor and Suspended Loads on Agricultural Structures Due to Use
This Engineering Practice presents probable floor and suspended loads due to building use and methods of applying the loads in building design. It includes recommended design loads resulting from livestock, suspended caged poultry, vehicles, and manure stored on a floor. It does not include loads on manure storages, or wind and snow loads, or building design loads covered by ANSI/ASCE-7.

ANSI/ASABE EP389.2 JUN1993 (R2015), Auger Flighting Design Considerations
This Engineering Practice is a guide for designing conveyor augers using steel helicoid flighting and for specifying helicoid flighting as generally used in agricultural equipment.

ANSI/ASABE EP400.3-2007 (R2012), Designing and Constructing Irrigation Wells
A guide for preparing specifications for irrigation well construction. The objective is to obtain economical wells of high productivity which are relatively sand free with a long projected life. The scope of this Engineering Practice is directed to wells constructed to obtain ground water for irrigation purposes; however, many of the details presented herein also are suitable for domestic, municipal, and industrial wells.

ANSI/ASABE EP403.4-NOV-2011 (R2015), Design of Anaerobic Lagoons for Animal Waste
This Engineering Practice describes the minimum criteria for design and operation of anaerobic animal waste lagoons located in predominantly rural or agricultural areas.

ANSI/ASABE EP411.5-2012 (R2016), Guidelines for Measuring and Reporting Environmental Parameters for Plant Experiments in Growth Chambers
Set forth guidelines for the measurement of environmental parameters that characterize the aerial and root environment in a plant growth chamber. It establishes criteria that will promote a common basis for environmental measurements for the research community and the commercial plant producer and promotes uniformity and accuracy in reporting data and results in the course of conducting plant experiments.

ANSI/ASABE EP446.3-2008 (R2012), Loads Exerted by Irish Potatoes in Shallow Bulk Storage Structures
Provides guidelines from which designers may calculate loads on vertical & inclined walls, partitions, bin fronts, ducts, & appurtenances that are to resist lateral pressure of potatoes stored in bulk. Guidelines may be modified for specific, unique load conditions. For bins that are wider than deep & not deeper than 5.5 m (18 ft). This practice is for bins in which length is greater than width. Applies to maximum potato pressures measured in full-sized bins with wet potatoes.
ANSI/ASAE EP484.2-AUG98 (R2012), Diaphragm Design of Metal-Clad, Wood-Frame Rectangular Buildings
This Engineering Practice is a consensus document for the analysis & design of metal-clad wood-frame buildings using roof and ceiling diaphragms, alone or in combination. The roof (and ceiling) diaphragms, endwalls, intermediate shearwalls, and building frames are the main structural elements of a structural system used to efficiently resist the design lateral (wind) loads. This Engineering Practice gives acceptable methods for analyzing and designing the elements of the diaphragm system. Provisions of this Engineering Practice are limited to the analysis of single-story buildings of rectangular shape.

ANSI/ASAE EP486.2-2012 (R2016), Shallow Post and Pier Foundation Design
Contains safety factors & other provisions for allowable stress design (ASD) which is also known as working stress design, & for load & resistance factor design (LRFD) which is also known as strength design. It contains properties & procedures for modeling soil deformation for use in structural building frame analyses. This engineering practice contains safety factors and other provisions for allowable stress design (ASD) which is also known as working stress design, and for load and resistance factor design (LRFD) which is also known as strength design. It contains properties and procedures for modeling soil deformation for use in structural building frame analyses.

Provides empirical equations to adjust forage harvester feed rates and specific energy measurements to a common crop moisture level of 65% wet basis. Historically, engineers and researchers have tried to compensate for the significant effect of changing moisture contents by converting test data to a dry mass basis, or by only comparing data obtained within a few moisture percentage points on a wet mass basis. The crop moisture compensation equations in this Engineering Practice significantly decrease data scatter as a function of moisture content when compared to data scatter on a wet or dry mass basis.

ANSI/ASAE EP545 MAR1995 (R2015), Loads Exerted by Free-Flowing Grain on Shallow Storage Structures
This Engineering Practice presents methods of estimating the grain pressures within shallow storage structures used to store free-flowing, agricultural whole grains.

Establishes guidelines for designing and calculating allowable bending properties of mechanically laminated wood assemblies used as structural members.

Establishes a unique identification system for slow-moving animal-drawn vehicles on public roadways or highways. It is intended that this identification system be used to complement existing laws, rules and regulations in individual states, provinces, and municipalities. It is recognized that this recommended practice can be a cultural or religious issue and is not intended to devalue or replace those values. It is intended to provide options to those who would like to add or enhance lighting and marking of their animal-powered vehicles in the form of a voluntary consensus standard.

ANSI/ASAE S229.6-DEC1976 (R2012), Baling Wire for Automatic Balers
This specification shall cover annealed baling wire for automatic balers. The wire shall be furnished in two sizes of coils: 960 m (3150 ft) minimum and 1981 m (6500 ft) minimum.

ANSI/ASAE S261.1-OCT96 (R2015), Design and Installation of Nonreinforced Concrete Irrigation Pipe Systems
This Standard is intended as a guide to engineers in the design and installation of low or intermediate pressure nonreinforced concrete irrigation pipelines and for the preparation of detailed specifications for a particular installation. It is restricted to pipelines with vents or stands open to the atmosphere or closed pipelines operating at less than 6 m (20 ft) of head. It is not intended to serve as a complete set of design criteria and construction specifications.

ANSI/ASAE S277.2-1992 (R2012), Mounting Brackets and Socket for Warning Lamp and Slow-Moving Vehicle (SMV) Identification Emblem
This Standard defines mounting devices for use with warning lamps and SMV emblems.

ANSI/ASAE S279.17-2013, Lighting and Marking of Agricultural Equipment on Highways
This Standard provides specifications for lighting and marking of agricultural equipment whenever such equipment is operating or is traveling on a highway.

ANSI/ASAE S289.2 FEB1998 (R2013), Concrete Slip-Form Canal Linings
This Standard is to provide standards and specifications for the installation of concrete slip-form canal linings in the interest of reducing costs and assuring quality control.

ANSI/ASAE S296.5 DEC2003 (R2013), General Terminology for Traction of Agricultural Tract and Transport Devices and Vehicles
Assist in the standardized reporting of information on traction and transport devices and vehicles. When it is not possible for data to be reported using this terminology, it is recommended that new terms be clearly defined. Unless otherwise indicated, all definitions refer to individual traction or transport devices or vehicles operating on a horizontal surface.

ANSI/ASAE S303.4-2007 (R20103), Test Procedure for Solids-Mixing Equipment for Animal Feeds
Promotes uniformity and consistency in the terms used to describe and evaluate animal feed mixers. Provides a procedure for testing mixers which ultimately improves the quality of animal feed mixtures.

ANSI/ASAE S315.4-2012 (R2017), Agricultural Baling Twine for Automatic Balers
The purpose of this standard is to provide uniform polyolefin and sisal agricultural baler twine specifications to ensure satisfactory performance in round and square balers and have adequate durability in normal storage and handling of baled forage and biomass materials. This standard is intended to cover agricultural baler twines manufactured for use in round balers, small square balers, and large square balers. This standard is not intended to restrict manufacturers in the use of materials or manufacturing processes, rather create a minimum expectation of bale twine product performance.

ANSI/ASAE S318.18-JUN2017, Safety for Agricultural Field Equipment
This Standard is a guide to provide a reasonable degree of personal safety for operators and other persons during the normal operation and servicing of agricultural field equipment. This Standard does not apply to skid steer loaders, permanently installed grain dryers, and agricultural equipment covered by other safety standards, such as but not limited to permanently installed farmstead equipment, portable grain augers, and storage structures, except where specifically referenced by other standards.

ANSI/ASAE S319.4-2008 (R2013), Method of Determining and Expressing Fineness of Feed Materials by Sieving
Defines a test procedure to determine the fineness of feed ingredients and to define a method of expressing the particle size of the material. Surface area and number of particles per unit mass can be calculated from the determined particle size.

ANSI/ASAE S331.6-2015, Implement Power Take-Off Driveline Specifications
Establishes categories of universal joint drivelines with two subsets of connecting members each, one heavy duty, HD, and one regular duty, RD. The intended use of the drivelines is between tractor power take-off shafts and implement input shafts, or any universal joint application within the implement. The universal joint driveline from the tractor power take-off shaft to the implement shaft is considered a part of the implement. This Standard does not provide for dimensional interchangeability from one implement to another.
ANSI/ASAE S388.5 MAY2006 (R2016), Field Equipment for Agriculture-Safety Chain for Towed Equipment
This Standard covers the specifications for an auxiliary attaching system to retain a connection between towing and towed agricultural field equipment in the event of separation of the primary attaching system long enough to bring the machines to a stop. It should not be construed that this auxiliary system can ensure that control or connection will be maintained in the event of incidents such as loss of control, rollover, jackknife, or collision. This Standard applies to all combinations of towing and towed agricultural field equipment when traveling on highways.

ANSI/ASAE S343.4-2015, Terminology for Combines and Grain Harvesting
Establishes terminology pertinent to grain combine design and performance. It is intended to improve communication among engineers and researchers and to provide a basis for comparative listing of machine specifications.

ANSI/ASAE S351-1982 (R2017), Hand Signals for Use in Agriculture
This Standard provides for hand signals to be used in agricultural operations especially when noise or distance precludes the use of normal voice communication. The purpose of the hand signals is to provide an easy means of communication, particularly in the interest of safety.

ANSI/ASAE S354.6-NOV2016, Safety for Farmstead Equipment
The purpose of this standard is to provide a reasonable degree of personal safety for operators and other persons during normal operation and servicing of farmstead equipment. Does not apply to agricultural field equipment nor to self-propelled mobile equipment.

ANSI/ASAE S355.5 MONYEAR-2015, Safety Practices for Agricultural Front-End Loaders
This Standard provides a uniform method of warning owners, bystanders, and operators of the potential hazards encountered in the operation and servicing of agricultural tractors equipped with agricultural front-end loaders. It emphasizes that hazard control and accident prevention are dependent upon the awareness, concern, and prudence of personnel involved in the operation, transport, and maintenance of equipment. Annex A includes safe practice messages to enhance safety in the operation and servicing of such equipment.

ANSI/ASAE S358.3 MAY2012 (R2017), Moisture Measurement - Forages
To establish uniform methodology for estimating the moisture content of forage materials in various forms. Other techniques, such as Karl Fischer titration and toluene distillation, should be used for more accurate moisture determination.

ANSI/ASAE S362.2 JAN1993 (R2015), Wiring and Equipment for Electrically Driven or Controlled Irrigation Machines
Provides detailed information for the application of electrical apparatus to electrically driven or controlled irrigation machines. The purpose of this Standard is to improve the degree of personal safety in operation and application of products and materials under a reasonable range of conditions. This Standard covers all electrical equipment, apparatus, components, and wiring necessary for electrically driven or controlled irrigation machines, from the point of connection of electric power to the machine. Provisions of this Standard apply to electrical equipment for use on circuits operating at voltages between 30 and 600 V.

ANSI/ASAE S365.9-2011 (R2017), Braking System Test Procedures and Braking Performance Criteria for Agricultural Field Equipment
The purpose of this Standard is to establish requirements, minimum performance criteria, and performance test procedures for braking systems on agricultural field equipment.

ANSI/ASAE S375.2-1996 (R2013), Capacity Ratings and Unloading Dimensions for Cotton Harvester Baskets
The purpose of this Standard is to provide a uniform method of expressing the following information relative to cotton strippers and cotton pickers: 1. Capacity of basket. 2 Unloading height of basket. 3 Lip height of raised basket. 4 Unloading angle of basket. 5 Maximum basket height. 6 Working height. 7 Transport height.

ANSI/ASAE S376.3-2016, Design, Installation and Performance of Underground, Thermoplastic Irrigation Pipelines
This Standard applies to underground, thermoplastic pipelines used in the conveyance of irrigation water to the point of distribution and may or may not apply to potable water systems.

ANSI/ASAE S377-1990 (R2015), Application of Remote Linear Control Devices to Lawn and Garden Ride-on Tractor Attachments and Implements
The purpose of this Standard is to establish common mounting and clearance dimensions for remote linear control devices as applied to lawn and garden ride-on tractor attachments and implements with such other specifications as are necessary to accomplish the following objectives: 1) To permit use of any make or model of attachment or implement adapted for control by a remote linear control device; 2) To facilitate changing the remote linear control device from one attachment or implement to another.

ANSI/ASAE S390.6 (ISO 12934:2013) - DEC16, Tractors and machinery for agriculture and forestry - Basic types - Vocabulary
This standard provides terms and definitions for agricultural field equipment designed primarily for use in agricultural operations for the production of food and fibre. This standard also applies to agricultural tractors used in forestry applications. Purpose-built forestry machines, as defined by ISO 6814 are not included.

ANSI/ASAE S392.2 APR2005 (R2015), Cotton Module Builder and Transporter Standard
Provides uniform equipment size guidelines for manufacturers that produce cotton module builders and transporters. Standardization will allow harvesting equipment, module builders, transporters, and module covers from various manufacturers to be used compatibly throughout the cotton industry and so avoid problems caused by incompatible equipment dimensions. This Standard also promotes consideration of safety in equipment operation and transport, and in the transporting of seed cotton modules on highways.

ANSI/ASAE S396-JUN2016, Combine Capacity and Performance Test Procedure
Intended to provide the basic requirements for a uniform procedure to measure & report combine capacity, as defined in ANSI/ASAE S343, Terminology for Combines and Grain Harvesting. Because crop conditions are variable & uncontrollable, the procedure provides only for the comparative testing of one combine, or one combine configuration, relative to another, in a particular crop condition . It is also intended to provide the basic requirements for evaluating the uniformity of material spread from harvest residue spreading or chopping devices. Harvest residue spreaders may be evaluated for spreading either straw or chaff separately or as a system for spreading tag.

ANSI/ASAE S397-4-NOV-2013, Electrical Service and Equipment for Irrigation
Provides a common document for use by all those involved in electrical irrigation systems; such as electricians, power suppliers, well drillers, irrigation dealers and manufacturers, extension specialists and irrigators. This Standard applies to three-phase, 240 V, or 480 V service, the most commonly used irrigation service voltages for irrigation pump motors, irrigation machines, and auxiliary equipment.

ANSI/ASAE S401.2-AUG93 (R2012), Guidelines for Use of Thermal Insulation in Agricultural Buildings
Establishes guidelines for evaluating and specifying the type, amount, and manner of installation of thermal insulation in agricultural buildings. The scope includes consideration of burning characteristics, insulation values, and proper installation and protection of insulating materials.
ANSI/ASAE S418.1 OCT2010 (R2014), Dimensions for Cylindrical Hydraulic Couplers for Lawn and Garden Tractors

The purpose of this Standard is to establish interface dimensions of cylindrical hydraulic couplers frequently used by the equipment industry to connect hydraulic remote cylinders and other hydraulic devices to lawn and garden tractors and to permit interchangeable use of remote cylinders and other hydraulic devices on different makes of tractors when designed for this use.

ANSI/ASAE S422.1-2015, Mapping Symbols and Nomenclature for Erosion and Sediment Control Plans for Land Disturbing Activities

Establish list of standard descriptive elements for use in erosion & sediment control plan development. Facilitates use & review of such plans by contractors & other professionals. Does not restrict creation of additional descriptive elements as required for practices not included here. Does not imply that these practices are suitable for erosion or sediment control in any or all applications. Descriptive elements are intended only to facilitate communications. Information within this Standard is not intended to be used in lieu of other construction information and details.

ANSI/ASAE S423.1-2014, Thermal Performance Testing of Open-Loop Solar Ambient Air Heaters with Defined Inlet and Outlet Conditions

Provide method for testing the thermal efficiency of open-loop solar air heaters which are used exclusively for heating ambient air. Test data should provide basis for computing technical performance & comparing efficiency of collectors of different design/construction. Examples: preheating of ventilation air, heating make-up air for environmental control systems, & heating air to dry agricultural products without recirculation. Standard restricted to collectors that have a fixed orientation & slope during the test & are used exclusively for heating ambient air with defined inlet & outlet conditions.

ANSI/ASAE S424.1-SEP92 (R2017), Method of Determining and Expressing Particle Size of Chopped Forage Materials by Screening

This Standard shall be used to determine the particle size of chopped forage materials where the reduction process yields particles such as that material produced by shear-bar type forage harvesters. It is not intended for use on material produced by flail-type harvesters where substantial fractions of the material may be extremely long. This Standard is intended for use in the field as well as in the laboratory. It is intended to separate chopped forage samples without drying them first.

ANSI/ASAE S436.1-1997 (R2016), Test Procedure for Determining the Uniformity of Water Distribution of Center Pivot and Lateral Move Irrigation Machines Equipment with Spray or Sprinkler Nozzles

Defines a method for characterizing the uniformity of water distribution of sprinkler packages installed on center pivots and lateral move irrigation machines. This test produces data to be used in computing the coefficient of uniformity, which can assist in system design and/or selection, and can be used to quantify certain aspects of system performance in the field. The coefficient of uniformity is only one factor in evaluating total system performance. Application rates, runoff, wind, amount of water applied, pump performance, and overall system management can greatly affect the total performance of irrigation systems.

ANSI/ASAE S448.2-2014, Thin-Layer Drying of Agricultural Crops

Provide a unified procedure for determining and presenting the drying characteristics of grains and crops. The drying data determined and presented according to this Standard can be used in characterizing the drying rate of a product, product drying computer simulation, performance testing of drying equipment, and product quality evaluations. This Standard applies specifically to grains and crops that are dried by forced air convection in a thin layer.

ANSI/ASAE S459-FEB93 (R2017), Shear and Three-Point Bending Test of Animal Bone

To use in determining the mechanical properties of animal bones such as the ultimate shear strength, ultimate bending strength, apparent modulus of elasticity, and fracture energy.

ANSI/ASAE S472-MAR 88 (R2017), Terminology for Forage Harvesters and Forage Harvesting

The purpose of this Standard is to establish terminology and specifications pertinent to forage harvester design and performance. It is intended to improve communication among engineers and researchers and to provide a basis for comparative listing of machine specifications.

ANSI/ASAE S478.1-2012 (R2016), Roll-Over Protective Structures (ROPS) for Compact Utility Tractors

To establish the test and performance requirements of a roll-over protective structure, ROPS, designed for compact utility tractors to minimize the frequency and severity of crushing injury to the operator resulting from accidental tractor upset.

ANSI/ASAE S483.2 AUG2011 (R2016), Rotary Mower Blade Dullctility Test

The purpose of this Standard is to identify production blade lots, from which samples were subjected to destructive testing.

ANSI/ASAE S493.1-2003 (R2013), Guarding for Agricultural Equipment

Provides general guidelines for guarding for agricultural equipment so as to provide a reasonable degree of personal safety for operators and other persons during the normal operation and servicing of such equipment.

ANSI/ASAE S515-JAN94 (R2012), Pallet Load Transfer System for Vegetable Harvesters, Shuttle Vehicles, and Road Trucks

Ensures compatibility between all vehicles used in a palletized load transfer system for vegetables. This Standard applies to vegetable harvesters, field shuttle vehicles, trailers, over-the-road trucks, and yard facilities used in such a system.

ANSI/ASAE S521-FEB93 (R2016), Method of Determining Peanut Blanchability

Establishes uniformity and consistency in terms used to describe the blanchability of peanuts. Defines a test procedure that can be used to quantify the blanchability of a sample of peanuts for comparison with other samples. Describes test equipment that ensures accurate control of the test parameters.

ANSI/ASAE S572.1 MAR2009 (R2013), Spray Nozzle Classification by Droplet Spectra

Defines droplet spectrum categories for the classification of spray nozzles, relative to specified reference fan nozzles discharging spray into static air or so that no stream of air enhances atomization. The purpose of classification is to provide the nozzle user with droplet size information primarily to indicate off-site spray drift potential and secondarily for application efficacy.

ANSI/ASAE S584.3-2013, Agricultural Equipment: Speed Identification Symbol (SIS)

The scope of this standard is primarily directed to identifying agricultural equipment (implements of husbandry) that have been designed in their original equipment configuration for specified ground speeds greater than 40 km/h (25 mile/h) but under 65 km/h (40 mile/h).

ANSI/ASAE/ISO 5687-2014, Equipment for harvesting - Combine harvesters - determination and designation of grain tank capacity and unloading device performance

Specifies a method for determining and designating the capacity and unloading rate of combine harvester grain tanks and unloading systems.

ANSI/ASAE/ISO 9190-2002 (R2017), Lawn and garden ride-on (riding) tractors - Drawbar

To specify the dimensions and location requirements for drawbars on lawn and garden ride-on (riding) tractors.

ANSI/ASAE/ISO 9191-2002 (R2017), Lawn and garden ride-on (riding) tractors - Three-point hitch

To specify the requirements for the connection of implements or attachments to the rear of lawn and garden ride-on (riding) tractors by means of a three-point free link hitch in association with a power lift.
ANSI/ASAE/ISO 9192-2002 (R2017), Lawn and garden ride-on (riding) tractors - One-point tubular sleeve hitch

To specify the requirements for the connection of implements or attachments to the rear of lawn and garden ride-on (riding) tractors by means of a one-point (single pin connection) hitch in association with a manual or power lift system. Standard dimensions for hitch point location, hitch tube and implement yoke are laid down to ensure the connection of specific implements or attachments.

ASB (ASC Z50) (American Society of Baking)

ANSI/ASB Z50.1-2006 (R2016), Bakery Equipment - Safety Standards

Reaffirm and redesignate previous standard. Update forward pages with current information.

ANSI/ASB Z50.2-2015, Bakery Equipment - Sanitation Standards

Update the older sections of this standard to the latest consensus.

ASC X9 (Accredited Standards Committee X9, Incorporated)


Wireless Technology is providing communication tools for the ubiquitous office and other financial services environments. The currently deployed wireless technology has significant security concerns and issues. This Wireless Management and Security standard is applicable to wireless environments transmitting financial information; and will (i) establish a technology framework in which (ii) risks and requirements will be defined, (iii) management policy and practices will be addressed, and (iv) audit evaluation criteria will be provided suitable for use by a professional practitioner.

ANSI X9.100-10-2016, Paper Specifications for MICR Documents

This is a core printing standard describing how to properly print the E-13B font characters in magnetic ink. Part 1 gives normative information on correctly printing the shape and giving the magnetic characteristics of the E-138 characters and what print quality issues to avoid. Part 2 informatively describes recommended methods of testing MICR characters to assure they are in conformance with normative specifications given in Part 1. The Part 3 gives normative instruction on the requirements of a MICR reading device and the methods for producing and calibrating secondary reference documents used to measure MICR waveform and signal level.

ANSI X9.100-110-2015, Document Imaging Compatibility

This standard specifies the location and background design of essential check data fields and is intended for all business size and personal size checks.

ANSI X9.100-111-2015, Specifications for Check Endorsements

This standard is intended to provide uniformity of the endorsement process by specifying the placement and data content of endorsements. This standard also provides a method for measuring the legibility of endorsements with the inclusion and use of a legibility gage. This standard is not intended to modify existing MICR standards for checks.

ANSI X9.100-120-2015, Bank Deposit Tickets

This standard specifies certain deposit ticket parameters to aid in the processing of personal size and business size deposit tickets through conventional bank deposit and imaging processes. While this standard does not establish a specific design, orientation and layout for bank deposit tickets, it does provide specifications for a range within which key design elements shall be placed.

ANSI X9.100-130-2011 (R2017), Universal Interbank Batch/Bundle Ticket

This standard specifies the required elements of the Universal Interbank Batch/Bundle Ticket. It is expected that bankers refer to this standard when designing this form. This standard is sufficiently flexible to meet differing document and institution needs without unnecessary constraints.

ANSI X9.100-140-2016, Specifications for an Image Replacement Document (IRD)

This standard provides the financial industry with a specification for an Image Replacement Document (IRD) that provides for a machine readable substitute document created from the image that is made from the front and back of the original check.

ANSI X9.100-150-2010 (R2017), Check Carrier Envelopes

This Standard covers design considerations applying to carriers used for forward transit items, return items, and other bank interchange purposes.

ANSI X9.100-151-2010 (R2017), Check Correction Strips

This standard covers the design and the functional characteristics of the strip extension as affixed to a check. These strips provide a new MICR clear band area used to modify or correct the MICR line of items for forward collection, returns, rejects, or other banking interchange systems.

ANSI X9.100-160 Part 2-2014, Placement and Location of Magnetic Ink Printing (MICR) - Part 2: EPC Field Use

1. The industry has changed significantly with the 99.9% adoption of image exchange, therefore, very few paper check are processed as paper for collection at paying banks, so the usage of EPC identifiers for carrier envelopes is no longer needed and the assignments of the digits 3 & 7 will be delisted and placed back into reserve.
Organizations receiving images from multiple sources generally are not equipped to recognize all the images received because vendors use diverse image compression and image file formats. This media-based image exchange format will standardize the export and import of image data regardless of what type of hardware/software was used to capture, store or export the images. Software standardized to a media-based image exchange format will allow image data to be usable across vendor platforms thus reducing expense, duplication of effort and assist with archiving and retrieval processes. In addition, the media-based image exchange format allows a common index structure for such exchanges, thus benefitting a diverse community of users.

ANSI X9.100-183-2010 (R2017), Electronic Check Adjustments
The purpose of this standard is to provide the financial industry with a format to perform the electronic exchange of check adjustments. The format supports adjustment requests, adjustment notices, and other adjusted related messages.

ANSI X9.100-187-2016, Specifications for Electronic Exchange of Check and Image Data - Domestic
The purpose of this standard is to provide the financial industry with a format necessary to perform electronic check exchange (ECE), with or without images. The format supports forward presentment, posting, return notification, and return requests, as well as existing customer information reporting products. The standard also supports multiple check clearing alternatives, e.g., bank-to-bank, bank-to-switch.

ANSI X9.100-188-2016, Return Reasons
Extract the current list of Return Reasons Codes from Annex B in ANSI X9.100-187 and Region 7F Return Reason Information from Annex A in ANSI X9.100-140 into standalone standard. (Attach both annexes to this document)

ANSI X9.100-20 Parts 1, 2 & 3-2015, Print & Test Specifications for Magnetic Ink Printing
Specifies the shape, dimensions, magnetic signal level and tolerances for the 10 numerals and 4 special symbols printed in magnetic ink and used for the purpose of character recognition. Part 2 specifies the conformance testing requirements for the Part 1 requirements. Part 3 specifies the requirements for secondary reference documents and the test equipment for calibrating and maintaining their signal level.

ANSI X9.100-30-2011 (R2017), Optical Background Measurement for MICR Documents
The scope of the standard is the specification of the optical measurement methodology for the parameters of reflectance, PCS, DCR, Pixel Count, and opacity which are needed for MICR documents.

This Part 1 of ANSI X9.100-40 defines the elements and structures for standard check image tests used by the financial industry to assess specific attributes of check images. The specification establishes a framework for defining check image tests, conveying the results from executing a check image test, and conveying any parameters used in executing check image tests. Part 2 of ANSI X9.100-40 describes the application and registration procedures used to register check image tests that conform to this ANSI X9.100-40 Part 1 standard.

This Standard provides a uniform structure for international securities identification numbers (ISINs). It is intended for use in any application in the trading and administration of securities and other financial instruments.

ANSI X9.102-2008 (R2017), Symmetric Key Cryptography for the Financial Services Industry - Wrapping of Keys and Associated Data
This Standard specifies four key wrap mechanisms based on ASC X9-approved symmetric key block ciphers whose block size is either 64 bits or 128 bits. The key wrap mechanisms can provide assurance of the confidentiality and the integrity of data, especially cryptographic keys or other specialized data.

ANSI X9.103-2004 (R2010), Motor Vehicle Retail Sale and Lease Electronic Contracting
The scope of this American National Standard begins at the time of signing the Contract, inclusive of signature capture, and includes the creation, storage and assignment of Electronic Chattel Paper where the assignment will involve establishing control of the Electronic Chattel Paper. This standard addresses both electronically originated Chattel Paper and Tangible Chattel Paper that is subsequently converted to an electronic format.

ANSI X9.104-1-2004 (R2017), Financial transactions card originated messages - Card acceptor to acquiring host messages: Messages, data elements and code values
Part 1 of this two part standard defines a common interface for the exchange of information between point of sale systems or terminal devices located in a retail establishment and the acquiring host transaction processing system(s). Part 2 of this two part American National Standard X9.104 provides example of messages used in the convenience store and petroleum marketing industry based on the message formats defined in X9.104 part 1.

ANSI X9.104, Part 2-2004 (R2016), Financial transaction card originated messages - Card acceptor to acquiring host messages - Part 2 Convenience store and petroleum marketing industry
Part 2 of this two part American National Standard X9.104 provides example of messages used in the convenience store and petroleum marketing industry based on the message formats defined in X9.104 part 1.

This part of ISO 8583 specifies a common interface by which financial transaction card-originated messages can be interchanged between acquirers and card issuers. It specifies message structure, format and content, data elements and values for data elements. The method by which settlement takes place is not within the scope of this part of ISO 8583.

ANSI X9.105-3-2009, Financial transaction card originated messages - Interchange message specifications - Part 3: Maintenance procedures for messages, data elements and code values
This part of ISO 8583 establishes the role of the maintenance agency (MA) and specifies the procedures for adding messages and data elements to ISO 8583-1 and to codes listed in Annex A of ISO 8583-1. The responsibilities of the MA relate to all message type identifiers and classes, data elements and sub-elements, dataset identifiers and codes within ISO 8583-1, with the exception of institution identification Codes.

ANSI X9.106-2003/ISO 18245 (R2013), Retail Financial Services - Merchant Category Codes
This standard defines code values used to enable the classification of merchants into specific categories based on the type of business, trade or services supplied. Values are specified only for those merchant categories that are generally expected to originate retail financial transactions. This standard also establishes the procedures for a Registration and Maintenance Management Group (RMMG), which considers requests for new code values, and a Maintenance Agency (MA), which provides the administrative procedures required to maintain an up-to-date list of codes. It is not within the scope of this International Standard to mandate the use of merchant category codes in an

Establishes specifications for cards issued by or acceptable to the banking industry and is intended to permit interchange based on the use of magnetic stripe encoded information. It specifies the data content and physical location of read/write information on track 3. This replaces ANSI X9.1-1996.
ANSI X9.110-2008 (R2013), Transfer of Location of Electronic Contracts
This specification describes a method of transfer for electronic contracts, or electronic records between two disparate Electronic Vaults across a private or public network. The methods and approach described herein prescribe the requirements necessary to maintain compliance with legislation for Electronic Challen Paper defined in revised UCC Article 9, Section 105.

ANSI X9.111-2011 (R2017), Penetration Testing within the Financial Services Industry
This standard specifies recommended processes for conducting penetration testing with financial service organizations. This standard describes a framework for specifying, describing and conducting penetration testing, and then relating the results of the penetration testing. This standard allows an entity interested in obtaining penetration testing services to identify the objects to be tested, specify a level of testing to occur, and to set a minimal set of testing expectations. Included in this standard are: A conceptual framework for describing penetration testing, including &lsap; Roles and Responsibilities of participants &lsap; Types of penetration test &lsap; A generalized penetration testing cycle &lsap; General testing methodologies / techniques &lsap; Limitations of penetration testing &lsap; Ranking of methodologies, bases of testing effort (testing levels) &lsap; Engagement and scope of work considerations. Test Report guidelines, Testing requirements, &lsap; Security of the testing environment &lsap; General practices and methodologies; &lsap; Tester expertise.

Wireless Technology is providing communication tools for the ubiquitous office and other financial services environments. The currently deployed wireless technology has significant security concerns and issues. This Wireless Management and Security standard is applicable to wireless environments transmitting financial information, and will (i) establish a technology framework in which (ii) risks and requirements will be defined, (iii) management policy and practices will be addressed, and (iv) audit evaluation criteria will be provided suitable for use by a professional practitioner.

Part 1 consists of the overall description of the modelling approach; the overall description of the ISO 20022 Repository contents; a high-level description of the input to be accepted by the Registration Authority to feed/modify the Repository's Data Dictionary and Business Process Catalogue; a high-level description of the Repository output to be made publicly available by the Registration Authority. ISO 20022 compliant Business Transactions and Message Sets can be used for electronic data interchange amongst any industry participants (financial and others), independently of any specific communication network.

Part 2 specifies the responsibilities of the bodies involved in the registration and maintenance of the Data Dictionary and Business Process Catalogue items in the ISO 20022 Repository. The Registration Authority (RA) is the operating authority responsible for the above-mentioned tasks, and is assisted by different Standards Management Groups (SMG), i.e., groups of industry experts responsible for specific Business Areas of the Repository. The Registration Management Group (RMG) is the governing body of the overall registration process and the appeal body for the communities of users, the RA and the SMGs, and monitors the registration process performance.

The financial services industry relies on several time-honored methods of electronically identifying, authorizing, and authenticating entities and protecting financial transactions. These methods include, but are not limited to: Personal Identification Numbers (PINs) and Message Authentication Codes (MACs) for retail and wholesale financial transactions, user IDs and passwords for network and computer access, and key management for network connectivity. Over the last forty years, banks, investment, and insurance companies have developed risk management processes and policies to support the use of these technologies in financial applications.

ANSI X9.119-1-2016, Retail Financial Services - Requirements for Protection of Sensitive Payment Card Data - Part 1: Using Encryption Methods
Theft of sensitive card data during a retail payment transaction is increasingly becoming a major source of financial fraud. Besides an optional encrypted PIN, this data includes magnetic stripe track 2 data; PAN, expiration date, card verification value, and issuer private data. While thefts of this data at all segments of the transaction processing system have been reported, the most vulnerable segments are between the point of transaction device capturing the magnetic stripe data and the processing systems at the acquirer. This document would standardize the security requirements and implementation for a method for protecting this sensitive card data over these segments. Several implementations exist to address this situation. This document would provide guidance for evaluating these implementations.

ANSI X9.12-1991 (R2007), Specifications for Fully Registered Municipal Securities
This standard defines the physical characteristics and format of a municipal security including certificate size, content, and layout. The specific language regarding provisions of the instrument is defined by the issuing authority and is not prescribed in the body of this standard. At a minimum, this standard is intended for use in the issuance of all fully registered municipal securities.

ANSI X9.121-2016, Balance and Transaction Reporting Standard BTRS Version 3 (BTR3)
The BAI Codes Type 2 has been in use in the United States and elsewhere for a period of time. BAI has legally transferred the copyright to X9. These codes are widely used in the area of cash management reporting by banks and corporates. The project will convert the existing codes into a formal cash reporting standard and update all relevant areas. Given the widespread international use of the BAI codes, the final work product will consider the needs of a broader community, including ISO 20022.

ANSI X9.126/ISO 17442-2013, Legal Entity Identifier (LEI)
Legal entity identification is an integrated and necessary component of financial services transactions. Entering into business relationships requires 'Know Your Customer' processes to be initiated and maintained for the duration of these relationships and any longer term data retention requirements to be addressed. Parties involved in financial transactions need to be identified within these transactions. Then the risk of each party and the resulting concentration risk also needs to be measured. All of this is to be achieved while the support for Straight Through Processing (STP) is maintained. Following the global financial crisis, the need for regulators to identify legal entities, both nationally and across the global markets, has been raised as a critical need. More specifically, regulators are asking for standards to be used within the solutions they are developing to address the data collection and analysis needs resulting from the crisis. ISO 17442 fulfills the needs for legal entity identification of the global financial services industry and the regulatory community.
ANSI X9.129-2016, Electronic File Format Standards for Presentment and Remittance of Legal Orders
In today’s environment legal orders are generated in a large number of formats by a variety of different government agencies. These documents are then mailed to the bank for processing. When the bank receives the requests (mail, fax, spreadsheet) the process for fulfilling them is highly manual, which is time consuming and can be prone to errors, and there are limited areas where automation is applied. In most cases, the basic types of information, required for processing, are the same across the different request types. By creating a set of standards for electronic file formats for the different request types, benefits will be realized by both the requester and the receiver through automation of the process.

ANSI X9.131-2015, Financial transaction messages - Electronic benefits transfer (EBT) - WIC retailer interface standard for smart cards
A standard will permit commercial card and reader manufacturers, retailer store payment and electronic cash register providers and WIC State Agencies to program components of a WIC EBT smart card solution into their present and future systems. The cost will be reduced to participating retailers and WIC State Agencies through standardized requirements that define the components of a smart card EBT system for the WIC program. The benefits include increased competition, lower costs and greater efficiency and service to provide EBT WIC benefits on integrated retailer cash register systems. This will also facilitate the adoption of new technology and minimize costs to adopt the technology as it evolves over time.

Adjust the standard to allow AES algorithms and set security standards for AES keys. Increase security measure to protect keys and align with current industry practices.

ANSI X9.24-2-2016, Retail Financial Services Symmetric Key Management - Part 2: Using Asymmetric Techniques for the Distribution of Symmetric Keys
Compliant implementation of the requirements stated in ANSI X9.24 Part 1 for the secure management of symmetric TDEA keys requires unique keys per device and strict enforcement of dual control and split knowledge processes for handling the full-length keying material deployed to remote devices or established between communicating pairs. Historically, compliant implementation of key distribution has been a manually performed, physically on-site process that is difficult to manage, costly, and/or non-existent (i.e., not compliant). An automated rather than manual method of distributing symmetric keys could address these issues and could result in improved security.

This standard specifies schemes for the agreement of symmetric keys using Diffie-Hellman and MQV algorithms. It covers methods of domain parameter generation, domain parameter validation, key pair generation, public key validation, shared secret value calculation, key derivation, and test message authentication code computation for discrete logarithm problem based key agreement schemes.

ANSI X9.44-2007 (R2017), Key Establishment Using Integer Factorization Cryptography
The standard specifies key establishment schemes using public-key cryptography based on the integer factorization problem. Both key agreement and key transport schemes are specified. The schemes may be used by two parties to transport or agree on a shared keying material. The keying material may be used to provide other cryptographic services that are outside of the scope of this standard. The key pair generators may be used in other standards based on the integer factorization problem.

ANSI X9.58-2010, Financial transaction messages - Electronic benefits transfer (EBT) - Food Stamps
The standard provides all parties involved in Electronic Benefits Transfer (EBT) transactions for Food Stamps with technical specifications for exchanging financial transaction messages between an acquirer and an EBT card issuer processor. It specifies message structure, format and content, data elements and values for data elements used in the Food Stamp program. The method by which settlement takes place is not within the scope of this standard.

ANSI X9.59-2006 (R2013), Electronic Commerce for the Financial Services Industry: Account-Based Secure Payment Objects
Describes a model of account based electronic payments. It identifies the roles played by different components of the payment process. The roles are the consumer, who wishes to make a payment, a merchant which provides value, and their respective Financial Institutions, the consumer financial institution and the merchant financial institution. It specifies a collection of electronic payment objects and references digital signature techniques to secure their content.

ANSI X9.6-2014, Committee on Uniform Security Identification Procedures Security Identification (CUSIP)
This standard provides specifications for uniquely identifying an eligible issue. It shall serve as the common denominator in communications among users for completion of transactions and exchange of information. It specifies both the configuration of the number and the meaning attached to each portion.

ANSI X9.63-2011 (R2017), Key Agreement and Key Management Using Elliptic Curve-Based Cryptography
This Standard specializes ISO/IEC 11749-3 “Information Technology - Security Techniques - Key Management - Part 3: Mechanisms using asymmetric techniques” for use by the financial services industry. This Standard defines key establishment schemes that employ asymmetric cryptographic techniques. The arithmetic operations involved in the operation of the schemes take place in the algebraic structure of an elliptic curve over a finite field. Both key agreement and key transport schemes are specified. The schemes may be used by two parties to compute shared keying data that may then be used by symmetric schemes to provide cryptographic services, e.g., data confidentiality and data integrity.

This Standard defines methods for the generation and control of keys used in symmetric cryptographic algorithms. The Standard defines a constructive method for the creation of symmetric keys, by combining two or more secret key components. The Standard also defines a method for attaching a key usage vector to each generated key that prevents abuses and attacks against the key. The two defined methods can be used separately or in combination.

ANSI X9.73-2010 (R2017), Cryptographic Message Syntax - ASN.1 and XML
This Standard specifies a cryptographic syntax scheme which can be used to protect financial transactions, files and other messages from unauthorized disclosure and modification. The cryptographic syntax scheme is based on an abstract Cryptographic Message Syntax (CMS) schema whose concrete values can be represented using either a compact, efficient, binary encoding, or as a flexible, human-readable, XML markup format. Simple Object Application Protocol (SOAP) message extensions are defined for each of the cryptographic types defined in X9.73 to enable protection of financial services information in Web Services environments.

ANSI X9.79 - Part 4-2013, Public Key Infrastructure (PKI) – Part 4: Asymmetric Key Management
PKI technology has become a significant security control within the financial services industry for both internal operations and for external customer facing payment systems over the past decade. The usability and versatility of PKI has become such a critical infrastructure component that its proper management and auditability has become even more important than ever before. The expansion of X9.79 with Parts 3 and 4 consolidates PKI management and security requirements into a single ANSI.

Basic principles and techniques which provide the minimum security measures required for effective international PIN management. PIN protection techniques applicable to financial transaction card originated transactions in an online environment and a standard means of interchanging PIN data.
ANSI X9.80-2005 (R2013), Prime Number Generation, Primality Testing, and Primality Certificates

In the current state of the art in public key cryptography, all methods require, in one way or another, the use of prime numbers as parameters to the various algorithms. This document presents a set of accepted techniques for generating primes. This standard defines methods for generating large prime numbers as needed by public key cryptographic algorithms. It also provides testing methods for testing candidate primes presented by a third party.


This standard defines techniques for the generation of random numbers that shall be used whenever ASC X9 standards require the use of a random number or bitstring for cryptographic purposes.

ANSI X9.82-2-2015, X9.82-2 Random Number Generation - Part 2: Entropy Sources

ANSI X9.82 is concerned with the generation of random bits, primarily for use in cryptographic applications. As Part 1 of this Standard establishes, the only way for this seed value to provide real security is for it to be obtained from a source that provides sufficient entropy. Directly or indirectly, the seeding of an RBG will rely upon a non-deterministic process—i.e., an entropy source. This part of ANSI X9.82 describes the properties that an entropy source must have to make it suitable for use by cryptographic random bit generators.

ANSI X9.82-3-2007 (R2017), Random Number Generation Part 3: Deterministic Random Bit Generator Mechanisms

This part of ANSI X9.82 (Part 3) defines mechanisms for the generation of random bits using deterministic methods. The DRBG mechanisms are not sufficient by themselves to define a Random Bit Generator (RBG); Parts 2 and 4 of this Standard provide further requirements for the design of an RBG. A DRBG is based on a DRBG mechanism as specified in this part of the Standard and includes a source of entropy input. Part 3 specifies several diverse DRBG mechanisms, all of which provided acceptable security when this Standard was approved. However, in the event that new attacks are found on a particular class of mechanisms, a diversity of approved mechanisms will allow a timely transition to a different class of DRBG mechanism.

ANSI X9.82-4-2011 (R2017), Random Number Generation - Part 4: Random Bit Generator Constructions

This Standard defines techniques for the generation of random numbers that shall be used whenever ASC X9 Standards require the use of random number or bitstring for cryptographic purposes. Part 4 specifies how to build complete random bit generators from the mechanisms in X9.82 Part 2 and Part 3.

ANSI X9.84-2010 (R2017), Biometric Information Management & Security for the Financial Services Industry

This Standard describes the security framework for using biometrics for authentication of individuals in financial services. It introduces the types of biometric technologies and addresses issues concerning their application. This Standard also describes the architectures for implementation, specifies the minimum security requirements for effective management, and provides control objectives and recommendations suitable for use by a professional practitioner. Within the scope of this Standard the following topics are addressed: Security for the collection, distribution, and processing, of biometric data, encompassing data integrity, authenticity, and non-repudiation. Management of biometric data across its life cycle comprised of the enrollment, transmission and storage, verification, identification, and termination processes. Usage of biometric technology, including one-to-one and one-to-many matching, for the identification and authentication of banking customers and employees. Application of biometric technology for internal and external, as well as logical and physical access control. Encapsulation and cryptographic protection of biometric information for security, interoperability, and data confidentiality. Secure transmission and storage of biometric information during its life cycle. Security of the physical hardware used throughout the biometric data life cycle. Cryptographic techniques for data integrity, authenticity, and data confidentiality of biometric information. Validation of credentials presented at enrollment to support authentication as required by risk management; Surveillance to protect the financial institution and its customers; Items considered out of scope and not addressed in this Standard.


This Standard defines methods for digital signature generation and verification for the protection of messages and data giving partial message recovery. This document is Part 1 of this Standard, and it defines the Elliptic Curve Pintsov-Vanstone Signature (ECPVS) digital signature algorithm. Part 2 of this Standard defines the Finite Field Pintsov-Vanstone Signature (FPFVS) digital signature algorithm. ECPVS is a signature scheme with low message expansion (overhead) and variable length recoverable and visible message parts. ECPVS is ideally suited for short messages, yet is flexible enough to handle messages of any length. The ECPVS shall be used in conjunction with an Approved hash function and an Approved symmetric encryption scheme. In addition, this ECPVS Standard provides the criteria for checking the message redundancy. Supporting examples are also provided.


This standard provides all parties involved in Electronic Benefits Transfer (EBT) transactions with technical specifications for exchanging financial transaction messages.

This International Standard recognizes that a privacy impact assessment (PIA) is an important financial services and banking management tool to be used within an organization, or by 'contracted' third parties, to identify and mitigate privacy issues and risks associated with processing consumer data using automated, networked information systems. This International Standard * describes the privacy impact assessment activity in general, * defines the common and required components of a privacy impact assessment, regardless of business systems affecting financial institutions, and * provides informative guidance to educate the reader on privacy impact assessment.

ASCA (Accredited Snow Contractors Association)

ANSI/ASCA A1000-2014, System Requirements for Snow and Ice Management Services

This standard sets forth the provisions for snow and ice management companies to operate their businesses in a more efficient, organized and safer work process, that results in a safer property condition for vehicular and pedestrian traffic.

ASCE (American Society of Civil Engineers)

ANSI/ASCE T&DI 21-2013, Automated People Mover Standards

ANSI/ASCE/T&DI 21 presents, in four ANS designated parts, the minimum requirements for the design, construction, operation, and maintenance of APM systems. Part 1 covers the operating environment, safety, system dependability, automatic train control, and communications. Part 2 provides information on vehicles and propulsion and braking systems (PBS). Part 3 provides information on electrical systems, stations, and guideways. Part 4 provides information on security; emergency preparedness; system verification and demonstration; operation, maintenance and training; and operational monitoring.

ANSI/ASCE/CI 67-2017, SCHEDULE DELAY ANALYSIS STANDARD

The scope of this standard will cover a set of 'best practice' & 8221; concepts or guidelines that apply to any schedule delay analysis, whether conducted during construction or after project completion. This standard guideline is needed to help minimize the transactional cost of dispute by eliminating the disagreement over method with a set of guidelines or principles that apply in all situations. Clarity on best practices will help the parties know how delay analysis should be treated and that knowledge will help expedite dispute resolution related to schedule and delay analysis.


These standard guidelines address design, installation, operation and maintenance of urban subsurface drainage. Applications include airports, roads, and other transportation systems, as well as industrial, commercial, residential, and recreational areas. Incidental surface water is considered. Agricultural drainage, landfills, recharge systems, detention ponds, conventional storm sewer design, or the use of injection systems are not included in these standards.

ANSI/ASCE/EWRI 39-2015, Guidelines for Operational Hall Suppression Programs

The intent of this standard is to describe a process through which hail suppression operations should be designed, organized, and conducted. The information contained herein is intended to be helpful to those persons wishing to implement operational hail suppression activities. Operational activities addressed by this standard include airborne, ground-based, and rocket and artillery delivery systems. To participate in the public comment period, contact James Neckel, ASCE’s Codes and Standards Coordinator, at jneckel@asce.org or (703) 295-6176.


This document, Standard Practice for the Design, Conduct, and Evaluation of Operational Precipitation Enhancement Projects, is intended to provide water resources managers and others with the standard approach for designing, operating and evaluating precipitation enhancement projects.


This document describes the standard practice for the design and operations for supercooled fog dispersal projects. This document provides information on the planning, conduct, and evaluation of such efforts. This document includes a technical section on fog characteristics for the users who may not have significant experience in weather modification science, especially as it pertains to supercooled fog dispersal projects.


ASCE will conduct a public comment period on Standard Guidelines for the Design, Installation, and Operation of Urban Stormwater Systems. The intent of this standard is to present construction guidance for urban stormwater systems. It updates ASCE/EWRI 45, 46, and 47 with material developed within the past eight years. The collection and conveyance of surface stormwaters are within the purview of this standard for applications such as airports; roads and other transportation systems; and industrial, residential, and recreation areas. This document is intended for guidance.


This standard guideline outlines a procedure to optimize the fitting and goodness-of-fit testing of a probability density function (pdf) to a sample of saturated hydraulic conductivity (K) measurements. The procedure assumes a uniform scale of observation (similar measuring device) and statistically homogeneous and independent hydraulic conductivity measurements. This standard guideline outlines a procedure to calculate the effective saturated hydraulic conductivity in local-scale groundwater flow. The effective saturated hydraulic conductivity is a parameter that relates the average groundwater specific discharge to the average hydraulic gradient. This standard guideline procedure assumes (i) a uniform scale of observation (that is, the use of a similar measuring device for all saturated hydraulic conductivity measurements) and (ii) statistically homogeneous saturated hydraulic conductivity (K) with axisymmetric or isotropic spatial covariance.

ANSI/ASCE/EWRI 51-2016, Standard Guideline for the Geostatistical Estimation and Block-Averaging of Homogeneous and Isotropic Saturated Hydraulic Conductivity

This standard guideline outlines procedures for the geostatistical estimation and block averaging of homogeneous and isotropic saturated hydraulic conductivity. The procedures are described in the following sections, and are applicable to 1-, 2-, and 3- dimensional data sets of saturated hydraulic conductivity.
ANSI/ASCE/EWRI 56-10/57-10-2014, Guidelines for the Physical Security of Water Utilities
These wastewater/stormwater utilities guidelines recommend physical and electronic security measures for physical protection systems to protect against identified adversaries, referred to as the design basis threats (DBTs), with specified motivation, tools, equipment, and weapons. Additional requirements and security equipment may be necessary to defend against threats with greater capabilities.

ANSI/ASCE/EWRI 56-2011, Guidelines for the Physical Security of Water Utilities
These wastewater/stormwater utilities guidelines recommend physical and electronic security measures for physical protection systems to protect against identified adversaries, referred to as the design basis threats (DBTs), with specified motivation, tools, equipment, and weapons. Additional requirements and security equipment may be necessary to defend against threats with greater capabilities.

ANSI/ASCE/EWRI 57-2011, Guidelines for the Physical Security of Wastewater/Stormwater Utilities
These wastewater/stormwater utilities guidelines recommend physical and electronic security measures for physical protection systems to protect against identified adversaries, referred to as the design basis threats (DBTs), with specified motivation, tools, equipment, and weapons. Additional requirements and security equipment may be necessary to defend against threats with greater capabilities.

These three guidelines intend to present design guidance for stormwater impoundments. The guidelines’ purpose is to focus on local and regional impoundments to manage, treat, and/or attenuate stormwater runoff, thus reducing the impact of stormwater on downstream areas due to land-use changes from water discharge and water quality perspectives.

ANSI/ASCE/EWRI 63-2016, Standard Guidelines for the Installation of Stormwater Impoundments
These three guidelines intend to present design guidance for stormwater impoundments. The guidelines’ purpose is to focus on local and regional impoundments to manage, treat, and/or attenuate stormwater runoff, thus reducing the impact of stormwater on downstream areas due to land-use changes from water discharge and water quality perspectives.

ANSI/ASCE/EWRI 64-2016, Standard Guidelines for the Operation and Maintenance of Stormwater Impoundments
These three guidelines intend to present design guidance for stormwater impoundments. The guidelines’ purpose is to focus on local and regional impoundments to manage, treat, and/or attenuate stormwater runoff, thus reducing the impact of stormwater on downstream areas due to land-use changes from water discharge and water quality perspectives.

ANSI/ASCE/EWRI 65-2016, Calculation of the Saturated Hydraulic Conductivity of Fine-Grained Soils
This standard provides guidelines for calculating the saturated hydraulic conductivity \( K_{\text{sat}} \), permeability \( k \), and porosity \( n \) of fine-grained, isotropic, and homogenous soils using (i) strain-stress data from the incremental loading of a soil sample in a standardized consolidometer (step-load test), (ii) 1D vertical consolidation theory relating \( K_{\text{sat}} \) to the coefficient of consolidation \( c_v \), (iii) the relation between \( K_{\text{sat}} \) and \( k \), and (iv) the relation between porosity and the void ratio of a soil undergoing primary consolidation.

This standard covers the successful implementation of an erosion and sediment control program is a multifaceted undertaking that includes a mix of administrative, legal, and technical issues. This document provides guidelines for personnel involved in the implementation of erosion and sediment control programs.

ANSI/ASCE/SEI 25-2016, Earthquake Actuated Gas Shutoff Valves
This standard provides minimum functionality requirements for earthquake-actuated automatic gas shutoff devices and systems meant to include mechanical devices consisting of a sensing means and a means to shutoff the flow of gas. The components or parts of devices not covered by this standard or the applicable sections of ANSI Z21.21b/CSA 6.5h shall be in accordance with the applicable American National Standards Institute and industry standards.

ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.)

ANSI/ASHRAE 135ak-2012, BACnet - A Data Communication Protocol for Building Automation and Control Networks
This proposed addendum specifies explicit address range requirements, adds the 'abort reason' to transport state machine descriptions, and adds a serial number property to provide a standard way to define serial numbers.

ANSI/ASHRAE 62.2k-2016, Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings
The purpose of this proposed addendum is to create a compliance path within the standard based on the use of recirculated air that has been filtered to reduce exposure in the interior of the building to particulate matter of not exceeding 2.5 microns. Research has shown that reduction of such particles (PM2.5) would result in air quality that is equal or better in quality than provided by the current standard. This proposed addendum allows for a reduction in the required amount of whole-building ventilation needed to show compliance with the standard when the filtration requirements in the addenda are satisfied.

ANSI/ASHRAE 135.1a-2006, Method of Test for Conformance to BACnet
This first public review of proposed addendum 135.1a adds new tests and revises tests resulting from updates to ANSI/ASHRAE 135 since the original publication of Standard 135.1-2003.

ANSI/ASHRAE 135.1b-2009, Method of Test for Conformance to BACnet
This proposed addendum omits certain tests when Averaging and Command properties are fixed or not present, accommodates Group objects whose members list is not changeable, revises Alarm Acknowledgement tests, adds new Alarm Acknowledgement “offnormal” tests, Labels conditionally-writable properties in the EPICS, and adds new object types.

ANSI/ASHRAE 135.1c-2007, Method of Test for Conformance to BACnet
This proposed addendum updates references to refer to the 135-2004 edition, adds new object types from 135-2004, omits certain tests based on Protocol_Revision, removes interference from higher priority exception schedules, and makes minor corrections.

ANSI/ASHRAE 135.1i-2011, Method of Test for Conformance to BACnet
This proposed addendum updates or clarifies a wide variety of tests in the standard and adds new tests to solve existing problems or expand functionality. See the foreword or rationales for more detailed information. This is the first public review of this addendum.
ANSI/ASHRAE 135.1j-2012, Method of Test for Conformance to BACnet

This proposed addendum improves the tests for Read All Properties, Write Support, Command Prioritization, Application of the Event_Enable, and Limit_Enable; updates the Calendar Test and the Notification Class and Schedule Tests to use UTCTimeSynchronization; adds Protocol Revision 4 Schedule Object Tests; revises the Stop_Watch_Full test; and generalizes the Start_Time, Log_INTERVAL, and Buffer_Size tests. It also fixes the Record_Count and Notification_Threshold tests; adds Trigger Verification and COV Subscription Lifetime Value Range tests; updates the BUFFER_READY tests; modifies the List Management test; and implements COV testing by datatype.

ANSI/ASHRAE 135a-2005, BACnet - A Data Communication Protocol for Building Automation and Control Networks

As currently defined, the Life Safety Zone and Life Safety Point object types are not adequate for simulating/testing when Out_Of_Service is TRUE (see rationale for details). The proposed solution: make the Tracking_Value of both object types a required property and writable when Out_Of_Service is TRUE. Instead of the Present_Value, the Tracking_Value is decoupled from input(s) or process when Out_Of_Service is TRUE. The Present_Value shall not be writable in out-of-service operation.

ANSI/ASHRAE 135aa-2012, A Data Communication Protocol for Building Automation and Control Networks

This proposed addendum adds a Channel Object Type, which defines a standardized object used to receive a single value that is sent to multiple object properties; it also adds a WriteGroup Service to the Object Access Services.

ANSI/ASHRAE 135ad-2011, BACnet - A Data Communication Protocol for Building Automation and Control Networks

This proposed addendum fixes miscellaneous problems in the standard. Among other revisions, it allows Feedback_Value to be used to calculate Elapsed_Active_Time, adds the READ_ACCESS_DENIED condition to ReadProperty and ReadPropertyMultiple, removes Unqualified Frame Reference in USE_TOKEN, aligns the Loop Object’s Out_of_Service Behavior with Other Objects, and increases the segmentation window size for MS/TP.

ANSI/ASHRAE 135ae-2011, BACnet - A Data Communication Protocol for Building Automation and Control Networks

Makes various modifications relating to the Access Door object type. This second public review draft makes independent substantive changes to the previous draft in response to comments received during the first public review. During the second public review, the only section of this addendum that is being revised is the one that adds Fault Enumeration to Door_Status in the Access Door object type.

ANSI/ASHRAE 135af-2011, BACnet - A Data Communication Protocol for Building Automation and Control Networks

This proposed addendum undertakes a major overhaul of parts of the BACnet standard relating to events and alarms. It aims to address the many change proposals and interpretation requests that have been brought before the committee over the years. It makes changes to improve future maintenance of the standard, removes Annexes C and D, clarifies language of presence requirements of properties, revises the language of event reporting, and makes many other needed revisions.

ANSI/ASHRAE 135ag-2008-2011, BACnet - A Data Communication Protocol for Building Automation and Control Networks

This proposed addendum makes changes to prevent BBMD broadcast storms in BBMDs implemented prior to Addendum a, and it aligns BIBBS for automated trend retrieval to correct an existing omission. For details, see the rationales in the addendum.

ANSI/ASHRAE 135ah-2011, BACnet - A Data Communication Protocol for Building Automation and Control Networks

This proposed addendum removes ReadPropertyConditional. Because of the lack of implementations of ReadPropertyConditional, the benefits that could be achieved by retaining this object access service are limited.

ANSI/ASHRAE 135ai-2014, BACnet - A Data Communication Protocol for Building Automation and Control Networks

This addendum adds a Network Port Object Type, makes changes to Annex J for the Network Port Object, and makes changes to 135-2012a of the Network Port Object.

ANSI/ASHRAE 135aj-2016, BACnet - A Data Communication Protocol for Building Automation and Control Networks

This is a review of Independent Substantive Changes. The addendum describes a mechanism by which IPv6 can be added to BACnet and remain backwards compatible with existing devices and also adds an additional method for VMAC determination.

ANSI/ASHRAE 135al-2014, BACnet - A Data Communication Protocol for Building Automation and Control Networks

This addendum specifies a set of best practices that are recommended for the design of successful gateways to/from the BACnet protocol, updates the router configuration BIBBs to ensure that configuration tools can perform all of the expected functions, and adds a new device profile for those devices that do not match any existing device profiles.

ANSI/ASHRAE 135am-2016, BACnet - A Data Communication Protocol for Building Automation and Control Networks

This addendum extends BACnet/WS with RESTful services for complex data types and subscriptions, extracts data model from Annex Q into a separate common model, reworks Annex Q to be an XML syntax for the common model, adds a JSON syntax for the common model, deprecates Annex N SOAP services and adds a migration guide, and changes Clause 21 identifiers to use consistent format.

ANSI/ASHRAE 135aq-2016, BACnet - A Data Communication Protocol for Building Automation and Control Networks

This addendum adds Elevator Objects Types, COV Property Multiple Services to address the requirements for a large number of values to be subscribed to and for the notifications to have individual timestamps for those data changes, and also adds a New Fault Algorithm FAULT_LISTED.

ANSI/ASHRAE 135as-2014, BACnet - A Data Communication Protocol for Building Automation and Control Networks

Currently, the BACnet standard does not provide a method for conveying and recording the source of a write or command. This addendum makes changes that allow devices to indicate and record the source device or process. In addition, COV reporting is modified to allow a client to request that value changes be accompanied by value source information.

ANSI/ASHRAE 135ay-2014, BACnet - A Data Communication Protocol for Building Automation and Control Networks

This addendum adds a new object type Timer to allow timer functionality to be network visible. The addendum also corrects Expiry_Time property name to Expiration_Time in the Access Credential Object.

ANSI/ASHRAE 135b-2008, BACnet - A Data Communication Protocol for Building Automation and Control Networks

This is the fourth public review of proposed Addendum b, a set of miscellaneous changes: it adds new Event Log and Trend Log Multiple object types and harmonizes all Log objects; enables a device to provide notification that it has restarted and to periodically send time synchronization messages; provides a way to acknowledge alarms for which notifications were not received; allows MS/TP BACnet Data Expecting Reply frames to be broadcast; adds new Error Codes; and adds a new enumeration for Reliability properties. This PR draft makes independent substantive changes to the third PR draft in response to comments received.

ANSI/ASHRAE 135ba-2016, BACnet - A Data Communication Protocol for Building Automation and Control Networks

The purpose of this addendum is to add CSML Descriptions into BACnet Devices, add Semantic Tags to All Objects, extend Structured View Objects to Contain Semantic Information, change Clause 21 identifiers to use a consistent format, and add Data Revising Capabilities to CSML.
ANSI/ASHRAE 135b-2016, BACnet - A Data Communication Protocol for Building Automation and Control Networks

The purpose of this addendum is to extend BIBBs for Primitive Value Objects; add new BIBBs for Event Enrollment and Subscription; amend B-AWS related BIBBs for Revised Event Reporting; and add Life Safety BIBBs and Device Profiles, Access Control BIBBs and Device Profiles, and a Cross-Domain Advanced Workstation Profile.

ANSI/ASHRAE 135bf-2016, BACnet - A Data Communication Protocol for Building Automation and Control Networks

The Network Port object has a couple of limitations when applied to advanced network setups. This addendum adds Advanced Network Configuration. The addendum also addresses BVLL Responses for non-BBMD Devices.

ANSI/ASHRAE 135bg-2016, BACnet - A Data Communication Protocol for Building Automation and Control Networks

This addendum adds engineering units; harmonizes Confirmed and Unconfirmed EventNotification message text handling; ensures Alert Enrollment objects do not send notifications which require acknowledgment; allows selection of the 4th last day of the month in a BACnetWeekNDay; removes initialization of GetEnrollmentSummary from AE-AS-A; ensures UTC_Offset is configurable; clarifies ReadRange, clarifies the effect of changing Buffer_Size; stops M5/TP nodes from sending Poll_FOR_MASTER frames to themselves; improves the Clause 12 pre-amble; and fixes the Notification_Class property of the Notification Class object.

ANSI/ASHRAE 135bh-2016, BACnet - A Data Communication Protocol for Building Automation and Control Networks

This addendum corrects Application State Machine Failover and increases Segmentation Window Size for M5/TP.

ANSI/ASHRAE 135d-2006, BACnet - A Data Communication Protocol for Building Automation and Control Networks

This second public review draft of Addendum d makes independent substantive changes to the first public review draft. This addendum's purpose is to create a standard BACnet object that represents the physical characteristics of an access-controlled door. The object represents all the physical door hardware commonly associated with a door, and it may be commanded to be locked, unlocked or pulse-unlocked (unlocked for a specified period of time). The object can also generate alarm conditions.

ANSI/ASHRAE 135f-2007, BACnet - A Data Communication Protocol for Building Automation and Control Networks

This second public review draft of Addendum f makes some independent substantive changes to the first public review draft. The addendum's purpose is to create a standard BACnet object that represents the physical characteristics of an access-controlled door. The object represents all the physical door hardware commonly associated with a door, and it may be commanded to be locked, unlocked or pulse-unlocked (unlocked for a specified period of time). The object can also generate alarm conditions.

ANSI/ASHRAE 135j-2009, BACnet - A Data Communication Protocol for Building Automation and Control Networks

This is the third public review of proposed Addendum j completes the physical access control extensions to BACnet. It adds new Access Point, Access Zone, Access User, Access Rights, Access Credential and Authentication Factor input object types, and a new ACCESS_EVENT event algorithm. This revised draft, presented in full, responds to comments reviewers made during the second public review of Addendum j.

ANSI/ASHRAE 135l-2009, BACnet - A Data Communication Protocol for Building Automation and Control Networks

This proposed addendum adds new workstation BIBBs and profiles. The original B-OWS profile was deemed insufficient for specifying the minimum capabilities of a basic operator workstation, so additional BIBBs are required. This addendum also adds new profiles for other kinds of workstations.

ANSI/ASHRAE 135n-2008, BACnet - A Data Communication Protocol for Building Automation and Control Networks

This is the second public review of proposed Addendum m, a set of miscellaneous changes: it resolves ambiguities in Foreign Device registration, improves Clause 5 FillWindow timeouts, clarifies the GetEventEnrollment service Priority Filter parameter, supports alarm re-acknowledgement, adds Alarm and Event BIB requirements, removes certain B-BC requirements, clarifies support of particular ReinitializeDevice restart choices, clarifies DeviceCommunicationsControl and ReinitializeDevice interactions, and defines "object." This PR draft makes independent substantive changes to the first PR draft in response to comments received.

ANSI/ASHRAE 135o-2009, BACnet - A Data Communication Protocol for Building Automation and Control Networks

This proposed addendum accommodates remote operator access and NAT in Annex J BACnet/IP. Two common uses cases for Annex J BACnet/IP are not sufficiently well accommodated by Annex J: Network Address Translation (NAT) and operator access across the Internet to multiple remote subnets. Some small changes are proposed to accommodate these cases.

ANSI/ASHRAE 135q-2009, BACnet - A Data Communication Protocol for Building Automation and Control Networks

Proposed Addendum r makes various changes to clarify ambiguous language identified in five interpretations that have been approved: IC 135-2004-8, IC 135-2004-10, IC135-2004-17, IC135-2004-19, and IC 135-2004-22.

ANSI/ASHRAE 135s-2009, BACnet - A Data Communication Protocol for Building Automation and Control Networks

This proposed addendum clarifies when the File object's Archive property is set to TRUE or FALSE and requires support for COV subscriptions with lifetimes less than or equal to 8 hours. The value was chosen as a round value in hours which can be counted in seconds in a 15 bit register, permitting easy detection that the value has "wrapped" (the sign bit changes).

ANSI/ASHRAE 140c-2011, Standard Method of Test for the Evaluation of Building Energy Analysis Computer Programs

Revises Standard 140-2007 (including published Addenda a and b) to meet current International Code Council (ICC) requirements for mandatory language in standards cited in its model codes. Major changes are: (1) the replacement of "permissive" language such as "should" by normative language such as "shall"; and (2) the reorganization of key sections to separate and distinguish between normative and informative parts of the standard clearly. While the intent is to leave the standard's test methods unchanged, the revisions are extensive and some of them could be regarded by some reviewers as potentially substantive.

ANSI/ASHRAE 145.2d-2016, Laboratory Test Methods for Assessing the Performance of Gas-Phase Air Cleaning Systems: Air Cleaning Devices

Table 6.1.4.1 sets forth required compounds for testing in certain categories of compounds. Since there are many difficulties in performing this test for formaldehyde, it is recommended that the method no longer require formaldehyde testing. Addendum d makes the appropriate change to Table 6.1.4.1.

This proposed addendum revises the requirements for terminating relief vent discharge lines to atmosphere to include any system requiring a machinery room. Currently, there are several requirements that dictate that the discharge vent be to atmosphere; however, there are situations where a machinery room is required but the provisions that trigger piping discharge lines to atmosphere may not apply. As a result, one could interpret that discharging lines into a machinery room is permissible.

ANSI/ASHRAE 15b-2016, Safety Standard for Refrigeration Systems

This corrects previously updated references in Appendix A (Informative References) and Appendix B (Normative References) to ANSI/ASHRAE Standard 15-2013.


This proposed addendum to Standard 15-2004 revises Appendix F, which is used to determine the required relief capacity for positive displacement compressors. The addendum expands the list of refrigerants and their corresponding properties for determining relief capacity. In addition, the methodology has been revised to more clearly demonstrate relief valve capacity calculations for positive displacement compressors equipped with capacity modulation.


This proposed addendum adds three definitions to Standard 15-2007 so that the standard can better support for the safety of cascade refrigeration systems. There has been a trend toward increased use of cascade systems in refrigeration applications. Cascade systems are being used in supermarkets, refrigerated warehouses, and industrial plants. The definitions provide a foundation for additional revisions to the standard.


This proposed addendum addresses pressure-relief discharge piping requirements for low-pressure refrigeration systems using R-718 (water) as a refrigerant. These refrigeration systems have safety relief devices that primarily provide relief protection for heat-exchanger tube failure. Due to the present requirements for vent-pipe termination according to Section 9.7.8, liquid water would be discharged at a high elevation, which is not desirable. The proposed change would add an exception to Section 9.7.8 and permit alternate location of the relief vent termination for R-718 systems.

ANSI/ASHRAE 15i-2009, Safety Standard for Refrigeration Systems

This proposed addendum would allow the use of small amounts of flammable refrigerants in small portable cooling appliances and/or self-contained refrigeration systems without approval by the authority having jurisdiction through an exception to Section 7.5.3. This change follows an increasing global trend for safety standards to permit the use of small amounts of flammable refrigerants when product testing for safety is conducted by a recognized and approved testing laboratory or inspection agency and the listed product status with such organizations is maintained.

ANSI/ASHRAE 160a-2011, Criteria for Moisture Design Analysis in Buildings

In this proposed addendum, the three required conditions for minimizing mold growth have been modified by retaining only the most significant condition while eliminating the other two. This change is proposed because (1) the condition being retained (Item a) is sufficient for determining the onset of mold growth, (2) one of the conditions being deleted (Item b) was erroneous, and (3) the other condition being removed (Item c) is not germane to determining mold growth. In addition, this change will make the standard easier to use.

ANSI/ASHRAE 161a-2009, Air Quality within Commercial Aircraft

This proposed addendum adds a definition to clarify how the phrase 'commercial aircraft' should be interpreted in ASHRAE Standard 161. It also adds the appropriate reference to the reference section of the standard. Standard 161 defines the requirements for air quality in air-carrier aircraft and specifies methods of measurement and testing for compliance with the standard.

ANSI/ASHRAE 161b-2009, Air Quality within Commercial Aircraft

This proposed addendum removes the prefix ‘ortho’ from the term ‘ortho-TCP’ in all places (two) where it occurs in ASHRAE Standard 161. There are multiple isomers of Trichloropropane, and it is the intention of the standard to cover all of them, not just the ortho-TCP isomer. Standard 161 defines the requirements for air quality in air-carrier aircraft and specifies methods of measurement and testing for compliance with the standard.
ANSI/ASHRAE 34a-2007, Designation and Safety Classification of Refrigerants
This addendum adds new refrigerant 438A to Table 2 and Table D2.

ANSI/ASHRAE 34aa-2012, Designation and Safety Classification of Refrigerants
This addendum modifies Section 9.5.2.2, Azeotropic Blends, to define the requirements applicants shall provide as evidence of the existence of an azeotropic blend within the intended application range in requesting an R-500 Series Designation.

ANSI/ASHRAE 34ab-2012, Designation and Safety Classification of Refrigerants
This addendum adds the zeotropic refrigerant blend R-515A in Table 4-2 and Table D-2.

ANSI/ASHRAE 34ac-2016, Designation and Safety Classification of Refrigerants
This addendum adds the azeotropic refrigerant blend R-514A in Table 4-2 and Table D-2. The component R-1130 (E) is simultaneously out for publication public review as Addendum a. Publication of Addendum ac is contingent on publication of Addendum ab.

ANSI/ASHRAE 34ad-2016, ANSI/ASHRAE Standard 34-2013, Designation and Safety Classification of Refrigerants
This addendum adds the azeotropic refrigerant blend R-515A in Table 4-2 and Table D-2.

ANSI/ASHRAE 34af-2009, Designation and Safety Classification of Refrigerants
This addendum adds new refrigerant 438A to Table 2 and Table D2.

ANSI/ASHRAE 34af-2016, ANSI/ASHRAE Standard 34-2013, Designation and Safety Classification of Refrigerants
This addendum adds the zeotropic refrigerant blend R-452B in Table 4-2 and Table D-2.

ANSI/ASHRAE 34ag-2009, Designation and Safety Classification of Refrigerants
This addendum changes the safety classification of R-403A from A1 to A2.

ANSI/ASHRAE 34ag-2016, ANSI/ASHRAE Standard 34-2013, Designation and Safety Classification of Refrigerants
This addendum adds the zeotropic refrigerant blend R-456A in Table 4-2 and Table D-2.

ANSI/ASHRAE 34ah-2016, ANSI/ASHRAE Standard 34-2013, Designation and Safety Classification of Refrigerants
This addendum adds the zeotropic refrigerant blend R-457A in Table 4-2 and Table D-2.

ANSI/ASHRAE 34ai-2016, ANSI/ASHRAE Standard 34-2013, Designation and Safety Classification of Refrigerants
This addendum adds the zeotropic refrigerant blend R-452C in Table 4-2 and Table D-2.

ANSI/ASHRAE 34b-2007, Designation and Safety Classification of Refrigerants
This addendum adds a designation of R-430A to the blend R-152a/600a (76.0/24.0) with composition tolerances of (+/- 1.0, +/- 1.0), a safety classification of A3 and a RCL of 8,000 ppm, 21 g/m3, 1.3 lb/Mcf.

ANSI/ASHRAE 34c-2007, Designation and Safety Classification of Refrigerants
This addendum adds a designation of R-431A to the blend R-290/152a (71.0/29.0) with composition tolerances of (+/- 1.0, +/- 1.0), a safety classification of A3 and a RCL of 1,200 ppm, 11g/m3, 0.69 lb/Mcf.

ANSI/ASHRAE 34d-2007, Designation and Safety Classification of Refrigerants
This addendum adds a designation of R-432A to the blend R-1270/E170 (80.0/20.0) with composition tolerances of (+/- 1.0, +/- 1.0), a safety classification of A3 and a RCL of 5,500 ppm, 11g/m3, 0.69 lb/Mcf.

ANSI/ASHRAE 34e-2007, Designation and Safety Classification of Refrigerants
This addendum adds a designation of R-433A to the blend R-1270/290 (30.0/70.0) with composition tolerances of (+/- 1.0, +/- 1.0), a safety classification of A3 and a RCL of 3,100 ppm, 5.5 g/m3, 0.34 lb/Mcf.

ANSI/ASHRAE 34f-2007, Designation and Safety Classification of Refrigerants
This addendum updates the RCL value for R-C318 in Table 1 to 80,000 ppm and adds RCL values for R-427A and R-428A in Table 2.

ANSI/ASHRAE 34g-2007, Designation and Safety Classification of Refrigerants
This addendum modifies the method of calculating the heat of combustion to more closely represent what actually occurs. It also adds an informative appendix with an example calculation.

ANSI/ASHRAE 34h-2007, Designation and Safety Classification of Refrigerants
This addendum adds new refrigerant 1234ze(E) to Table 1 and Table D1.

ANSI/ASHRAE 34i-2011, Designation and Safety Classification of Refrigerants
This addendum adds new refrigerant 1234ze(E) to Table 1 and Table D1.

ANSI/ASHRAE 34j-2011, Designation and Safety Classification of Refrigerants
This addendum adds new refrigerant 511A to Table 2 and Table D2.

ANSI/ASHRAE 34k-2011, Designation and Safety Classification of Refrigerants
This addendum deletes the provisional status of RCL values for refrigerants 14, 115, 170, C318, 1270, 405A, 416A, 417A, 424A, 426A, and 504 and deletes footnote d in Table 1 and footnote e in Table 2.

ANSI/ASHRAE 34l-2011, Designation and Safety Classification of Refrigerants
This addendum adds the zeotropic refrigerant blend NOEL from 200,000 ppm to 350,000 ppm and deletes the LOEL value of 250,000 ppm for R-32 in Table E1. The bases for these changes are more recent acceptable GLP methodology. RCL values for refrigerants containing R-32 are subsequently changed in Table 2.

ANSI/ASHRAE 34m-2007, Designation and Safety Classification of Refrigerants
This addendum adds the refrigerant concentration limit (RCL) to the purpose and scope of Standard 34.

ANSI/ASHRAE 34n-2011, Designation and Safety Classification of Refrigerants
This addendum adds ‘pressure at the critical point’ to subclauses 9.5.2.1, 9.5.2.2, and 9.5.2.3 and modifies subclause 9.5.2.5.

ANSI/ASHRAE 34o-2011, Designation and Safety Classification of Refrigerants
This addendum clarifies the requirements of clause B1.

ANSI/ASHRAE 34p-2015, Designation and Safety Classification of Refrigerants
This addendum revises Section 9.9.2 Units, to require new refrigerant Applicants to submit Refrigerant Designation Data required for Section 9.5.2 in both SI and Inch-Pound (IP) units.

ANSI/ASHRAE 34p-2007, Designation and Safety Classification of Refrigerants
This addendum adds R-436A, a new zeotropic refrigerant blend, to Table 2.

ANSI/ASHRAE 34p-2015, Designation and Safety Classification of Refrigerants
This addendum adds the zeotropic refrigerant blend R-443A, to Table 4-2 and Table D-2. The recommended flammability classification is 1. The recommended toxicity classification A is based on an adopted OEL of 1000 ppm v/v. The recommended ATEL is 34,000 ppm v/v.

ANSI/ASHRAE 34q-2007, Designation and Safety Classification of Refrigerants
This addendum adds new refrigerant 1234ze(E) to Table 1 and Table D1.

ANSI/ASHRAE 34q-2015, Designation and Safety Classification of Refrigerants
This addendum adds the zeotropic refrigerant blend R-449B, to Table 4-2 and Table D-2. The recommended flammability classification is 1. The recommended toxicity classification A is based on an adopted OEL of 850 ppm v/v. The recommended ATEL is 100,000 ppm v/v.
ANSI/ASHRAE 34r-2015, Designation and Safety Classification of Refrigerants

This addendum adds R-437A, a new zeotropic refrigerant blend, to Table 2.

ANSI/ASHRAE 34s-2007, Designation and Safety Classification of Refrigerants

This addendum revises the oxygen deprivation limit (ODL) adjustment for altitude by adding an intermediate adjustment at 1500m.

ANSI/ASHRAE 34s-2015, Designation and Safety Classification of Refrigerants

This addendum adds the zeotropic refrigerant blend R-1336mzz(Z), to Table 4-1, Table D-1 and Table E-1.

The recommended flammability classification is 1. The recommended toxicity classification A is based on an adopted OEL of 500 ppm v/v. The recommended ATEL is 13,000 ppm v/v.

ANSI/ASHRAE 34s-2007, Designation and Safety Classification of Refrigerants

This addendum modifies data for R-600 in Table E1 by adding an anesthetic NOEL of 130,000 and changing 'Other' to 10,000.

ANSI/ASHRAE 34v-2016, Designation and Safety Classification of Refrigerants

This addendum revises the zeotropic refrigerant blend R-454C in Table 4-2 and Table D-2.

The recommended flammability classification is 2L. The recommended toxicity classification A is based on an adopted OEL of 650 ppm v/v. The recommended ATEL is 110,000 ppm v/v.

ANSI/ASHRAE 34w-2009, Designation and Safety Classification of Refrigerants

This addendum adds new refrigerant 1234yf to Table 1 and Table D1.

ANSI/ASHRAE 34x-2016, Designation and Safety Classification of Refrigerants

This addendum revises Table 2 and Table D-2.

The recommended flammability classification 2L is based on an LFL of 6.3 vol. %, a heat of combustion of 10,045 kJ/kg (4,391 BTU/lb), and a burning velocity of 2.4 cm/s. The recommended toxicity classification A is based on an adopted OEL of 690 ppm v/v. The recommended ATEL is 140,000 ppm v/v.

ANSI/ASHRAE 34t-2007, Designation and Safety Classification of Refrigerants

This addendum adds occupational exposure limits (OEL) for the refrigerants to Tables 1 and 2.

Refrigerants 435A, 510A, 436A, 436B, and 437A are included in this public review; however, the addition of these refrigerants to the standard is currently out for public review in separate addenda. The addition of the OEL values for these refrigerants is dependent on subsequent approval for publication of proposed addenda 34n, o, p, q, and r, respectively. Composition tolerances for these refrigerants can be found in the appropriate public review draft.

ANSI/ASHRAE 34t-2015, Designation and Safety Classification of Refrigerants

This addendum adds the zeotropic refrigerant blend R-454A, to Table 4-2 and Table D-2.

The recommended flammability classification 2L is based on an LFL of 6.3 vol. %, a heat of combustion of 10,045 kJ/kg (4,391 BTU/lb), and a burning velocity of 2.4 cm/s. The recommended toxicity classification A is based on an adopted OEL of 850 ppm v/v. The recommended ATEL is 130,000 ppm v/v.

ANSI/ASHRAE 34u-2007, Designation and Safety Classification of Refrigerants

This addendum modifies data for R-600 in Table E1 by adding an anesthetic NOEL of 130,000 and changing 'Other' to 10,000.

ANSI/ASHRAE 34v-2016, Designation and Safety Classification of Refrigerants

This addendum adds the zeotropic refrigerant blend R-454A, to Table 4-2 and Table D-2.

The recommended flammability classification is 1. The recommended toxicity classification A is based on an adopted OEL of 1000 ppm v/v. The recommended ATEL is 52,000 ppm v/v.

ANSI/ASHRAE 34u-2007, Designation and Safety Classification of Refrigerants

This addendum modifies data for R-600 in Table E1 by adding an anesthetic NOEL of 130,000 and changing 'Other' to 10,000.

ANSI/ASHRAE 34v-2016, Designation and Safety Classification of Refrigerants

This addendum modifies data for R-600 in Table E1 by adding an anesthetic NOEL of 130,000 and changing 'Other' to 10,000.

ANSI/ASHRAE 52.2b-2008, Method of Testing General Ventilation Air-Cleaning Devices for Removal by Particle Size

This proposed addendum is part of a larger plan to combine Standards 52.1 and 52.2 into a single standard on air filter testing. It incorporates the sections on arrestance and dust-holding capacity into Standard 52.2 and deletes some references to Standard 52.1 that occur in Standard 52.2. Future addenda will complete the process of making Standard 52.2 self-sufficient and comprehensive, and at this time SPC 52.1 will be able to withdraw Standard 52.1.

ANSI/ASHRAE 52.2e-2016, Method of Testing General Ventilation Air Cleaning Devices for Removal Efficiency by Particle Size

The purpose of this addendum is to address the concerns regarding partial, shortcut, or initial testing only that can misstate the MERV performance classification and discredit the validity of the minimum reporting requirements of the standard.

ANSI/ASHRAE 52.2f-2016, Method of Testing General Ventilation Air Cleaning Devices for Removal Efficiency by Particle Size

ASHRAE 52.2 received a change request stating 'The data set and the resulting composite curve are the actual data product of the test method, whereas the MERV classification is merely a shortcut interpretation of the minimum efficiency composite curve. This reinforces this fact and strengthens the committee’s position regarding the importance of actual particle size efficiency rather than a nebulous quasi-rating classification.’

ANSI/ASHRAE 52.2g-2016, Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size

Due to the frequent practice of pre-filtering, filters are often used in 2-stage systems. Thus, Addendum g adds an optional test method to allow standard testing for 2-stage systems.

ANSI/ASHRAE 52.2i-2016, Method of Testing General Ventilation Air Cleaning Devices for Removal Efficiency by Particle Size

ISO 12103-1, A2 Fine test dust has formally replaced SAE Standard J726 test dust. Proposed addendum i updates ANSI/ASHRAE 52.2-2012 to reflect that change.

ANSI/ASHRAE 55a-2011, Thermal Environmental Conditions for Human Occupancy

Clariﬁes Figures 5.2.3.2 and 5.3 by providing numerical adjustment factors and equations. Adds equation for clothing and metabolic rate adjustments to Figure 5.2.3.2 and adds equations equivalent to the comfort boundaries of Figure 5.3. In addition, the SET model of the cooling effect of air movement is extended to Section 5.3. Additional air movement now extends the upper limit of the adaptive comfort zone in naturally ventilated buildings to warmer temperatures similar to the PMV/PPD model in Section 5.2.
ANSI/ASHRAE 55e-2012, Thermal Environmental Conditions for Human Occupancy
This proposed addendum adds a definition for climatic design data.

ANSI/ASHRAE 55g-2016, Thermal Environmental Conditions for Human Occupancy
This proposed addendum adds a requirement to calculate the change to thermal comfort resulting from direct solar radiation impacting occupants. A calculation procedure is added in Normative Appendix C that adjusts mean radiant temperature (MRT) due to direct solar radiation so that the comfort zone calculation remains unchanged. With this change, the Graphical Comfort Zone Method is restricted to conditions without direct solar radiation. When direct solar radiation is present and impacts an occupant, the Analytical Comfort Zone Method in Section 5.3.2 must be used and provides prescriptive and performance compliance paths.

ANSI/ASHRAE 62.1b-2007, Ventilation for Acceptable Indoor Air Quality
Proposed addendum addresses compliance issues that may result from unclear wording or phrasing in Appendix C. Text is changed to indicate the percentages presented are percent-difference values, rather than percent-change values; Appendix D: Text improvements emphasizing the equations are only for single zone systems and increase consistency with Section 6. Replaced &#8220;air change effectiveness&amp;#8221; (d) with &amp;#8220;zone air change effectiveness&amp;#8221; (Ez) to be consistent with Section 6; Appendix F: In Tables F-1 and F-2, added air classification numbers per 5.17. Also, reformatted Table F-1 to match Table F-2, and moved units from title to table.

ANSI/ASHRAE 62.1c-2009, Ventilation for Acceptable Indoor Air Quality
The requirements for filtration of contaminants (PM10, PM2.5) have been revised to make them generic to the national requirements present in the Standard and should be discouraged.

ANSI/ASHRAE 62.1c-2015, Ventilation for Acceptable Indoor Air Quality
This proposed addendum revises the current definition of ETS to include emissions from electronic smoking devices and from smoking of cannabis. The existing requirements for separation of ETS-free spaces from ETS spaces remain unchanged. It also clarifies the intent of the standard that provision of acceptable indoor air quality is incompatible with the presence of ETS, including cannabis smoke and e-cigarette emissions. The ventilation rates determined in accordance with the provisions of the standard apply only to spaces where these emissions are not present and which are adequately separated from spaces where they are present.

ANSI/ASHRAE 62.1d-2009, Ventilation for Acceptable Indoor Air Quality
Completing the task of adding or modifying requirements for several occupancy categories in Table 5-2, 6-1 and 6-2, this proposed ISC specifically addresses ‘hydraulic elevator machine rooms,’ identifying air from them as Class 2 air, but not requiring minimum outdoor airflow rates or minimum exhaust rates from them.

ANSI/ASHRAE 62.1g-2006, Ventilation for Acceptable Indoor Air Quality
An earlier draft of this addendum was approved for publication but then appealed. The appeals panel upheld one part of the appeal relating to language in the pressurization and separation requirements. The panel concluded that the language calling for air not to flow from ETS areas into ETS-free areas could be interpreted as not even allowing eddies at the boundary between the two spaces. The SSPC did not intend this meaning, and in this draft it has revised the language to remove this concern.

ANSI/ASHRAE 62.1l-2009, Ventilation for Acceptable Indoor Air Quality
In response to comments received on previous drafts of 62.1, this proposed addendum deletes Section 6.2.9.

ANSI/ASHRAE 62.1I-2009, Ventilation for Acceptable Indoor Air Quality
This proposed addendum modifies Informative Appendix D as follows: (1) Improve variable-name consistency with body of the standard and Appendix A. (2) Delete one figure, replace with two improved figures. (3) Delete ‘proportional’ systems from Table D-1, since VAV systems with fixed-position outdoor air dampers are unlikely to meet the requirements of the standard and should be discouraged.

ANSI/ASHRAE 62.1I-2012, Ventilation for Acceptable Indoor Air Quality
This proposed addendum adds a refrigerated warehouse space type to Table 6-1, providing revised ventilation rates for these spaces. These rates include a ‘People Outdoor Air Rate, Rp’ which will require ventilation during periods of expected occupancy, but do not include an ‘Area Outdoor Air Rate, Ra’ which will allow the ventilation rate to be zero for refrigerated warehouses with no occupants. Note E to Table 6-1 is modified to indicate that if combustion powered equipment (e.g., a propane fork lift) is used in the space, additional ventilation is required.

ANSI/ASHRAE 62.1m-2009, Ventilation for Acceptable Indoor Air Quality
This proposed addendum removes ventilation requirements for healthcare spaces from the Standard since ventilation requirements for these types of spaces are covered in Standard 170-2008, ‘Ventilation of Health Care Facilities’.

ANSI/ASHRAE 62.1n-2009, Ventilation for Acceptable Indoor Air Quality
This proposed addendum modifies Section 5.1 and 6.0 to relocate Natural Ventilation requirements into Section 6, to add prescriptive requirements for naturally ventilated systems, and to require both passive and mechanical ventilation (mixed-mode or hybrid) ventilation for most buildings in most climates.

ANSI/ASHRAE 62.1p-2009, Ventilation for Acceptable Indoor Air Quality
This proposed addendum moves the existing 6.2.8 and the corresponding Table 6-4 into a new Section 6.5 such that it applies to all spaces regardless of the method used to provide ventilation to the occupied spaces (Ventilation Rate Procedure, IAQ Procedure, Natural Ventilation).

ANSI/ASHRAE 62.1q-2009, Ventilation for Acceptable Indoor Air Quality
This addendum addresses separation distance requirements between outdoor air intakes and other openings in buildings with respect to sources of contaminants and exhaust locations. To reduce the need for interpretation and judgment, building exhaust and relief airstreams are characterized using the Classes of Air already defined in the Standard rather than simple descriptions of the air quality.

ANSI/ASHRAE 62.1r-2015, Ventilation for Acceptable Indoor Air Quality
This proposed addendum modifies Section 5.2 (Exhaust Duct Location) to clarify requirements by including air classes instead of descriptive language, and modifies the requirements by allowing positively pressurized exhaust ducts inside the space of origin.

ANSI/ASHRAE 62.1s-2009, Ventilation for Acceptable Indoor Air Quality
Based on committee-member experience, 1’shipping/receiving’ areas and ‘warehouses’ require a minimum outdoor airflow rate per person as well as a minimum per unit area rate, and ‘co-in-operated laundries’ need a higher minimum outdoor airflow rate per unit area than previously published.

This proposed change implements interpretation IC 62.2-2004-3. The proposed language clarifies the section and makes it easier for users to apply an ANSI consensus standard method to meet the requirements of Section 6.5. No change is made to the actual requirements which exist to limit the transport of contaminants from garages to occupiable spaces.

This proposed addendum substitutes the IECC climate zone map for infiltration degree days as the basis for the criteria of Section 4.1 Exception (a) without significantly changing the area included in the version of the addenda adopted previously by the SSPC. This proposed change will make the requirements of Standard 62.2 much more understandable and increase its usability in the residential building industry. The map has been adopted for use in the International Energy Conservation Code, the International Residential Code, and ASHRAE Standard 90 and is widely in use in the building code world.


The existing Table 4.2 of Standard 62.2 does not provide sufficient resolution in defining ventilation effectiveness for the 24 hour cycle time and, as such, prevented energy saving strategies like nighttime ventilation cooling by imposing an excessive penalty on systems that operate between 0.4 and 0.6 Fractional On-Time. The committee felt that a longer table in the standard was not warranted for these rare cases but agreed to allow linear interpolation for Fractional On-Times within the table as that is conservative relative to the fundamental equations on which Table 4.2 is based.

ANSI/ASHRAE 62.2g-2006, Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings

Condensing clothes dryers have entered the market. This addendum recognizes that the exhaust from the dryers (a condensate) can be discharged into a drain rather than from an opening in the building envelope.


This proposed addendum modifies the requirements for the selection of air-moving equipment in Section 7.1 of ASHRAE Standard 62.2-2004. It is a modification of the proposed changes 0S-01 (certification requirements) and 0S-02 (zone rating standard) submitted in 2005. The Systems Subcommittee of SSPC 62.2 worked with the proposer to reach this compromise position at its meeting in Chicago in January 2006.


The proposed change clarifies Section 6.1. The existing language is not appropriate if applying Standard 62.2 to existing buildings which have already been designed and constructed.


This proposed addendum deletes Exception 4.1(a) in response to recent studies of window opening patterns in California (covering much of the region described in 4.1(a)) showing window opening by household residents is much less than expected. Window opening occurs primarily in response to thermal comfort rather than indoor contaminants. Window opening, assumed to provide the ventilation required in this exception in mild climates, should not be an acceptable alternative to the ventilation requirements.


This proposed change clarifies that a system must be operated in order to achieve the stated purpose of the standard to define minimum requirements for acceptable indoor air quality. Currently the standard is vague such that a system could be installed and turned off and be in compliance. A non-operating system cannot achieve the air change rate required in Section 4.1 of the standard. Elsewhere in the standard (Section 4.4) it is stated that: ‘Readily accessible override control must be provided to the occupant.’ This proposed change makes it clear that the override control is modifying or suspending normal operation.

ANSI/ASHRAE 62.2q-2016, Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings

This proposed change adds an alternative combustion safety testing method based on performance in lieu of the prescriptive requirements that were the sole basis previously. ANSI/BPI-1200 is a consensus standard that addresses combustion safety testing.


This proposed addendum removes any credit for assumed infiltration. It does not change the overall target ventilation rate, and credit for measured infiltration is still allowed. The effect of this change is to ensure that each home will have the required minimum ventilation rate regardless of airtightness. This is especially important as homes are becoming commonly tighter than was assumed previously in 62.2. This change is consistent with the total ventilation rate method in the recently-published Addendum n and also with the recently-published addendum on multifamily buildings.

ANSI/ASHRAE 62.2v-2016, Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings

This proposed addendum addresses inconsistencies that have been in the determination of intermittent ventilation flow rates. It also puts forth explicit mechanisms to meet the equivalency intent of non-continuous ventilation which allows for a broader range of potential control algorithms than had previously been in the standard. It also establishes a short-term exposure limit of 5 times the long-term exposure limit which must be considered when using non-continuous ventilation.

ANSI/ASHRAE 62aa-2004, Ventilation for Acceptable Indoor Air Quality

This addendum converts requirements related to outdoor air intake location and intake protection into mandatory and enforceable language. This 3rd public review draft deletes the separation distance requirement for general building exhaust in Table 5.2, it allows the use of the National Fuel Gas Code and other established standards instead of the separation distance for combustion vents in Table 5.2, and it revises the requirements related to the limitation of rain penetration such that they relate more closely to industry practice for testing and specifying louvers.

ANSI/ASHRAE 62ae-2003, Ventilation and Acceptable Indoor Air Quality

This addendum addresses a number of distinct issues that have not been dealt with by previous addenda. It adds definitions of the terms outdoor air, cognizant authority and industrial space. It modifies or deletes several existing definitions in an attempt to clarify language and to delete a term that is not used in the standard.


This addendum implements changes to the Purpose and Scope of the standard that are contained in the approved Target, Title Purpose and Scope of the standard. These changes address how the standard relates to new and existing buildings, clarifies its coverage of industrial and laboratory spaces, and adds a caveat concerning situations where outdoor air quality may be poor.

ANSI/ASHRAE 62ah-2003, Ventilation for Acceptable Indoor Air Quality, Addenda h

This 4th public review of Addendum 62h addresses concerns raised in the last review draft, which added an allowance for compliance with the Indoor Air Quality Procedure through an “equivalency” with the IAQ conditions by use of the Ventilation Rate Procedure. The allowance concerned some commenters, especially its potential use in smoking areas. The committee deleted the allowance, noting that the IAQ Procedure as now worded in the addendum already allows such “alternative” design approaches.
Replaces material in sections 4 and 6 regarding the use of the IAQ Procedure. It describes situations in which the IAQ procedure can or must be used, and it does so in a mandatory and enforceable language. It does not tell one how to use this procedure, only when. (Addendum 62h addresses the former issue.) This is the second Public Review for this standard. It was originally listed in the November 6, 1998 issue of Standards Action. It is being resubmitted due to substantive changes to the text.

Replaces the current performance requirement for natural ventilation systems with a prescriptive requirement that is similar to many model building codes. The existing section is difficult for designers to understand and to use (see interpretations 62-1989-8 and 62-1989-14) and it is difficult to enforce. This is the second Public Review for this standard. It was originally listed in the November 6, 1998 issue of Standards Action. It is being resubmitted due to substantive changes to the text.

ANSI/ASHRAE 62k-2002, Ventilation for Acceptable Indoor Air Quality, Addenda k
Deletes the current Section 4 (Classification) and adds a new informative appendix addressing application of the standard in new and existing buildings. The current Section 4 discusses the two procedures for determining design ventilation rates, but contains no requirements and is therefore inconsistent with a standard in code-intended language. The new appendix attempts to address the issue of application of the standard in new and existing buildings. The appendix contains informative guidance on when the standard applies in new and existing buildings. It also contains a code-language version of these requirements that could be adopted, with or without modification, by jurisdictions that do not have a building code. Earlier versions of this addendum attempted to make this material part of the standard (in Section 4), but it was pointed out that this could create conflicts with building codes that contain their own compliance and enforcement sections. This standard was listed for public review in the 7/30/1999 issue of Standards Action. It is being resubmitted due to substantive changes to the text.

ANSI/ASHRAE 62m-2001, Ventilation for Acceptable Indoor Air Quality, Addenda m
Creates a new section on operating and maintenance procedures, recognizing the importance of these procedures on acceptable indoor air quality. Requirements include such measures as frequency of system inspection and air cleaner maintenance.

This 3rd public review of Addendum 62n (a proposed revision of the Ventilation Rate Procedure) tries to satisfy unresolved commenters from prior reviews. It revises the definition of “zone,” presents simple approaches for determining outdoor air intake rates for single-zone and 100% outdoor air systems, revises the tables of default values of zone and system ventilation efficiencies, and revises the normative appendix presenting a detailed methodology for determining ventilation efficiencies.

ANSI/ASHRAE 62o-2003, Ventilation for Acceptable Indoor Air Quality
Contains minimal normative guidance for ventilation of areas containing environmental tobacco smoke (ETS), simply stating that additional ventilation shall be provided relative to a similar ETS-free area. In informative language, it contains a method for determining this additional ventilation based upon chamber studies of occupant perception from the 1980s.

Independently addresses combustion processes, since all designers may not be subject to building codes and since building code content can change from minimum mandatory requirements. Combustion processes consume oxygen from combustion air and produce water vapor, carbon dioxide and other contaminants. Many building codes already adequately and appropriately address the proper indoor use of fuel-burning appliances, in terms of both combustion air and venting of combustion products.

Modifies several definitions for clarity. In addition, several definitions that are adequately defined in standard dictionaries are deleted for brevity, as are others that are not used in the body of the standard.

This addendum addresses outdoor air-quality assessment and air-cleaning requirements. The current standard requires outdoor air assessment and recommends outdoor cleaning but does not require it. The section where outdoor air cleaning is currently discussed (Section 5.9) is replaced with a new Section 4, which requires outdoor air-quality assessment for all ventilation systems. Documented assessment is expected to lead to informed decisions related to the location of intakes and outdoor air-cleaning measures.

Expands and clarifies requirements for equipment-related particle filtration. These requirements are intended to lower the level of particulate matter in the ventilation system where wet surfaces are present, thereby reducing the rate of dirt accumulation on ventilation system components, including ductwork.

Replaces section 5.11. In so doing, it clarifies and codifies requirements for drain pan design, carryover from cooling coils, access for inspection and cleaning, and requirements related to the proper application of humidifiers and water spray devices within the air distribution system. Recognizing that liquid water within the air distribution system increases the likelihood of microbial growth, the requirements in this addendum seek to prevent standing water in drain pans, limit water droplet carryover, and minimize stagnant water in humidifier and water spray sumps.

Adds requirements related to the control of ventilation systems. An improperly controlled system is unlikely to deliver ventilation air at design minimum levels. This addendum does not cover optional demand controlled ventilation requirements. It specifically addresses VAV system controls for outdoor air intake airflow. The intake control requirements recognize that, at low supply volumes, sufficient outdoor airflow may not be maintained if a fixed outdoor air intake damper position is used. In most cases, an active outdoor air control system must be provided to ensure minimum intake rates are maintained.

ANSI/ASHRAE 62w-2001, Ventilation for Acceptable Indoor Air Quality, Addenda w
Defines performance criteria for air stream surface materials in ventilation system equipment, ducts and plenums. Conformance with these criteria is intended to minimize the potential for microbial growth and dissemination through the air distribution system. Installation provisions are intended to minimize internal insulation material from becoming loose, damaged, or collecting dirt at joints and seams.

ANSI/ASHRAE 62x-2003, Ventilation for Acceptable Indoor Air Quality
Revises the humidity control requirements currently described in Section 5.10. Building pressurization requirements to minimize the infiltration of moist outdoor air (which can cause condensation on building surfaces during cooling operation) have also been added. This addendum has had four public reviews and the independent substantive changes in this draft respond to recent public review comments. Proposed additions are underlined and deletions are struck through.
ANSI/ASHRAE 62y-2004, Ventilation for Acceptable Indoor Air Quality
This proposed addendum classifies air with respect to contaminant and odor intensity and limits the recirculation of lower-quality air into spaces with air of higher quality. This 5th public review adds a sentence to the Class 2 Note under 5.x.1 to address concerns raised by the restaurant/hospitality industry and changes some classifications from 3 to 2 because of the restrictive requirement that class 3 air can only be recirculated to the space from which it comes.

This addendum addresses air-cleaning requirements for ozone. The current standard requires outdoor air assessment, and recommends outdoor cleaning for contaminants of concern, but it does not require cleaning for ozone. This addendum requires gaseous air cleaning when the outdoor ozone concentration is high, but it does not require air cleaning for other gaseous contaminants.

Updates the normative references. These changes affect the testing procedures for determining the building material thermal properties and assembly U-factors of Sections A9.3.1 and A9.3.2 of Normative Appendix A. Test procedure ASTM C1363 replaces ASTM C236 and ASTM C976 for these properties. Also, where credit is taken for a low-emissivity coating for skylights, the coating emissivity shall now be determined in accordance with NFRC 300-2001 instead of NFRC 301-1993.

This proposed addendum removes Informative Appendix D in its entirety.

ANSI/ASHRAE 90.4P-2016, Energy Standard for Data Centers
The purpose of this standard is to establish minimum efficiency requirements of data centers. The significant changes include corrected equations in Section 6, addition of climate Zones OA/0B, addition of verification of equipment efficiencies, and corrections to Section 11.

This proposed addendum to ASHRAE Standard 105 -2007 revises the definition of 'Gross Floor Area' of a building. The definition chosen reflects a general agreement among a number of interested ASHRAE parties and the Standard Project Committee 105 for what will be referenced within a number of ASHRAE standards. This definition is for use in energy analysis work and does not necessarily reflect the exact definition used by other organizations.

This proposed addendum to ASHRAE Standard 105 -2007 modifies the existing document from informative to mandatory language. A minimum of changes are being proposed to bring Standard 105 -2007 into agreement with the current ASHRAE practice for Standards. A more complete revision will be incorporated in the document currently being developed by the Standard Project Committee 105.

ANSI/ASHRAE Addendum 135.1d-2010, Method of Test for Conformance to BACnet
This proposed addendum adds a test to verify that COV subscription lifetimes are not affected by time-sync requests and adds new Active_COV_Subscription tests. This draft has been revised in response to comments received during the first public review, which took place in March of 2009.

ANSI/ASHRAE Addendum 135.1e-2011, Method of Test for Conformance to BACnet
This proposed addendum revises the current BBMD BACnet/IP tests to be more compatible with the two-hop method of distribution for broadcasts over the internet. Among other improvements, inconsistencies, errors, and omissions are fixed by this addendum. This draft has been revised in response to comments received during the first public review, which took place in March of 2009.

ANSI/ASHRAE Addendum 135.1f-2011, Method of Test for Conformance to BACnet
This proposed addendum clarifies which timestamp parameter is to be sent in Ack notifications, adds new tests for the functionality of the Database_Revision property, removes inconsistencies in the CreateObject service tests, and revises the DeleteObject service tests.

ANSI/ASHRAE Addendum 135.1g-2011, Method of Test for Conformance to BACnet
This proposed addendum makes corrections in several tests, removes the recipient test, revises the Acknowledge Alarm Initiation tests, and adds new tests for Device Identifier Recipients, Network Address Recipients, Disable Initiation, Non-router Network Layer Messages, Reading and Presenting Properties, Event Notification, Revision 4 Schedules, Event Notification Network Priority, Device and Network Mapping, Device Restart Notification, and Schedule Written Datatypes.

ANSI/ASHRAE Addendum 135.1h-2011, Method of Test for Conformance to BACnet
This proposed addendum fixes a problem in the chaining test, fixes a problem in the CHANGE_OF_STATE test for an Event Enrollment Object, and revises the ConfirmedCOVEventNotification Service Initiation Tests to non-infinite lifetimes.

ANSI/ASHRAE Addendum 135ab-2011, BACnet - A Data Communication Protocol for Building Automation and Control Networks
This proposed addendum provides additional standard baud rates for MS/TP, specifying some higher rates now needed with the increased speed of processors.

ANSI/ASHRAE Addendum 135ac-2011, BACnet - A Data Communication Protocol for Building Automation and Control Networks
This proposed addendum specifies the usage of dates and times more precisely. Currently, dates and times are used in different ways in the standard. In some cases, the use of &#x2116; unspecified or &#x2116; wildcard values is specifically allowed, but in other places, it is ambiguous. This addendum proposes to fix this problem.

ANSI/ASHRAE Addendum 135g-2010, BACnet - A Data Communication Protocol for Building Automation and Control Networks
This fifth public review proposes independent substantive changes to the fourth public review draft of Addendum g, which updates BACnet Network Security. The existing BACnet Network Security architecture defined in clause 24 of Standard 135 -2008 is based on the 56-bit DES cryptographic standard and needs to be updated to meet the needs of today's networks.

ANSI/ASHRAE Addendum 135h-2010, BACnet - A Data Communication Protocol for Building Automation and Control Networks
This fourth public review proposes independent substantive changes to Addendum h. This draft removes all changes made in Section 7 of this addendum in the first public review draft. The effect of this draft is to remove the addition of UTF-8 (Unicode Transfer Format 8) from the addendum. After this public review, the project committee hopes to be able to publish Addendum h with the miscellaneous changes to the standard defined in the first public review draft (except those in Section 7) as modified by the second and third public review drafts. Support for UTF-8 is now addressed in Addendum k.

ANSI/ASHRAE Addendum 135k-2010, BACnet - A Data Communication Protocol for Building Automation and Control Networks
This proposed addendum adds support for UTF-8. Due to the historic use of ANSI X3.4 in many controllers, there is an expectation that for many years to come BACnet installations will have to be able to deal with multiple character sets (ANSI X3.4 and UTF-8). This change is intended to extend character set 0 to include all UTF-8 characters. The addendum also updates the standard to reflect the fact that the Japanese Industrial Standards Committee has changed the name of “JIS C 6226” to “JIS X 0208”.
ANSI/ASHRAE Addendum 135n-2010, BACnet - A Data Communication Protocol for Building Automation and Control Networks
This proposed addendum adds support for long Backup and Restore preparation times. In larger devices, preparations to perform Clause 19.1 Backup and Restore operations can take a considerable amount of time, much greater than (say) typical APDU_Timeout values. A mechanism for supporting such devices is proposed.

ANSI/ASHRAE Addendum 135p-2010, BACnet - A Data Communication Protocol for Building Automation and Control Networks
This proposed addendum adds a new Global Group object type. There is a need for a standard object type similar to the Group object type except that it can provide a collection of information from objects in a number of BACnet devices and can also deliver that information in an intrinsic event notification when any of the group member objects enter a non-NORMAL state. This draft has been revised in response to comments received during the first public review, which took place in March of 2009.

ANSI/ASHRAE Addendum 135t-2010, BACnet - A Data Communication Protocol for Building Automation and Control Networks
This proposed addendum provides a new annex that defines formats for XML data exchanged between various BAS systems. The data may have a variety of purposes and may be conveyed through files or by other means. The intention is to give BACnet new capabilities for standardized communications between a wide range of applications. XML can be used for exchanging files between systems, integrating buildings with energy utilities, and expanding enterprise integration with richer Web services. This draft has been revised in response to comments received during the second public review, which took place in March of 2009.

ANSI/ASHRAE Addendum 135u-2010, BACnet - A Data Communication Protocol for Building Automation and Control Networks
This proposed addendum clarifies the use of RejectPDU, adds an error code UNSUPPORTED_OBJECT_TYPE for the CreateObject service, adds new abort and error codes, and specifies proper errors when attempting access to the Log.Buffer property. This draft has been revised in response to comments received during the first public review, which took place in March of 2009.

ANSI/ASHRAE Addendum 135v-2009, BACnet - A Data Communication Protocol for Building Automation and Control Networks
This proposed addendum fixes a problem in the MS/TP TokenCount value, clarifies the word “supported” in Protocol_Services_Supported, and Protocol_Objects_Supported, and removes NM-CE-A from device profiles.

ANSI/ASHRAE Addendum 135w-2010, BACnet - A Data Communication Protocol for Building Automation and Control Networks
This proposed addendum adds more primitive value objects and adds time references for scheduling. This draft has been revised in response to comments received during the first public review, which took place in March of 2009.

ANSI/ASHRAE Addendum 135x-2010, BACnet - A Data Communication Protocol for Building Automation and Control Networks
This proposed addendum fixes an error in the criteria for COV for Load Control, clarifies the Trend Log Time Stamp, clarifies ReadRange on Lists, and clarifies the results of using special property identifiers.

ANSI/ASHRAE Addendum 135y-2010, BACnet - A Data Communication Protocol for Building Automation and Control Networks
This proposed addendum specifies deployment options for MS/TP.

ANSI/ASHRAE Addendum 140b-2010, Standard Method of Test for the Evaluation of Building Energy Analysis Computer Programs
This proposed addendum adds new test cases to a new Section 7 of Standard 140, adding relevant informative appendices and updating existing ones as needed. These Class II test cases may be used for all types of building load calculation methods, regardless of time-step granularity, whereas the Class I (Section 5) test cases are designed for more detailed diagnosis of simulation models. Adapted from HERS BESTEST (developed by NREL), the new test cases formally codify the Tier 1 & Tier 2 Tests for certification of residential energy performance analysis tools, as described in the 2006 Mortgage Industry National Home Energy Rating Systems Standards.

ANSI/ASHRAE Addendum 15a-2014, Safety Standard for Refrigeration Systems
Second review: This independent substantive change (ISC) public review adds a number of clarifying requirements to over pressure protection for refrigeration systems. It clarifies requirements for relief vent lines terminating to atmosphere and removes an explicit provision for discharging ammonia to a water diffusion tank. First review: This addendum modifies and clarifies the requirements for discharge of pressure relief devices, including where refrigerant may be safely discharged in the event of a release.

ANSI/ASHRAE Addendum 15b-2012, Safety Standard for Refrigeration Systems
This addendum clarifies the location requirements for machinery room mechanical ventilation.

ANSI/ASHRAE Addendum 15c-2012, Safety Standard for Refrigeration Systems
This addendum clarifies that design pressure is expressed in terms of relative pressure or gauge pressure (not absolute pressure).

This addendum is intended to more closely harmonize Standard 15 with the 2012 International Mechanical Code (IMC) section 1101.10 regarding refrigerant access.

This addendum removes an obsolete Appendix from Standard 15, pertaining to calculating allowable concentration for refrigerant blends.

This addendum removes obsolete information regarding manual emergency discharge of ammonia refrigerant.

ANSI/ASHRAE Addendum 161b-2017, Air Quality within Commercial Aircraft
This proposed addendum updates the normative references and revises Section 8.10 (formerly titled Pesticides) with more emphasis on non-chemical methods of insect control on aircraft.

ANSI/ASHRAE Addendum 161c-2013, Air Quality within Commercial Aircraft
Flame retardants are used extensively throughout aircraft for safety reasons, but there are health concerns associated with exposure to some of the chemical compounds used for this purpose. Potential exposure of cabin occupants to these substances may come through dermal contact with materials containing the flame retardants and through inhalation of dust which includes flame retardants. This proposed addendum provides requirements and information about flame retardants to minimize exposure.

ANSI/ASHRAE Addendum 161c-2017, Air Quality within Commercial Aircraft
The proposed addendum references a 2015 ICAO document regarding airline worker education/training relevant to onboard fume events, and revises Section 8.10 (formerly titled ‘Pesticides&B8221;) with more emphasis on non-chemical methods of insect control on aircraft.
ANSI/ASHRAE Addendum 161d-2013, Air Quality within Commercial Aircraft
This proposed addendum adds requirements and information about refrigerants to the standard. These refrigerants are used in vapor-compression refrigeration units and in vapor-compression cooling systems that are used on some aircraft for galley cooling and other applications. Typically, vapor compression systems are not used on aircraft within the scope of this standard for cabin environmental control systems.

ANSI/ASHRAE Addendum 161f-2013, Air Quality within Commercial Aircraft
This proposed addendum is intended to reflect the fact that at least one new aircraft design does not use bleed air for cabin ventilation and pressurization and that this approach or similar ones offer a way to reduce or eliminate the potential for bleed air contamination from lubricating oil or hydraulic fluid.

ANSI/ASHRAE Addendum 161g-2013, Air Quality within Commercial Aircraft
This standard defines the requirements for air quality in air-carry aircraft and specifies methods for measurement and testing in order to establish compliance with the standard.

ANSI/ASHRAE Addendum 170j-2012, Ventilation of Health Care Facilities
This proposed addendum adds filtration requirements for certain types of residential health care facilities.

ANSI/ASHRAE Addendum 170k-2013, Ventilation of Health Care Facilities
This proposed addendum clarifies the requirement that ‘all’ room air be exhausted directly to the outdoors and provides limitations as to the reuse of exhaust air for energy recovery.

ANSI/ASHRAE Addendum 170n-2013, Ventilation of Health Care Facilities
This proposed addendum clarifies the requirements for the calculation of outside air quantities for air handling systems and provides designers with two alternative calculation pathways thus providing more flexibility. As this Standard provides guidance on the type of supply air outlets that shall be used in healthcare environments the committee has determined that the minimum outdoor air change rates indicated in Table 7-1 represent the Zone Outdoor Airflow, as may be needed for use in calculations defined by this addendum.

ANSI/ASHRAE Addendum 170q-2012, Ventilation of Health Care Facilities
The proposed addendum provides additional information to the designer concerning other potential pharmacy requirements that may be imposed by State pharmacy regulations. The proposed addendum also provides clarification concerning a configuration of air intake not explicitly described previously and addresses radiant heating systems utilizing wall panels.

ANSI/ASHRAE Addendum 170s-2012, Ventilation of Health Care Facilities
The proposed changes are intended to clarify and coordinate requirements of the Standard with the FGI Guidelines for Design and Construction of Health Care Facilities.

ANSI/ASHRAE Addendum 170t-2012, Ventilation of Health Care Facilities
This proposed addendum updates references to the Guidelines for Design and Construction of Health Care Facilities.

ANSI/ASHRAE Addendum 170v-2013, Ventilation of Health Care Facilities
This proposed addendum provides clarification concerning design relative humidity requirements for spaces whose function is recovery and reduces the lower design humidity limit from 30% to 20% RH to match that of those spaces noted in Addendum d to Standard 170-2008 currently published and posted for free on the ASHRAE website. Addendum d noted that based on recent research, a reduction in the lower limit of the design humidity range for eight spaces designed for short term patient stays was warranted.

ANSI/ASHRAE Addendum 34a-2010, Designation and Safety Classification of Refrigerants
This addendum adds new refrigerant 407F to Table 2 and Table D2.

ANSI/ASHRAE Addendum 34a-2014, Designation and Safety Classification of Refrigerants
This addendum adds a new single-component refrigerant R-1233zd(E), structural category ‘Unsaturated Organic Compounds,’ to Table 1 and Table D1.

ANSI/ASHRAE Addendum 34aa-2009, Designation and Safety Classification of Refrigerants
This addendum changes the RCL values for R402A, R412A, R413A, R414A, R415A, R415B, R418A, and R419A in Table 2 of Standard 34-2009, due to prior errors in the flammability properties for these refrigerants.

ANSI/ASHRAE Addendum 34af-2013, Designation and Safety Classification of Refrigerants
This addendum changes the flammability safety classification from Class 2 to Class 1 for R30 in Table 1, as published data show that at 60 deg. C R30 is nonflammable at 1 atm. pressure.

ANSI/ASHRAE Addendum 34ag-2013, Designation and Safety Classification of Refrigerants
This addendum adds new zeotropic refrigerant R-417C to Table 2 and Table D2.

ANSI/ASHRAE Addendum 34ab-2009, Designation and Safety Classification of Refrigerants
This addendum modifies the requirements for submitting compact disks and hard copies of refrigerant applications.

ANSI/ASHRAE Addendum 34ac-2013, Designation and Safety Classification of Refrigerants
This addendum adds new zeotropic refrigerant R-444A to Table 2 and Table D2.

ANSI/ASHRAE Addendum 34ad -2009, Designation and Safety Classification of Refrigerants
This addendum modifies the data requirements for determining the anesthetic or central nervous system effects of a refrigerant.

ANSI/ASHRAE Addendum 34af-2013, Designation and Safety Classification of Refrigerants
This addendum deletes the use of the potential formation of CF4 in Section 6.1.3.5(a) for Heat of Combustion calculations, as this is not possible when working at stoichiometric concentrations in air. SO3 is deleted from the sample calculation table in Appendix F. The units in Appendix F example calculations and table are changed from kcal/mol to kJ/mol or kJ/kg, to be consistent with the definition of Heat of Combustion in this standard.

ANSI/ASHRAE Addendum 34ae-2009, Designation and Safety Classification of Refrigerants
This addendum specifies the temperature for leak/recharge testing to be consistent with the original intent of the committee.

ANSI/ASHRAE Addendum 34ae-2013, Designation and Safety Classification of Refrigerants
This addendum adds new refrigerant 407F to Table 2 and Table D2.
ANSI/ASHRAE Addendum 34ai to Standard 34-2013, Designation and Safety Classification of Refrigerants
This addendum adds new zeotropic refrigerant R-4198 to Table 2 and Table D2.

ANSI/ASHRAE Addendum 34ai-2010, Designation and Safety Classification of Refrigerants
This addendum modifies the language in 6.1.2, Toxicity Classification, to clarify the intent.

ANSI/ASHRAE Addendum 34d-2010, Designation and Safety Classification of Refrigerants
This addendum updates the Section E Definitions for occupational exposure limit (OEL) and the workplace environmental exposure level (WEEL) and updates Section 10, References.

ANSI/ASHRAE Addendum 34e-2011, Designation and Safety Classification of Refrigerants
This addendum adds new refrigerant 439A to Table 2 and Table D2.

ANSI/ASHRAE Addendum 34f-2011, Designation and Safety Classification of Refrigerants
This addendum adds new refrigerant 440A to Table 2 and Table D2.

ANSI/ASHRAE Addendum 34g-2011, Designation and Safety Classification of Refrigerants
This addendum adds new refrigerant 441A to Table 2 and Table D2.

ANSI/ASHRAE Addendum 34h-2011, Designation and Safety Classification of Refrigerants
This addendum adds new refrigerant 442A to Table 2 and Table D2.

ANSI/ASHRAE Addendum 34i-2014, Designation and Safety Classification of Refrigerants
This addendum revises Section 9.9.5, Quantity, changing the quantity and type of documents refrigerant applicants should submit to ASHRAE.

ANSI/ASHRAE Addendum 34p-2012, Designation and Safety Classification of Refrigerants
This addendum adds new zeotropic refrigerant S12A to Table 2 and Table D2.

ANSI/ASHRAE Addendum 34q-2012, Designation and Safety Classification of Refrigerants
This addendum adds new zeotropic refrigerant 442A to Table 2 and Table D2.

ANSI/ASHRAE Addendum 34r-2012, Designation and Safety Classification of Refrigerants
“...this addendum adds toxicity Code Classification assignments for refrigerants R-4218 to R-433A (inclusive), R-601A, and R-227ea to Tables 1 and 2.”

ANSI/ASHRAE Addendum 34s-2012, Designation and Safety Classification of Refrigerants
“...this addendum adds missing RCL data for R-600 in Table 1 and corrects significant figures for RCL data for R1270, R-436B, and R-437A in Tables 1 and 2.”

ANSI/ASHRAE Addendum 34t-2012, Designation and Safety Classification of Refrigerants
This addendum clarifies the definitions of lowest observed effect level (LOEL) and no-observed-effect level (NOEL) to be consistent as applied in this Standard.

ANSI/ASHRAE Addendum 34u-2012, Designation and Safety Classification of Refrigerants
“...this addendum clarifies 7.3, Requirements for Data Calculations, and 9.6, Toxicity Information, for consistency.”

ANSI/ASHRAE Addendum 34v-2012, Designation and Safety Classification of Refrigerants
“This addendum removes the term toxic concentration factors (TCFs) from Informative Appendix G, Calculation of RCL and ATEL for Blends.”

ANSI/ASHRAE Addendum 34w-2013, Designation and Safety Classification of Refrigerants
This addendum modifies the definition of Workplace Environmental Exposure Level (WEEL) and adds a reference for AIHA WEEL.

ANSI/ASHRAE Addendum 34x-2009, Designation and Safety Classification of Refrigerants
This addendum adds new refrigerant 433B to Table 2 and Table D2.
ANSI/ASHRAE Addendum 34x-2013, Designation and Safety Classification of Refrigerants
This addendum clarifies the conditions for bubble point in Sections B2.4.1 and B2.4.2 of Normative Appendix B.2, Fractionation Analysis.

ANSI/ASHRAE Addendum 34y-2009, Designation and Safety Classification of Refrigerants
This addendum adds new refrigerant 433C to Table 2 and Table D2.

ANSI/ASHRAE Addendum 34y-2012, Designation and Safety Classification of Refrigerants
"This addendum better defines the experimental verification of models used to identify the WCCF fractionated compositions, and allows vapor-liquid equilibrium (VLE) data only to be used for experimental verification."

ANSI/ASHRAE Addendum 34z-2010, Designation and Safety Classification of Refrigerants
The first public review of addendum 34z extended the rules for numbering refrigerants to include ethene and propene based refrigerants. Independent Substantive Changes to sections 4.1.7 and 5.2.2 are proposed based on comments received during the first public review of 34z-2007.

ANSI/ASHRAE Addendum 55a-2014, Thermal Environmental Conditions For Human Occupancy
This proposed addendum separates vertical air stratification limits for standing vs. seated occupants because the previous requirement did not distinguish between the two and would be overly restrictive when applied to standing occupants. This clarification only applies to occupants who are standing still with metabolic rates less than 1.3 met because the entire Section 5.3.4 Local Thermal Discomfort does not apply above 1.3 met.

ANSI/ASHRAE Addendum 55b-2012, Thermal Environmental Conditions for Human Occupancy
This proposed addendum splits normative and informative language that appears in the body of the Standard. Most of the informative language is moved to a new informative appendix.

ANSI/ASHRAE Addendum 55b-2014, Thermal Environmental Conditions for Human Occupancy
This addenda clarifies the three comfort calculation approaches in Section 5.3.3 by providing a new applicability table (Table 5.3.1) and re-organizing Section 5.3.3 to cover an "Elevated Air Speed Comfort Zone Method&8221; In addition, the standard now explicitly states that when ‘average air speed&8217; (VA) is greater than 0.2 m/s (40 fpm), Section 5.3.3 shall be used to calculate the upper and lower bounds of the comfort zone. This requirement was not clearly stated previously. Other changes include removal of the upper limit to air speed when occupants have control and change of the draft limit to 0.2 m/s (40 fpm) to align with the still air comfort zone.

ANSI/ASHRAE Addendum 55c-2012, Thermal Environmental Conditions for Human Occupancy
This proposed addendum represents an evolution of the description and definition of the average outdoor temperature to be used in the adaptive comfort model. The original term ‘monthly average’ did not fully capture the methodology used in defining the adaptive approach nor was it clear in describing how to apply it. The change to prevailing mean as well as the addition of the daily outdoor temperature definition provides much clearer direction on the application of the adaptive comfort model.

ANSI/ASHRAE Addendum 55c-2017, Thermal Environmental Conditions for Human Occupancy
This addendum simplifies Normative Appendix A (Methods for Determining Operative Temperature) to be a single calculation procedure for calculating operative temperature. Case 1 is removed because it is overly permissive and Case 3 is removed because it is redundant with Case 2.

ANSI/ASHRAE Addendum 55d-2012, Thermal Environmental Conditions for Human Occupancy
Removes informative language related to the use of Section 5.3 for occupant-controlled, naturally conditioned spaces (sometimes called the adaptive comfort method) from the body of the Standard and moves it to an informative appendix. This addendum also states the requirements more clearly in normative language. In some cases, paragraph numbering has been added or modified for greater clarity.

ANSI/ASHRAE Addendum 55d-2015, Thermal Environmental Conditions for Human Occupancy
Addendum b to SS-2013 changed the still air threshold from 0.15 to 0.2 m/s (30 - 40 fpm) to align the compliance paths that previously had differing definitions of still air. This proposed addendum updates additional references and figures in the standard that were impacted by Addendum b. The air speed limit to prevent draft sensation in cool environments is moved to Section 5.3.3.4 to clarify how the limit fits into the other air speed limits and Figure 5.3.3A. Normative Appendix C is also modified to state that the SET model cooling effect applies to both air and radiant temperature.

ANSI/ASHRAE Addendum 55e-2015, Thermal Environmental Conditions for Human Occupancy
This proposed addendum removes permissive language found throughout the standard (excluding Title, Sections 1, 2, 3, 7 & ALL Informative Appendices). In doing so, values for maximum differences of clothing level and metabolic rate between multiple occupants in a zone that allow averaging into a single representative occupant where established at 0.1 met and 0.15 clo.

ANSI/ASHRAE Addendum 55f-2012, Thermal Environmental Conditions for Human Occupancy
This proposed addendum clarifies the normative requirements for determining metabolic rates for representative occupants and moves these normative requirements to the body of the Standard. It adds a new informative appendix containing similar material that was previously in Normative Appendix A.

ANSI/ASHRAE Addendum 55g-2013, Thermal Environmental Conditions for Human Occupancy
This proposed change to Section 5.2.3.3.1 (reference Addendum d to Standard SS-2004) clarifies the requirements for local control of air speed, and provides an exception for classrooms and conference rooms where only one control is required.

ANSI/ASHRAE Addendum 55h-2010, Thermal Environmental Conditions for Human Occupancy
This proposed addendum clarifies the normative requirements for determining clothing insulation for representative occupants and moves these normative requirements to the body of the Standard. It adds a new informative appendix containing similar material that was in the previous Normative Appendix B.

ANSI/ASHRAE Addendum 55i-2010, Thermal Environmental Conditions for Human Occupancy
Proposed Informative Appendix H provides a sample compliance form to supplement Section 6 of the standard. Section 6 was modified in Addendum e of Standard SS-2004 currently published on the ASHRAE website. Section 6 of the standard and this sample compliance form document design compliance.
ANSI/ASHRAE Addendum S5i-201x, Thermal Environmental Conditions for Human Occupancy

This proposed addendum clarifies calculation of the cooling effect of air movement by moving informative text to an informative appendix and by stating requirements more clearly in normative language. A new definition of ‘average air speed’ is added to clarify that calculations shall use a time and spatial averaged air speed.

ANSI/ASHRAE Addendum S5j-2010, Thermal Environmental Conditions for Human Occupancy

This proposed change to Section 5.4 clarifies the description of the environmental variable for the purpose of understanding their use in Section 5. It is not a measurement specification or requirement. The Standard now allows the designer to choose the appropriate average air speed for use in design calculations; this language clarifies these choices within the context of specific temporal, spatial and clothing restraints. This change will make clear that the designer, when determining average air speed in a space, must include values for the speeds expected to be experienced on unclothed body parts.

ANSI/ASHRAE Addendum S5j-2013, Thermal Environmental Conditions for Human Occupancy

This proposed addendum inserts the calculation procedures from Addendum c back into the standard. Addendum c added a definition for “prevailing mean outdoor temperature” to the adaptive model including calculation procedures. The public review draft of subsequent Addendum d mistakenly deleted the calculation procedures section. Addenda c and d are available for free download on the ASHRAE website at http://www.ashrae.org/standards-research--technology/standards-addenda.

ANSI/ASHRAE Addendum S5k-2010, Thermal Environmental Conditions for Human Occupancy

This proposed Addendum updates references in the Standard to reflect updated publications since 2004.

ANSI/ASHRAE Addendum S5k-2013, Thermal Environmental Conditions for Human Occupancy

This proposed addendum adds a new method for the calculation of the clothing insulation using a predictive model of clothing insulation based on outdoor air temperature. This model can be used to predict clothing levels at design conditions, to generate clothing inputs for dynamic annual comfort simulations, or as an input for comfort control systems.

ANSI/ASHRAE Addendum S5l-2013, Thermal Environmental Conditions for Human Occupancy

This proposed addendum renames Section 6 from ‘Compliance’ to ‘Design Compliance’ to clarify that Section 6 covers design requirements and documentation in contrast to Section 7 (Evaluation of the Thermal Environment) that covers evaluation of existing spaces. The proposed addendum also removes informative language and clarifies the existing requirements in Section 6.

ANSI/ASHRAE Addendum S5m-2013, Thermal Environmental Conditions for Human Occupancy

This proposed addendum separates normative from informative text in the portions of Section 5 (Conditions that Provide Thermal Comfort) that describe the analytical and graphic methods.

ANSI/ASHRAE Addendum S5n-2013, Thermal Environmental Conditions for Human Occupancy

This proposed addendum combines and clarifies definitions by absorbing Section 5.4 (Description of Thermal Environmental Variables) into the definitions in Section 3.0 (Definitions). Some definitions that were not used have been deleted, others that are commonly used have been added, and many have been revised to be more clear and specific.

ANSI/ASHRAE Addendum S5r-2013, Thermal Environmental Conditions for Human Occupancy

This proposed addendum adds a requirement that design calculations shall use generally accepted engineering standards. The following definition is reproduced from ASHRAE/IES Standard 90.1-2010 for the convenience of reviewers: generally accepted engineering standard: a specification, rule, guide, or procedure in the field of engineering, or related thereto, recognized and accepted as authoritative.

ANSI/ASHRAE Addendum 62.1a-2014, Ventilation for Acceptable Indoor Air Quality

This proposed addendum clarifies Section 5.9.2 regarding the conditions under which the ventilation system must be operated to provide exfiltration. It also proposes a change to the definition of ‘exfiltration’ in Section 3 and modifies Section 6.2.7.1.4 to require compliance with 5.9.2, rather than restating requirements which may possibly become inconsistent with 5.9.2.

ANSI/ASHRAE Addendum 62.1c-2011, Ventilation for Acceptable Indoor Air Quality

This proposed addendum extends Table 6-4 and no performance or demand controlled alternative exists in the standard. This proposed addendum was drafted in response to a change proposal requesting that demand controlled exhaust systems be allowed for enclosed garages. The SSPC was not comfortable with specifying controls of such variable exhaust rates, but did conclude that it was appropriate to add an alternate exhaust rate design procedure that allows the designer a performance path.

ANSI/ASHRAE Addendum 62.1d-2011, Ventilation for Acceptable Indoor Air Quality

This proposed addendum adds an exception to Section 5.8 (Particulate Matter Removal). In sensible-only cooling (i.e. sensible-only chilled beams) the equipment’s purpose is to provide only sensible cooling. In this case the coil surface would never be wet and the filtration requirements intended for wetted surfaces should not apply. Latent cooling for these systems would be provided by other portions of the system, such as cooling coils in the primary air stream, which would then have independent upstream air filtration.
ANSI/ASHRAE Addendum 62.1e-2011, Ventilation for Acceptable Indoor Air Quality

This proposed addendum has been issued in response to a change proposal and is intended to clarify requirements for system control in Section 5.3 needed to assure that provided ventilation rates meet the standard at all conditions.

ANSI/ASHRAE Addendum 62.1e-2016, Ventilation for Acceptable Indoor Air Quality

This proposed addendum modifies Section 8, Operation and Maintenance, incorporating calibration requirements for airflow monitoring sensors and systems. The requirements in the proposed Table 8.4.1 (Minimum Maintenance Activity and Frequency) were initially based on requirements in ASHRAE/ACCA Standard 180-2012, Standard Practice for Inspection and Maintenance of Commercial-Building HVAC Systems, although the SSPC has modified some of those requirements.

ANSI/ASHRAE Addendum 62.1f-2016, Ventilation for Acceptable Indoor Air Quality

In preparation for publication of Standard 62.1-2016, this proposed addendum updates the normative references. This process includes reviewing the references to ensure that their content has not been changed such that they should no longer be referenced and that they are written in normative language. References that are not in normative language are being moved to a new Informative Bibliography. In some cases, the language of the Standard where these documents are referenced need to be modified. In particular, changes to the notes to Table 5.5.1 are made for avoid referencing non-normative documents and to improve the normative language used.

ANSI/ASHRAE Addendum 62.1g-2010, Ventilation for Acceptable Indoor Air Quality

This proposed addendum has been developed in response to a change proposal; with additional changes resulting from public review comments. It provides additional information for demand controlled ventilation (DCV) systems to augment Section 6.2.7 Dynamic Reset.

ANSI/ASHRAE Addendum 62.1g-2016, Ventilation for Acceptable Indoor Air Quality

This proposed addendum is from a change proposal submitted from outside the SSPC. The proposer pointed out that the addendum provided an exception which essentially allows coils which are very difficult to clean as long as ‘instructions for . . . cleaning’ are provided. The SSPC agrees that providing instructions does not make cleaning these coils any more feasible, and therefore the exception should be deleted.

ANSI/ASHRAE Addendum 62.1h-2012, Ventilation for Acceptable Indoor Air Quality

62.1-2010, Table 6-1, includes ventilation rates for “Sports arena (play area)” and “Gym, stadium (play area).” Both space types have ventilation rates base on floor area only, the per person rate is zero. Users of the standard have expressed interest in applying demand controlled ventilation to these space types, which is effectively prohibited by the lack of a per person component to the ventilation rate. This proposed addendum replaces both of these space types with “Gym, Sports Arena (play area),” with \( R_p = 20 \, \text{cfm/person and } R_a = 0.06 \, \text{cfm/ft}^2 \) and assigns this new space type with an air class of 2 rather than class 1 from the first publication public review version.

ANSI/ASHRAE Addendum 62.1h-2016, Ventilation for Acceptable Indoor Air Quality

The changes to the standard in this proposed addendum are for the purpose of complying with ASHRAE’s mandatory language policy for standards. The changes are intended to clarify the requirements and reduce ambiguity in interpretation and enforcement. Many of these changes will change requirements of the standard.

ANSI/ASHRAE Addendum 62.1i-2016, Ventilation for Acceptable Indoor Air Quality

This proposed addendum changes Appendix F (Separation of Exhaust Outlets and Outdoor Air Intakes) from informative to normative. This proposed addendum is for the purpose of making language in the standard mandatory in compliance with current ASHRAE requirements.

ANSI/ASHRAE Addendum 62.1j-2009, Ventilation for Acceptable Indoor Air Quality

This proposed addendum clarifies when, at a minimum, the ventilation systems shall be operated.

ANSI/ASHRAE Addendum 62.1j-2013, Ventilation for Acceptable Indoor Air Quality

This proposed addendum adds requirements to the IAQ Procedure for determining minimum ventilation rates which require consideration of the combined effects of multiple contaminants of concern on individual organ systems. This ‘additive’ effect is already implicit in the Ventilation Rate Procedure. This is intended to improve the IAQ Procedure by requiring consideration of these additive effects that are well established in the literature for many organ systems. The change requires identifying those contaminants of concern that act on individual organs and identifying those contaminants as a ‘contaminant mixture of concern.’

ANSI/ASHRAE Addendum 62.1k-2009, Ventilation for Acceptable Indoor Air Quality

This proposed addendum corrects language in Note 2 of Table 6-1 to make it consistent with terminology used elsewhere in the standard.

ANSI/ASHRAE Addendum 62.1k-2014, Ventilation for Acceptable Indoor Air Quality

This proposed addendum modifies the standard such that laboratory exhaust is assigned a default of Air Class 4, but explicitly allows a responsible EH&S professional to determine that a lower air class is appropriate for particular systems. If they assign a lower air class, then the use of heat wheel energy recovery would be allowed. The SSPC believes that determination of the appropriate air class is best made by a qualified professional on a case by case basis.

ANSI/ASHRAE Addendum 62.1m to Standard 62.1-2010, Ventilation for Acceptable Indoor Air Quality

This proposed addendum resulted from a change proposal that recommended adding the National Standards for Total System Balance issued by the Associated Air Balance Council (AABC) as an equivalent method of balancing ventilation systems in Section 7.2.2. Public review comments argued that it was inappropriate to include a list of equivalent standards and that it was difficult for enforcement personnel to determine if other standards were “equivalent.” The SSPC decided to restrict the list to ASHRAE 111, and revise the language to ‘national standard’ to make it clear that standards by SMACNA, AABC and others were acceptable.

ANSI/ASHRAE Addendum 62.1n-2013, Ventilation for Acceptable Indoor Air Quality

This proposed addendum increases the filter requirements from MERV 6 to MERV 8. This will reduce the potential for particulate deposition on cooling coils that could lead to biological or other contamination on the coils. In addition, it brings the requirement inline with ANSI/ASHRAE/USGBC/IES Standard 189.1-2011, Standard for the Design of High-Performance Green Buildings.

ANSI/ASHRAE Addendum 62.1p-2015, Ventilation for Acceptable Indoor Air Quality

At present, all occupancy types are required to provide no less than the area component of the minimum ventilation rate during periods when the space is ‘expected to be occupied.’ A previous interpretation clarified that this prohibited the use of occupancy sensors to reduce the ventilation rate to zero during these times. This proposed addendum would allow the ventilation to be reduced to zero through the use of occupancy sensors (not through contaminant or CO2 measurements) for spaces of selected occupancy types. These occupancy types are identified by a new Note H to Table 6.2.2.1 (Minimum Ventilation Rates in Breathing Zone).

ANSI/ASHRAE Addendum 62.1q-2010, Ventilation for Acceptable Indoor Air Quality

Designers who choose to use the IAQ Procedure must identify contaminants of concern. Table B-3 lists some volatile organic compounds which designers might want to consider as possible contaminants of concern. Also, the impact of mixtures of some contaminants on humans may be considered to be ‘additive’ (this is a basic assumption in the Ventilation Rate Procedure). To encourage designers to consider ‘additivity’ when applying the IAQ Procedure, some guidance from the ACGIH has been included in the informative text.
ANSI/ASHRAE Addendum 62.1q-2015, Ventilation for Acceptable Indoor Air Quality
This proposed addendum modifies Section 5.2 (Exhaust Duct Location) to clarify requirements by including air classes instead of descriptive language, and modifies the requirements by allowing positively pressured exhaust ducts inside the space of origin. It also modifies the air class of residential kitchen hoods.

ANSI/ASHRAE Addendum 62.1r-2010, Ventilation for Acceptable Indoor Air Quality
This proposed addendum modifies the IAQ procedure in Section 6.3 and its description in Section 6.1. It addresses compliance issues that may result from unclear wording or phrasing. It makes a mass balance analysis a required part of the IAQ procedure. This proposed addendum requires that performance of IAQ procedure designed systems be tested similar to the requirements to test VRP designed systems or that it be based on the tested performance of a design for a similar zone, with added requirements for determining whether a zone is similar.

ANSI/ASHRAE Addendum 62.1s-2014, Ventilation for Acceptable Indoor Air Quality
This proposed addendum deletes Sections 6.2.7.1.2 and 6.2.7.1.3, and removes an informative note to Section 6.2.7.1.1. The deleted sections remove language which was potentially confusing, retaining the essential requirement for DCV as stated in Section 6.2.7.1.1. The changes remove the assumption that the Standard is intended for use only as calculations for code review and not physical operation. Proposed changes to Section 5.9.2 clarify the requirements and extend them to apply under conditions of DCV control operation.

ANSI/ASHRAE Addendum 62.1t-2010, Ventilation for Acceptable Indoor Air Quality
This proposed addendum modifies normative Appendix A, and associated Section 6.2 requirements. (1) It reduces compliance issues that may result from unclear wording or phrasing, especially for VAV systems. (2) It improves nomenclature consistency between the body of the standard and the appendix. (3) It moves key equations from textual definitions to the body of the Appendix. (4) It clarifies the design conditions (including minimum expected discharge airflow and highest expected system primary airflow) used to calculate worst-case intake airflow for multiple-zone recirculating systems.

ANSI/ASHRAE Addendum 62.2a-2014, Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings
Standard 62.2 determines required ventilation flow rates as a function of floor area. However, floor area is not defined in the standard. This has created confusion, especially with regard to unfinished basements. This proposed addendum provides a definition of floor area for use with the standard that will produce more consistency in the application of the standard.

This proposed addendum adds the option of using a filter tested in accordance with AHRI Standard 680 -2009 which relies on procedures specified in ANSI/ASHRAE Standard 52.2-2007. Note: This change proposal is responsive to interpretation request IC 62.2-2007-7 currently posted on the ASHRAE website at http://www.ashrae.org/technology/page/121.

ANSI/ASHRAE Addendum 62.2c-2011, Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings
In existing buildings, which are often substantially leakier than new construction even after air sealing, it is common for the calculation of ventilation requirements to result in very small flow rates. Full application of Standard 62.2 would then require substantial effort and cost to be undertaken for little change in outdoor air delivery to the home. This proposed addendum provides a minimum air flow requirement for existing buildings below which installation of whole-house ventilation is not required.

For testing and rating fans, Standard 62.2 currently references only the HVI standards but not the ASHRAE and AMCA standards upon which they are based. Adding these standards to Section 7.1 of 62.2 makes it clear as to the basis of these requirements.

This proposed addendum adds an appendix to allow some optional pathways that will only be applicable for previously occupied buildings. The major focus is to overcome the barriers that exist to application of the standard in existing buildings. Many requirements that are easy to meet at the original design and construction stage may be very difficult or extremely expensive at the retrofit stage. This appendix offers some options that allow a bit more flexibility. The biggest conceptual change is to provide alternative methods for meeting the local exhaust requirement in kitchens or baths that do not have what is currently required by 62.2.

This proposed addendum would require HVAC systems covered by Section 6.7 to be designed to accommodate the pressure drop imposed on them by the installed filters to ensure that sufficient airflow is not inhibited. This proposed change includes a requirement to provide the needed information on design airflow and maximum allowable clean filter pressure drop so that the filter can be replaced properly. Since the needed information on clean filter pressure drop is not routinely available at present, the proposed change would not take effect until January 1, 2014.

ANSI/ASHRAE Addendum 62.2g-2009, Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings
This proposed addendum accounts for recent data showing what level of air sealing between units is reasonably achievable in new multifamily construction while still providing reasonable protection from contaminants originating in neighboring units.

ANSI/ASHRAE Addendum 62.2h-2012, Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings
This is the second public review of proposed Addendum f with changes based on a comment from the first public review. These proposed changes were made to extend the application range of Table 5.3 and to include some updated values based on newer data.
This proposed addendum updates a reference from an outdated version. The reference is used regarding duct leakage. It makes no substantive changes to the requirements of Standard 62.2.

ANSI/ASHRAE Addendum 62.2g-2011, Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings
This proposed addendum would remove limits on the amount of net exhaust flow of whole house mechanical ventilation systems in hot, humid climates and the amount of net supply flow in very cold climates. The Envelope Subcommittee discussed Section 4.6 and decided that the restrictions were not justified by recent field experience. There was general agreement that the problems in both hot/humid and cold climates were caused by specific and easily avoidable errors in envelope design that could not be solved by the system restrictions in Section 4.6.

ANSI/ASHRAE Addendum 62.2g-2014, Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings
With regard to multifamily dwellings, currently 62.1 has responsibility for buildings 4 stories or more and 62.2 for 3 stories and less. The ventilation rates for dwelling units in 62.1 are different from the rates in 62.2. 62.1 does not address modest retrofits whereas 62.2 does. This scope change would do away with the building height separation, bringing the dwelling units themselves into 62.2 regardless of height. This will allow for consistency within dwelling units and also allow application of ASHRAE ventilation standards to the multifamily retrofit market.

ANSI/ASHRAE Addendum 62.2h-2011, Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings
This proposed change to Appendix A provides clarifications, with one exception (the Section A2 addition). All the other changes (except the A2addition) are minor, clarifying rather than altering the intended meaning. Currently Appendix A does not indicate whether to apply the infiltration credit, Section 4.1.3, before or after Section A3. In some cases, the order in which Sections A3 and 4.1.3 are applied will affect the final whole-building ventilation rate (in cases where Section 4.1.3 zeros out the whole-building ventilation rate). It seems logical to use the order stated in the proposed change to Section A2.

ANSI/ASHRAE Addendum 62.2h-2015, Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings
Combined exhaust/supply terminations are regularly specified and provided with heating and energy recovery ventilators. Their use reduces building penetrations, labor, and associated system costs. Air leakage can also be reduced, resulting in space conditioning energy savings. The durability of the structure can be improved through reducing entry pathways for bulk water. Manufacturer tests have shown that minimum cross-contamination of airflow results. There is currently no industry standard to test these units, so we propose that their performance be verified by the manufacturer.

ANSI/ASHRAE Addendum 62.2i-2011, Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings
The current methodology for intermittent ventilation ignored the impact of infiltration on the equivalent annual dose calculation which is the basis of this requirement. This new methodology assumes an infiltration rate of 0.02 cfm/sq. ft. of floor area and an occupancy area of 400 sq. ft./person. Higher occupancy areas and/or higher infiltration rates would result in lower equivalent annual doses than the proposed new methodology. In general, this new methodology results in lower allowable intermittent ventilation rates.

ANSI/ASHRAE Addendum 62.2j-2010, Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings
This proposed addendum is only to clarify the intent of the standard that fans used for whole-house ventilation should be relatively quiet (1 sone) compared to those that are manually controlled for local exhaust needs (3 sones).

ANSI/ASHRAE Addendum 62.2j-2012, Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings
This proposed addendum adds new definitions, revises Sections 6 and 7, and adds a new Section 8 with requirements specific to multifamily buildings. The proposed changes to requirements account for unique features of multifamily buildings compared to single-family buildings and include adjusting the whole building ventilation rate due to the fact that infiltration cannot be relied on for individual units in multifamily buildings, provision of ventilation to common spaces and common parking garages which do not exist in single-family buildings, and prevention of contaminant transfer from other units through walls or ducts.

ANSI/ASHRAE Addendum 62.2j-2015, Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings
To date, no multifamily homes of even 2+ units has been able to get credit for any infiltration. This proposed change is to allow horizontally-attached single family homes to take a reduced infiltration credit, proportional to the percentage of exterior surface area that is not common. Fire-rated common walls typically have similar airtightness to other exterior walls, so this is a reasonable approximation of the effect of infiltration on attached housing.

ANSI/ASHRAE Addendum 62.2k-2012, Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings
This proposed addendum clarifies the difference between intermittent whole-house ventilation and intermittently operating local exhaust ventilation by adding a definition for intermittent ventilation and revising the language in Sections 5 and 7 to refer to demand controlled local exhaust.

ANSI/ASHRAE Addendum 62.2L-2011, Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings
This proposed addendum revises the proposed requirement for a carbon monoxide alarm to refer to NFPA Standard 720, Standard for the Installation of Carbon Monoxide (CO) Detection and Warning Equipment, which includes provisions that cover the installation, location, performance, inspection, testing, and maintenance of carbon monoxide detection and warning equipment.

ANSI/ASHRAE Addendum 62.2L-2017, Ventilation and Acceptable Indoor Air Quality in Residential Buildings
The current standard allows single-point blower door testing when determining an infiltration credit. This proposed change reduces the equations that are currently in the standard to a single, simple equation that is consistent with the use of a single-point test rather than requiring the user of the standard to go through the entire set of equations including intermediate steps. This proposed change will make infiltration credit calculations simpler for those using a single-point blower door test.

ANSI/ASHRAE Addendum 62.2m-2010, Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings
This proposed addendum revises and extends duct tightness requirements. It moves the duct-tightness requirements for ducts in garages to a new subsection 6.5.2, and expands its coverage to all unconditioned spaces. It keeps the original prescriptive language regarding the air-tightness of the garage-house interface in subsection 6.5.1. In order to clearly identify when this new provision applies for ducts in unconditioned crawlspaces, subsection 6.5.2 refers to the pressure boundary and an additional clarification was added to the definition of pressure boundary.

ANSI/ASHRAE Addendum 62.2m-2012, Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings
This proposed addendum deletes Section 4.1.2 Alternative Ventilation which allows for 'other methods' to be used to provide the required ventilation rates but provides no guidance. The proposed addendum adds a new Section 4.6 Equivalent Ventilation which along with a new definition for annual exposure provides a basis for alternative ventilation system designs by requiring that they provide the same or lower annual exposure as would be provided by complying with Section 4.1.
ANSI/ASHRAE Addendum 62.2m-2015,
Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings

This proposal change integrates multifamily buildings into the rest of the standard rather than leaving them in a separate section. This makes it more clear that multifamily dwelling units and single-family homes are subject to the same requirements. No changes to the requirements themselves have been proposed with this change proposal.

ANSI/ASHRAE Addendum 62.2n-2010,
Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings

This proposed addendum corrects an error in the values of Table 4.2 that were published in Addendum b to Standard 62.2-2007. Ventilation Effectiveness is a function of the ceiling height and occupant density (bedrooms per unit volume) of a dwelling. The values in current Table 4.2 in Addendum b were unintentionally based on a 3-bedroom house with 2500 ft^2 of floor area and 8-foot ceilings but were intended to be based on a small dwelling to be sufficiently conservative. The table is being corrected based on a more ‘typical’ 3-bedroom house with 1764 ft^2 and 8-ft ceilings.

ANSI/ASHRAE Addendum 62.2n-2012,
Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings

This proposed addendum to 62.2 incorporates a revised method of calculating infiltration airflow using normalized leakage, with a revised height adjustment exponent, and a new Appendix that includes weather and shielding factor (wsf) values. This infiltration airflow rate would then be used to determine the required mechanical ventilation fan flow rate requirement for meeting the standard.

ANSI/ASHRAE Addendum 62.2o-2016,
Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings

The committee approved a proposal to change references to ‘whole-building’ or ‘whole-house’; ventilation to ‘dwelling unit’; ventilation in the main body of the standard. This proposed change will ensure that the same nomenclature is used in Normative Appendix A (Existing Buildings), for consistency.

ANSI/ASHRAE Addendum 62.2p-2010,
Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings

Builders and code authorities using 62.2-2007 are unsure which systems can use the prescriptive sizing approach and which systems need to measure airflow. For some systems the current requirements are ambiguous as to which airflow must be measured. This proposed addendum moves the requirements in Section 7.3 to the relevant sections (Sections 4 and 5) to clarify the application of the airflow measurement requirements.

ANSI/ASHRAE Addendum 62.2p-2016,
Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings

The intent of Section 7.2.2 Demand-Controlled Local Exhaust Fans) is to require fans to have at least one speed setting meeting the minimum required exhaust airflow rate where the corresponding sone rating is 3 or less. This proposed change would clarify this intent. Currently, the language in this section would permit any fan with a high speed setting exceeding 400 cfm to be exempt from the sone requirement, even if operating on a lower speed setting. Closing this loop hole will ensure that occupants that have typical sized range hoods will have at least one speed setting rated &8804; 3 sone.

ANSI/ASHRAE Addendum 62.2q-2010,
Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings

Builders and code authorities are unsure what is required to comply with the current language of Section 6.1. This proposed addendum clarifies the requirements.

ANSI/ASHRAE Addendum 62.2q-2012,
Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings

Historically, local exhaust fans have been permitted to serve the dual function of providing whole-house ventilation and local exhaust. When serving as dual-duty fans, the whole-house rate and the local exhaust rate have not been required to be additive. This proposed change is needed to clarify that the whole building ventilation rate can be credited towards the local exhaust rate, and that the rates are not required to be additive.

ANSI/ASHRAE Addendum 62.2r-2010,
Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings

This proposed addendum clarifies the language in Section 4.1.3 (Infiltration Credit) without changing the intent. The added text inserts language to the standard consistent with an interpretation provided in 2007.
ANSI/ASHRAE Addendum 62.2v-2013, Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings

The SSPC has had comments from users of the Standard, especially Appendix a, that they did not understand which height was to be used when calculating the Normalized Leakage. This proposed change would clarify the intent of the Standard on how to calculate the building height.

ANSI/ASHRAE Addendum 62.2w-2016, Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings

This proposed addendum updates the normative references in anticipation of publishing the 2016 edition of Standard 62.2.

ANSI/ASHRAE Addendum 84a-2013, Method of Testing Air-to-Air Heat/Energy Exchangers

This proposed addendum clarifies the standard in three areas. Equation (14) is modified to clarify which airstream the specific heat Cp is evaluated. Text near Equations (22) and (23) is re-arranged for clarity. Two sets of uncertainty limits had been provided for Equations (24), (25) and (26), in this proposed addendum each equation is provided with a single, unambiguous uncertainty limit.


This addendum updates all references in Standard 90.2

ANSI/ASHRAE Addendum a to ANSI/ASHRAE Standard 140-2014, Standard Method of Test for the Evaluation of Building Energy Analysis Computer Programs

The purpose of this addendum is to add a new set of test cases within new Section 5.2.4 of Standard 140. These test cases use the results of verified detailed numerical models for ground-coupled heat transfer as a secondary mathematical truth standard for comparing the results of models typically used with whole-building energy simulation software. The new test cases use an idealized uninsulated slab-in-grade configuration (slab interior surface level with exterior soil surface).


In Table 6.1.4.1, the same compound is listed under two names: 2-butunanone and MEK. This addendum fixes the double entry. It also changes the table so that two different concentrations are no longer required for the same test.

ANSI/ASHRAE Addendum a to ANSI/ASHRAE Standard 200-2015, Methods of Testing Chilled Beams

This addendum updates the normative and informative references.


This addendum changes the intermediate compressor speed for the intermediate heating test from 1/2 of the speed between minimum capacity (k = 1) and the speed for maximum capacity (k = 2) to 1/3 for variable capacity systems.

ANSI/ASHRAE Addendum ak to ANSI/ASHRAE Standard 34-2010, Designation and Safety Classification of Refrigerants

This addendum adds “specific volume at the critical point” calculation requirements for blends to Section 9.5.2.5.

ANSI/ASHRAE Addendum ak to ANSI/ASHRAE Standard 34-20137, Designation and Safety Classification of Refrigerants

This addendum adds the zeotropic refrigerant blend R-459A in Table 4-2 and Table D-2.

ANSI/ASHRAE Addendum al to ANSI/ASHRAE Standard 34-2017, Designation and Safety Classification of Refrigerants

This addendum adds the zeotropic refrigerant blend R-459B in Table 4-2 and Table D-2.

ANSI/ASHRAE Addendum am to ANSI/ASHRAE Standard 34-20137, Designation and Safety Classification of Refrigerants

This addendum adds the zeotropic refrigerant blend R-460A in Table 4-2 and Table D-2.

ANSI/ASHRAE Addendum an to ANSI/ASHRAE Standard 135-2014, BACnet - A Data Communication Protocol for Building Automation and Control Networks

This addendum adds Extended Length MS/TP Frames. Since BACnet now supports higher baud rates for MS/TP, increasing the frame sizes will allow better throughput as well as opening up future possibilities that the ability to carry full ethernet-sized frames will enable. The addendum also adds a procedure for determining Maximum Conveyable APDU.

ANSI/ASHRAE Addendum an to ANSI/ASHRAE Standard 34-2017, Designation and Safety Classification of Refrigerants

This addendum adds the zeotropic refrigerant blend R-460B in Table 4-2 and Table D-2.

ANSI/ASHRAE Addendum ao to ANSI/ASHRAE Standard 135-2012, BACnet - A Data Communication Protocol for Building Automation and Control Networks

This proposed addendum updates ReadRange to match changes in the service made by Addendum 2001b; adds Present Value Range to Value Objects; clarifies Reject-Message-To-Network reason #3 DNET; prevents reliance on Static Router Bindings; and adds Property_List Property.

ANSI/ASHRAE Addendum ar to Standard 135 -2013, BACnet - A Data Communication Protocol for Building Automation and Control Networks

This addendum adds new Engineering Units, clarifies Coercion Requirements, specifies SubscribeCOVProperty Error Codes, adds Slave Proxy BBIBs, allows Unicast I-Have messages, and requires both Time Sync Services for Time Masters.

ANSI/ASHRAE Addendum at to ANSI/ASHRAE Standard 135-2014, BACnet - A Data Communication Protocol for Building Automation and Control Networks

This addendum adds an Interface_Value Property, which allows a controller to expose the actual value of the physical input or output in a standard manner.

ANSI/ASHRAE Addendum au to ANSI/ASHRAE Standard 135-2014, BACnet - A Data Communication Protocol for Building Automation and Control Networks

The purpose of this addendum is to deprecate execution of GetAlarmSummary since addendum 135-2010af made the GetEventInformation service execution required for all devices that support event reporting. The addendum also deprecates execution of GetEnrollmentSummary because this complex service does not provide enough information to acknowledge an event.


This is a review of Independent Substantive Changes made since the last public review. This addendum extends the CHANGE_OF STATE event algorithm for all discrete types, adds a new event algorithm CHANGE_OF_DISCRETE_VALUE, adds a new fault algorithm FAULT_OUT_OF_RANGE, extends the Loop Object Type to support specific low and high error limits, adds the ability to report faults to Date and Time Related Value Objects, and adds the ability to report faults to the Command, Device, and Notification Class Objects.

ANSI/ASHRAE Addendum ax to ANSI/ASHRAE Standard 135-2014, BACnet - A Data Communication Protocol for Building Automation and Control Networks

This addendum removes Incorrect Recipient_List Requirement to be Non-empty, removes the Broadcast Requirement for I-Have Requests, extends the Allowable BACnetPropertyStates Enumeration Range, specifically disallows Duplicate Time Entries in Schedules, and clarifies Non-DBMD Responses to BBMD BVRL Requests.
ANSI/ASHRAE Addendum az to ANSI/ASHRAE Standard 135-2014, BACnet - A Data Communication Protocol for Building Automation and Control Networks

The purpose of this addendum is to add Binary Lighting Output Object Type and set Non-zero Values to Change_Of_State_Count and Elapsed_Active_Time.


This addendum applies to the 100% Efficiency Test. This test depends on the test filter absolutely not breaking through at all. Experience has shown that even filters that exceed the requirements of 22+ pounds of sorbent can breakthrough in less than an hour when a few ppb or less can be ~1% breakthrough. Since the ability of the system to measure >99% efficiency can be determined in 5-10 minutes, shortening the test period for the 100% efficiency test makes sense.


This addendum proposes a change to Section 9.8 of Standard 15-2007, which requires pressure relief protection for all positive displacement compressors equipped with a stop valve in the discharge line, regardless of size. The proposed change will bring Standard 15 in alignment with UL 984 (Hermetic Refrigerant-Motor Compressors) and except small compressors due to their self-limiting nature in building excessive discharge pressure if started while breaking through at all. Experience has shown that even filters that exceed the requirements of 22+ pounds of sorbent can breakthrough in less than an hour when a few ppb or less can be ~1% breakthrough. Since the ability of the system to measure >99% efficiency can be determined in 5-10 minutes, shortening the test period for the 100% efficiency test makes sense.


This addendum modifies Section 4.3 of the standard after the SSPC realized that indoor design humidities exceeding 70% RH were excessive and should not be allowed for design analysis. This addendum also modifies Table 4.3.2 based on recent analysis of measured indoor humidity and ventilation data.

ANSI/ASHRAE Addendum b to ANSI/ASHRAE Standard 200-2015, Methods of Testing Chilled Beams

This addendum includes a method of test for water pressure drop method of test, revisions to the normative references, and an update to the dew-point temperature tolerances.


This addendum corrects wording to clarify that the upper element portion of the water heater tank is always heated to 57°C (135°F) at the conclusion of a water heating test, and to correct for any net change in average tank temperature.

ANSI/ASHRAE Addendum b to ANSI/ASHRAE Standard 52.2-2014, Method of Testing General Ventilation Air Cleaning Devices for Removal Efficiency by Particle Size

Currently, ASHRAE 52.2 penalizes the calculated efficiencies for filters when the downstream background counts exceed 5% of the upstream counts. This addendum gives ASHRAE 52.2 the same efficiency calculation across particle counters and upstream concentrations and still requires the reporting of the downstream particle counts that may indicate particle shedding.

ANSI/ASHRAE Addendum c Standard 52.2-2015, Method of Testing General Ventilation Air Cleaning Devices for Removal Efficiency by Particle Size

This addendum addresses the specifications for the aerosol particle counter. Input from several particle counter manufacturers was obtained to help ensure that the proposed recommendations are achievable and practical. Additionally, stringent requirements on the particle counter’s sizing resolution, calibration, sampling rate, and other performance factors are specified. An overall strategy for this revision is to have the specifications sufficiently stringent and comprehensive to provide significantly improved reproducibility while not being more stringent than needed to meet this goal.


This standard test endpoint for the initial efficiency test is 1 h. However, some filters can reach 0.95-1.00 penetration (&#8804;5%) efficiency within this hour. Thus, allowing the test to stop sooner makes sense for these filters. This addendum modifies the initial performance test to allow testing to stop when the test limit exceeds 0.95.


This addendum proposes to update Standard 15 to be consistent with the 2007 version of ASHRAE Standard 34. One of the more significant changes included herein is the removal of the existing Table 1 (refrigerant quantity limits) in Standard 15 with the appropriate references for required refrigerant concentration limits now being made directly to Tables 1 and 2 in ASHRAE Standard 34. This change is intended to remove any inconsistencies in refrigerant concentration limits or classifications between Standard 15 and Standard 34. Appendix C has been deleted in this addendum for the same reason.


This addendum corrects editorial errors that have been identified associated with Sections 10.6 and 10.7 related to the combined space/water heating tests, and it eliminates all of Section 10.7.2, which is not used in the approved version of the standard.


This addendum revises three paragraphs in Sections 4, 7 and 8. Proposed changes to Section 4.1 Building Designer Requirements, now specifies that a building designer shall review the building design and removes the requirement to survey a new building design. Section 7.2.7, Location of Cooling Tower Makeup Valve, removes the requirement to delineate the height of either the discharge outlet or makeup valve relative to the overflow of the tower basin. The requirement for the designer to provide detailed instructions for the commission of all building water systems has been removed from Section 8.4, Commissioning.

ANSI/ASHRAE Addendum d to ANSI/ASHRAE Standard 52.2-2014, Method of Testing General Ventilation Air Cleaning Devices for Removal Efficiency by Particle Size

As a result of ASHRAE RP-1287, relative humidity (RH) was found to be a large contributor to variations in the repeatability and reproducibility of the efficiency of the ASHRAE Standard 52.2-2012 test on particles from 1.0 to 10.0 microns. This addendum suggests adjusting the mandatory relative humidity for performing the test from 20%-65% to 45% &#177; 10.


This proposed addendum is intended to revise Standard 15-2007 to provide appropriate guidance for the protection of positive displacement compressors when used in cascade refrigeration system configurations. There has been a trend toward increased use of cascade systems in refrigeration applications. Cascade systems are being used in supermarkets, refrigerated warehouses, and industrial plants.


This addendum deletes item d from Section 8.12, moves Table 9.7.8.5 to Normative Appendix D, Allowable Equivalent Length of Discharge Piping, and renames it Table D-2, and adds additional data for Piping Nominal Diameter NPS.DN and Tubing Diameter D.D. (Based on Type L Copper) to Table D-2.


This proposed addendum addresses an issue raised by interpretation, IC 62.1-2004-03, clarifying the meaning of “pool deck area” and associated outdoor airflow rate requirements.

ANSI/ASHRAE Addendum i to ANSI/ASHRAE Standard 135-2012, BACnet - A Data Communication Protocol for Building Automation and Control Networks

This proposed addendum defines a new Lighting Output Object type.
ANSI/ASHRAE Addendum k to ANSI/ASHRAE Standard 135.1-2012, Method of Test for Conformance to BACnet

The existing MS/TP tests are not usable without a test tool that implements them. This addendum adds a set of MS/TP tests that can be applied without such a custom test tool.

ANSI/ASHRAE Addendum I Standard 135.1-2012, Method of Test for Conformance to BACnet

This proposed addendum generalizes the Notify_Type test; adds tests for Resizable Array Properties, Acknowledging Offnormal Events, Alarm Summarization, Event Log, Structured View, ReadRange, and Who-Has; corrects the AddListElement and Trend Log COV Subscription Failure tests; removes the testing requirement that Status_Flags be changeable; allows WritePropertyMultiple tests to be applied to Array Properties; modifies the Event Notifications tests to allow use of Event Enrollment Objects; updates expected error codes for Negative COV tests; improves the Basic DeviceCommunicationControl tests; and clarifies, corrects, or removes various other tests.

ANSI/ASHRAE Addendum m to ANSI/ASHRAE Standard 135.1-2012, Method of Test for Conformance to BACnet

This addendum adds a Network Priority test and Virtual Router tests; replaces Time Master tests; and adds Backup and Restore tests, an APDU Retry test, and Workstation Schedule Interaction tests.

ANSI/ASHRAE Addendum n to 135.1-2012, Method of Test for Conformance to BACnet

This proposed addendum restricts the "non-documented" test To Standard Object Types, adds a router binding test, updates the Priority_For_Writing tests, makes the Trend Log tests generic, adds a note to bring testers attention to change in length of BACnetLogStatus, clarifies that "Ignore Remote Packets" test is not for use with intervening router, and modifies the B/IP test for NAT operation.

ANSI/ASHRAE Addendum o to ANSI/ASHRAE Standard 55-2010, Thermal Environmental Conditions for Human Occupancy

This proposed addendum clarifies the normative language that appears in Section 7 (Evaluation of the Thermal Environment) of the body of the Standard. This revised Section 7 provides standardized measurement methods for the evaluation of comfort conditions in existing buildings. The intention is to assist users of the Standard in understanding what is actually happening in buildings. Use of standardized methods allows better comparison among different buildings and in the same building under a variety of conditions. The methods have also been simplified when compared to previous versions of Standard 55.

ANSI/ASHRAE Addendum p to ANSI/ASHRAE Standard 55-2010, Thermal Environmental Conditions for Human Occupancy

This proposed addendum deletes Section 5.3.3.4 (Air Speed Measurement) for consistency with Draft Addendum 55i. The deleted section is mostly informative text. New definitions are added for 'average air speed' and 'average air temperature' to clarify how these commonly used terms apply to averages across the human body. Note that these definitions are also included in Draft Addendum 55n.

ANSI/ASHRAE Addendum q to ANSI/ASHRAE Standard 55-2010, Thermal Environmental Conditions for Human Occupancy

This proposed addendum generalizes the Notify_Type test; adds tests for Resizable Array Properties, Acknowledging Offnormal Events, Alarm Summarization, Event Log, Structured View, ReadRange, and Who-Has; corrects the AddListElement and Trend Log COV Subscription Failure tests; removes the testing requirement that Status_Flags be changeable; allows WritePropertyMultiple tests to be applied to Array Properties; modifies the Event Notifications tests to allow use of Event Enrollment Objects; updates expected error codes for Negative COV tests; improves the Basic DeviceCommunicationControl tests; and clarifies, corrects, or removes various other tests.

ANSI/ASHRAE Addendum r to ANSI/ASHRAE Standard 55-2010, Thermal Environmental Conditions for Human Occupancy

The purpose of this standard is to provide procedures for determining the annual fuel utilization efficiency of residential central furnaces and boilers.

ANSI/ASHRAE Addendum s to ANSI/ASHRAE Standard 55-2010, Thermal Environmental Conditions for Human Occupancy

The fundamental calculation of the Standard requires a summation of building and site energy. To quote from Section 4.1 (not open for comment in this ISC), "Where additional expressions of energy performance or greenhouse gas emissions are made, they shall be determined and expressed in accordance with Sections 4.3 through 4.6. " Basically, to go beyond the calculation boundary of the building and site's energy use requires the direction of an "adopting authority", which does not necessarily mean a government agency, and adoption by that authority of conversion factors expanding on the site energy for a particular purpose. Within that framework further calculation methodologies are offered for primary energy, greenhouse gas emissions and any other authority determined parameter. The choice of the factors used in these further calculations is up to the adopting authority. An informative appendix is included that contains some potential choices for the various multipliers (Annex J). The changes proposed in this ISC provide further distance between the normative calculation methodologies and the informative material in the appendix.

ANSI/ASHRAE Addendum t to ANSI/ASHRAE Standard 55-2010, Thermal Environmental Conditions for Human Occupancy

This proposed addendum generalizes the Notify_Type test; adds tests for Resizable Array Properties, Acknowledging Offnormal Events, Alarm Summarization, Event Log, Structured View, ReadRange, and Who-Has; corrects the AddListElement and Trend Log COV Subscription Failure tests; removes the testing requirement that Status_Flags be changeable; allows WritePropertyMultiple tests to be applied to Array Properties; modifies the Event Notifications tests to allow use of Event Enrollment Objects; updates expected error codes for Negative COV tests; improves the Basic DeviceCommunicationControl tests; and clarifies, corrects, or removes various other tests.

ANSI/ASHRAE Addendum u to ANSI/ASHRAE Standard 55-2010, Thermal Environmental Conditions for Human Occupancy

This proposed addendum generalizes the Notify_Type test; adds tests for Resizable Array Properties, Acknowledging Offnormal Events, Alarm Summarization, Event Log, Structured View, ReadRange, and Who-Has; corrects the AddListElement and Trend Log COV Subscription Failure tests; removes the testing requirement that Status_Flags be changeable; allows WritePropertyMultiple tests to be applied to Array Properties; modifies the Event Notifications tests to allow use of Event Enrollment Objects; updates expected error codes for Negative COV tests; improves the Basic DeviceCommunicationControl tests; and clarifies, corrects, or removes various other tests.

ANSI/ASHRAE Addendum v to ANSI/ASHRAE Standard 55-2010, Thermal Environmental Conditions for Human Occupancy

This proposed addendum generalizes the Notify_Type test; adds tests for Resizable Array Properties, Acknowledging Offnormal Events, Alarm Summarization, Event Log, Structured View, ReadRange, and Who-Has; corrects the AddListElement and Trend Log COV Subscription Failure tests; removes the testing requirement that Status_Flags be changeable; allows WritePropertyMultiple tests to be applied to Array Properties; modifies the Event Notifications tests to allow use of Event Enrollment Objects; updates expected error codes for Negative COV tests; improves the Basic DeviceCommunicationControl tests; and clarifies, corrects, or removes various other tests.

ANSI/ASHRAE Addendum w to ANSI/ASHRAE Standard 55-2010, Thermal Environmental Conditions for Human Occupancy

This proposed addendum generalizes the Notify_Type test; adds tests for Resizable Array Properties, Acknowledging Offnormal Events, Alarm Summarization, Event Log, Structured View, ReadRange, and Who-Has; corrects the AddListElement and Trend Log COV Subscription Failure tests; removes the testing requirement that Status_Flags be changeable; allows WritePropertyMultiple tests to be applied to Array Properties; modifies the Event Notifications tests to allow use of Event Enrollment Objects; updates expected error codes for Negative COV tests; improves the Basic DeviceCommunicationControl tests; and clarifies, corrects, or removes various other tests.

ANSI/ASHRAE Addendum x to ANSI/ASHRAE Standard 55-2010, Thermal Environmental Conditions for Human Occupancy

This proposed addendum generalizes the Notify_Type test; adds tests for Resizable Array Properties, Acknowledging Offnormal Events, Alarm Summarization, Event Log, Structured View, ReadRange, and Who-Has; corrects the AddListElement and Trend Log COV Subscription Failure tests; removes the testing requirement that Status_Flags be changeable; allows WritePropertyMultiple tests to be applied to Array Properties; modifies the Event Notifications tests to allow use of Event Enrollment Objects; updates expected error codes for Negative COV tests; improves the Basic DeviceCommunicationControl tests; and clarifies, corrects, or removes various other tests.

ANSI/ASHRAE Addendum y to ANSI/ASHRAE Standard 55-2010, Thermal Environmental Conditions for Human Occupancy

This proposed addendum generalizes the Notify_Type test; adds tests for Resizable Array Properties, Acknowledging Offnormal Events, Alarm Summarization, Event Log, Structured View, ReadRange, and Who-Has; corrects the AddListElement and Trend Log COV Subscription Failure tests; removes the testing requirement that Status_Flags be changeable; allows WritePropertyMultiple tests to be applied to Array Properties; modifies the Event Notifications tests to allow use of Event Enrollment Objects; updates expected error codes for Negative COV tests; improves the Basic DeviceCommunicationControl tests; and clarifies, corrects, or removes various other tests.

ANSI/ASHRAE Addendum z to ANSI/ASHRAE Standard 55-2010, Thermal Environmental Conditions for Human Occupancy

This proposed addendum generalizes the Notify_Type test; adds tests for Resizable Array Properties, Acknowledging Offnormal Events, Alarm Summarization, Event Log, Structured View, ReadRange, and Who-Has; corrects the AddListElement and Trend Log COV Subscription Failure tests; removes the testing requirement that Status_Flags be changeable; allows WritePropertyMultiple tests to be applied to Array Properties; modifies the Event Notifications tests to allow use of Event Enrollment Objects; updates expected error codes for Negative COV tests; improves the Basic DeviceCommunicationControl tests; and clarifies, corrects, or removes various other tests.


The purpose of Standard 110P is to specify a quantitative and qualitative test method for evaluating fume containment of laboratory fume hoods.


This second public review draft is a proposed revision of Standard 111-1988, which provides uniform procedures for measuring, testing, adjusting, balancing, and evaluating and reporting the performance of HVAC systems in the field. It applies to both the air-moving and hydronic types of building HVAC systems and their associated heat transfer, distribution, refrigeration, electrical-power and control subsystems. It is intended for use by building engineers, operators, users, manufacturers, and installers.

ANSI/ASHRAE Standard 113-2013, Method of Testing for Room Air Diffusion

This standard specifies equipment and procedures for measuring air speed and air temperature in occupied zones of building spaces.

ANSI/ASHRAE Standard 116-2010, Methods of Testing for Rating Seasonal Efficiency of Unitary Air Conditioners and Heat Pumps

in response to comments received during the first public review (September 2007), this second public review draft makes independent substantive changes to the first PR draft. The standard as a whole is being revised to improve its alignment with related ASHRAE and ARI standards, especially ASHRAE Standard 37. Sections 6.6 through 6.13 from Standard 116-1995 (RA 2005) have been deleted and replaced by sections that refer the user to corresponding sections in Standard 37-2005. In addition, the proposed revision incorporates mandatory language throughout, adds the ASHRAE map of climate zones for US locations & updates references.


This revision of Standard 118.1-2008 updates the references, revises the definitions of Type IV and Type V equipment, revises the test methods and performance calculations for all heat pump water heaters, adds appendix 84 to include heat transfer calculations for direct geosexchange and water source heat pump water heaters, and adds appendix 85 to establish test conditions for all heat pump water heaters.

ANSI/ASHRAE Standard 118.2-2006 (R2015), Method of Testing for Rating Residential Water Heaters

The purpose of this standard is to provide test procedures for rating the efficiency and hot water delivery capabilities of directly heated residential water heaters.
ANSI/ASHRAE Standard 130-2016, Laboratory Methods of Testing Air Terminal Units

This revision of Standard 130-2008 specifies instrumentation, test installation methods, and procedures for determining the capacity and related performance in a laboratory controlled environment of constant-volume and variable-volume air terminal units.

ANSI/ASHRAE Standard 133-2015, Method of Testing Direct Evaporative Air Coolers

Standard 133-2008 provides procedures for testing direct evaporative cooling devices under laboratory conditions to obtain rating information. As an ASHRAE method-of-test standard, it is intended to offer recommended practices and accurate measurement procedures. This revision makes one key change to the standard: the density correction to saturation effectiveness has been simplified by clarifying that it shall be reported only as a function of actual test standard airflow.


The purpose of this standard is to define graphic symbols for heating, ventilating, air-conditioning and refrigerating systems.

ANSI/ASHRAE Standard 135-2012, BACnet – A Data Communication Protocol for Building Automation and Control Networks

This protocol provides a comprehensive set of messages for conveying encoded binary, analog, and alphanumeric data between devices including: ____(a) hardware binary input and output values, ____(b) hardware analog input and output values, ____(c) software binary and analog values, ____(d) text string values, ____(e) schedule information, ____(f) alarm and event information, ____(g) files, and ____(h) control logic. This protocol models each building automation and control computer as a collection of data structures called objects, the properties of which represent various aspects of the hardware, software, and operation of the device. These objects provide a means of identifying and accessing information without requiring knowledge of the details of the device’s internal design or configuration.

ANSI/ASHRAE Standard 135.1-2013, Method of Testing Conformance to BACnet

To define a standard method for verifying that an implementation of the BACnet protocol provides each capability claimed in its Protocol Implementation Conformance Statement (PICS) in conformance with the BACnet standard.

ANSI/ASHRAE Standard 135.10-2014, Method of Test for Conformance to BACnet

Error situations were identified for SubscribeCOV in Addendum 135-2008b, but not for SubscribeCOVProperty. This addendum aligns SubscribeCOVProperty error codes with SubscribeCOV.

ANSI/ASHRAE Standard 137-2013 (R2017), Methods of Testing for Efficiency of Space-Conditioning/Water Heating Appliances that Include a Desuperheater Water Heater

This standard covers electric, air-to-air, space-conditioning appliances that include a refrigerant-to-water desuperheater and have rated cooling capacities of less than 65,000 Btu/h.


This standard establishes uniform methods of laboratory testing for rating steady-state thermal performance of ceiling panels used in indoor spaces for sensible heating, sensible cooling, or both. The objective is to rate ceiling panels under repeatable conditions.


The intent of this standard is to provide uniform test methods for rating desiccant dehumidifiers that utilize heat for the regeneration process. This 2015 edition of the standard updates the previous revision by eliminating duplication of content in the published references. All cited references have been updated to the latest versions at the time of publication. In addition, references and recommendations for measurement of moist air properties have been revised to reflect the need for increased accuracy of these measurements.

ANSI/ASHRAE Standard 140-2014, Method of Test for the Evaluation of Building Energy Analysis Computer Programs

Specifies test procedures for evaluating the technical capabilities and ranges of applicability of computer programs that calculate the thermal performance of buildings and their HVAC systems.


The purpose of this addendum is to add a new set of cases, as new Section 5.5 of Standard 140, for testing the ability of whole-building energy simulation programs to model the air distribution side of typical heating, ventilating, and air-conditioning (HVAC) equipment.

ANSI/ASHRAE Standard 143-2015, Method of Test for Rating Indirect Evaporative Coolers

This revision of Standard 143-2007 provides procedures for testing indirect evaporative cooling devices under laboratory conditions to obtain rating information. As an ASHRAE method-of-test standard, it is intended to offer recommended practices and accurate measurement procedures.


This revision of Standard 145.1-2008 provides a standard laboratory test method for assessing the performance of loose granular media used in gas-phase air-cleaning systems. The results of these tests can provide information to the engineer useful for the design and selection of air-cleaning equipment and the design of air-cleaning systems for controlling indoor concentrations of gaseous air contaminants.

This proposed standard provides a laboratory test method for assessing the performance of air cleaning devices used in gas-phase air cleaning systems. The test method is for filters and complete devices designed to be used for in-duct gaseous contaminant air cleaning in their commercial form at full-scale. These gaseous contaminant air cleaning devices are those most often selected for use in building HVAC systems. The results can provide useful information for the design and selection of air cleaning systems for controlling indoor concentrations of gaseous air contaminants.

ANSI/ASHRAE Standard 146-2011, Methods of Testing and Rating Pool Heaters

The purpose of this standard is to provide methods of testing and rating pool heaters.


In 2002 ASHRAE published Standard 147. This revision, Standard 147-2002R, updates the 2002 edition by expanding the number of equipment types and systems covered; by providing significant requirements for field-erected systems; by adding more requirements on leak checking; by adding requirements for systems with larger charges; and by making many formerly recommended practices mandatory. After consideration of comments received on the fourth independent substantive change public review the committee has proposed the changes included in this public review draft.

ANSI/ASHRAE Standard 149-2013, Laboratory Methods of Testing Fans Used to Exhaust Smoke in Smoke Management Systems

This standard establishes uniform methods of laboratory testing and test documentation for fans used to exhaust smoke in smoke management systems.


8/23/1994 This code applies to refrigerating systems and heat pumps used in the occupancies defined in Section 3. It does not apply where water is the primary refrigerant. Application: This Code shall apply to refrigerating systems installed subsequent to its adoption and to parts replaced and components added after its adoption. Equipment listed by an approved nationally recognized testing laboratory is deemed to meet the design, manufacture, and factory test requirements section of this Code, for the refrigerant or refrigerants for which such equipment is designed. Exceptions: In cases of practical difficulty or unnecessary hardship, the authority having jurisdiction may grant exceptions from the literal requirements of this Code or permit the use of other devices, materials or methods, but only when it is clearly evident that equivalent protection is thereby secured.


This standard prescribes a uniform set of testing procedures for determining the cooling capacities and efficiencies of cool storage systems.

ANSI/ASHRAE Standard 152-2014, Method of Test for Determining the Design and Seasonal Efficiencies of Residential Thermal Distribution Systems

This revision of Standard 152-2004 prescribes a method of test to determine the efficiency of space heating and/or cooling thermal distribution systems under seasonal and design conditions. The objective is to facilitate annual energy calculations and heating and cooling equipment capacity calculations.


This standard provides a means for measuring the mass flow capacity of reversing valves used on heat pumps and other refrigerating systems.


SSPC 154 would like to thank the commenters on the first full public review draft of Standard 154-2011R, Ventilation for Commercial Cooking Operations &amp;#8211; After review of the comments and further committee work the following independent substantive changes (ISC) are offered for public review. In addition to several editorial changes and the revision of Informative Appendix C the project committee also revised Section 5.1.1 to permit internal welding of ducts serving Type I hoods, which is allowed by NFPA Standard 96.

ANSI/ASHRAE Standard 158.1-2012, Methods of Testing Capacity of Refrigerant Solenoid Valves

Provides a means of accurately measuring the refrigerant mass flow capacity of solenoid valves. The flow capacity may be expressed in terms of refrigerating effect with various refrigerants by performing simple thermodynamic computations.

ANSI/ASHRAE Standard 158.2-2011, Methods of Testing Capacity of Refrigerant Pressure Regulators

This proposed revision of Standard 158.2 updates the references and makes minor editorial improvements. This standard provides methods of determining the mass flow capacity of refrigerant pressure regulators with sufficient accuracy to facilitate proper engineering application of these devices in systems operating at various conditions with various refrigerants. AHRI Standard 770, Refrigerant Pressure Regulating Valves, requires that this standard be used as a method of test for capacity.


Addendum C gives requirements for carbon dioxide (CO2) refrigeration systems and modifies the requirements for machinery rooms. This addendum revises Section 3 with the addition of new definitions and a changed definition. In addition, this addendum eliminates Section 8.12(d) and completely revises Section 9.2.6.


This addendum makes a change to the requirements for the pressure relief of heat exchanger coils that are capable of being isolated by valves, and exposed to a heating source.


This addendum makes changes to ASHRAE Standard 15-2013. The first change to Section 9.2.1 clarifies the metric unit gage pressure when designing for vacuum. The changes to Section 9.9 give new requirements for the use of pressure limiting devices. The changes to Section 9.11 clarifies that ASME Section VIII Pressure Vessel Design is not required for the water side of heat exchangers, providing certain other design requirements are met. The changes to Section 9.13 stipulates that other types of compression devices that are not specifically listing in the section may be used for the connection of copper tube providing they are agency listed for the refrigeration use.

ANSI/ASHRAE Standard 16-2016, Method of Testing for Rating Room Air Conditioners, Packaged Terminal Air Conditioners and Packaged Terminal Heat Pumps for Cooling and Heating Capacity

ASHRAE Standard 16-1983R (RA 2014) prescribes test methods for determining the cooling and heating capacity of room air conditioners, packaged terminal air-conditioners, and packaged terminal heat pumps.


This is the second public review of proposed new Standard 160. It specifies performance-based design criteria for predicting, mitigating, or reducing moisture damage to buildings depending upon climate, construction type, and HVAC system operation. It applies to all types of buildings, building components and materials. This second public review draft makes independent substantive changes to the first public review draft in response to comments received.

ANSI/ASHRAE Standard 160d-2016, Criteria for Moisture-Control Design Analysis in Buildings

This addendum to Standard 160-2009 updates the References in Section 8.

ANSI/ASHRAE Standard 160e-2016, Criteria for Moisture-Control Design Analysis in Buildings

This addendum revises Sections 6.1 and 7.5 and brings the standard more in line with the current state of knowledge about mold growth while providing a less stringent criterion.
ANSI/ASHRAE Standard 161-2013, Air Quality Within Commercial Aircraft
This second public review draft of proposed Standard 161 makes a number of independent substantive changes to the first public review draft in response to comments received. This standard defines the requirements for air quality in air-carryer aircraft and specifies methods of measurement and testing for compliance with the standard. It considers chemical, physical, and biological contaminants and factors such as moisture, temperature and pressure that may affect air quality.

ANSI/ASHRAE Standard 161a-2017, Air Quality within Commercial Aircraft
This proposed addendum requires documentation of abnormal cabin air quality conditions and provides a recommended template for collecting relevant data.

ANSI/ASHRAE Standard 164.1-2012 (R2016), Method of Test for Residential Central-System Humidifiers
This standard establishes a uniform method of laboratory testing for rating central-system residential humidifiers.

ANSI/ASHRAE Standard 164.2-2012 (R2016), Method of Test for Self-Contained Residential Humidifiers
This standard establishes a method of test for the humidification rate and power input of self-contained humidifiers for whole house applications.

ANSI/ASHRAE Standard 164.3-2015, Method of Test for Commercial and Industrial Isothermal Humidifiers
This standard method of test establishes a uniform method of laboratory testing for rating commercial and industrial isothermal humidifiers.

ANSI/ASHRAE Standard 169-2013, Weather Data for Building Design Standards
This proposed new standard is intended as a comprehensive source of climate data for those involved in building design. It provides a variety of climatic information used in the design, planning and sizing of buildings’ energy systems and equipment and should be a valuable resource available for referencing in building design standards. The weather data has been compiled from ANSI/ASHRAE/IESNA Standard 90.1-2004, ANSI/ASHRAE Standard 90.2-2004, and the 2005 ASHRAE Handbook--Fundamentals.

This revision of Standard 17-2008 prescribes a method of testing capacity of thermostatic expansion valves for use in air-conditioning and refrigeration systems.

ANSI/ASHRAE Standard 170-2013, Ventilation of Health Care Facilities
This fourth public review of proposed Standard 170 makes independent substantive changes to the third public review draft in response to comments received. It clarifies the requirements for reserve cooling, air handling unit design, pressure alarms, exhaust discharges and revises minimum requirements for filter efficiencies and certain space temperatures/humidities. Co-sponsored by the American Society for Healthcare Engineering (ASHE), Standard 170 aims to ensure high quality ventilation in health care facilities.

This revision of Standard 171-2008 is a complete overhaul of the original standard, published in 2008, replacing a static push/pull test method with a cyclical, low-frequency test method and establishing a rating methodology for use with building codes. Restraint capacities determined using the previous version are no longer considered valid.

The purpose of Standard 172-201x is to define a test method to determine the formation of insoluble materials in synthetic lubricants and HFC systems.

ANSI/ASHRAE Standard 173-2012 (R2016), Method of Test to Determine the Performance of Halocarbon Refrigerant Leak Detectors
The practices and procedures of this standard cover the testing of refrigerant leak detectors intended for use in the leak testing or refrigerating, air-conditioning, and heat pump systems and their components.

ANSI/ASHRAE Standard 174-2009, Method of Test for Rating Desiccant-Based Dehumidification Equipment
This proposed standard provides a method of test for rating the overall performance of desiccant-based dehumidification equipment. Desiccant-based systems are typically designed with moisture removal as their primary function and deliver air at lower dew points than typical air conditioning systems. This method of test has been developed to assist in the measurement and documentation of variables needed to establish moisture-removal capacity per unit of energy.

ANSI/ASHRAE Standard 18-2008 (R2013), Methods of Testing for Rating Drinking-Water Coolers with Self-Contained Mechanical Refrigeration
The purpose of this standard are to establish the types of equipment to which the provisions of this standard apply and to define terms describing the equipment covered and terms related to testing.

This standard prescribes methods for testing liquid-to-liquid heat exchangers. To attain this objective, the standard lists and defines the terms for rating liquid-to-liquid heat exchangers and establishes testing methods that are to be used as a basis for obtaining ratings of liquid-to-liquid heat exchangers.

ANSI/ASHRAE Standard 182-2008 (R2013), Method of Testing Absorption Water-Chilling and Water-Heating Packages
The purpose of this standard is to prescribe a method of testing absorption water-chilling and water-heating packages to verify capacity and thermal energy input requirements at a specific set of operating conditions.

ANSI/ASHRAE Standard 184-2016, Method of Test for Field Performance of Liquid-Chilling Systems
ASHRAE Standard 184P prescribes methods for obtaining performance data relating to field-installed liquid-chilling systems.

ANSI/ASHRAE Standard 185.1-2015, Method of Testing UVC Lights for Use in Air Handling Units or Air Ducts to Inactivate Airborne Microorganisms
This standard establishes a test method for evaluating the efficacy of UVC lights for their ability to inactivate airborne microorganisms.

ANSI/ASHRAE Standard 185.2-2014, Method of Testing Ultraviolet Lamps for Use in HVAC&R Units or Air Ducts to Inactivate Microorganisms on Irradiated Surfaces
This standard establishes a test method for measuring the intensity of ultraviolet lamps on irradiated surfaces under typical HVAC&R operating conditions.

The purpose of this document is to establish minimum legionellosis risk management requirements for building water systems. The standard is intended for use by owners and managers of human-occupied buildings, and those involved in the design, construction, installation, commissioning, operation, maintenance and service of centralized building water systems and components.

ANSI/ASHRAE Standard 190-2013, Method of Testing for Rating Indoor Pool Dehumidifiers
The purpose of this standard is to prescribe test methods for determining the moisture removal capacity and efficiency, the pool heating capacity, and sensible and total cooling capacity for indoor pool dehumidifiers.

ANSI/ASHRAE Standard 193-2010 (R2014), Method of Test for Determining Airtightness of HVAC Equipment
This standard prescribes a method of test to determine the airtightness of forced-air HVAC equipment prior to field installation.
ANSI/ASHRAE Standard 194-2012, Method of Test for Direct-Expansion Ground Source Heat Pumps
The purpose of this standard is to provide test procedures for rating factory made residential, commercial, and industrial Direct-Expansion Ground Source Heat Pumps as defined in Section 3.

ANSI/ASHRAE Standard 195-2013, Method of Test for Rating Air Terminal Unit Controls
This revision to the first draft of Standard 195P clarifies that the previous tests defined in the standard may be used individually or together. The stability test is also modified, eliminating the requirement to record the number of times the actuator moves during the test. Finally, the rating condition is extended, calling for the stability test to be executed at a low flow and at maximum flow.

The purpose of this standard is to prescribe test methods for rating DX-Dedicated Outdoor Air Systems (DX-DOAS) Units.

ANSI/ASHRAE Standard 199-2016, Method of Testing the Performance of Industrial Pulse Cleaned Dust Collectors
The purpose of ASHRAE Standard 199P is to provide a quantitative laboratory test method for determining the performance of Industrial Pulse Cleaned Dust Collectors using a test dust.

This standard prescribes methods of laboratory testing to measure the heat rejection capabilities of remote mechanical-draft, air-cooled refrigerant condensers for refrigerating and air conditioning. The objective is to ensure uniform performance information for establishing ratings.

ANSI/ASHRAE Standard 200-2015, Methods of Testing Chilled Beams
The purpose of this standard is to define laboratory methods of testing chilled beams to determine performance. This standard specifies test instrumentation, facilities, installation methods, and procedures for determining the performance of chilled beams. This is a review of Independent Substantive Changes.

This standard prescribes methods of test to determine the range and average operating heat gains of electrical equipment for use in cooling load calculations.

This standard provides uniform test methods and calculation procedures for establishing the efficiencies of multipurpose residential heat pumps for space-conditioning, water heating, and/or dehumidification.

The test procedure discussed in this standard was developed to provide a uniform method of testing for rating the seasonal efficiency of multi-purpose heat pumps, referred to herein as combined appliances, which perform space conditioning and water heating in residential applications. The heat pumps may also provide additional functions, such as ventilation and/or dehumidification. This procedure pulls together past test procedures and U.S. Department of Energy waivers dealing with special design equipment into a single comprehensive procedure covering all existing and anticipated multi-purpose heat pumps.

There is no standard that provides guidance for the design of a building rating system. There are many commercial entities that are rating buildings utilizing a number of different systems yielding varying results. ASHRAE’s Executive Committee spoke with several government and regulatory agencies as to the need and viability for this standard. The feedback received was an overwhelming need for a standard that provides uniformity in the building energy labeling and disclosure process. Std. 214 fulfills this need and is intended to provide a consensus standard that can be used in international, national and regional legislation, policy making, and regulation activity.

ANSI/ASHRAE Standard 22-2014, Methods of Testing for Rating Liquid Cooled Refrigerant Condensers
This revision of Standard 22-2007 updates the Title, Purpose, and Scope; implements mandatory language; adds requirements to use enthalpy for Primary Test Calculation and uncertainty analysis, and adds three informative annexes. Overall, this standard prescribes methods for testing liquid-cooled refrigerant condensers.

ANSI/ASHRAE Standard 23.1-2010, Methods of Testing for Rating the Performance of Positive Displacement Refrigerant Compressors and Condensing Units That Operate at Subcritical Temperatures of the Refrigerant
Despite the change in its title and designation, this proposed 'new' standard is actually a revision of ASHRAE Standard 23-2005, Methods of Testing for Rating Positive Displacement Refrigerant Compressors and Condensing Units. Standard 23 has been revised, renumbered, and given a new scope because ASHRAE is developing a companion standard, Standard 23.2, which will address the testing of positive displacement compressors and condensers using refrigerants like CO2 that operate at supercritical temperatures. This draft revises Standard 23 to restrict it to the testing of such equipment using refrigerants that operate at subcritical temperatures.

ANSI/ASHRAE Standard 23.2-2014, Method of Test for Rating the Performance of Positive Displacement Compressors that Operate at Supercritical Pressures of the Refrigerants
The purpose of this standard is to provide methods of testing for rating the thermodynamic performance of positive displacement refrigerant compressors and compressor units that operate at supercritical pressures of the refrigerant.

ANSI/ASHRAE Standard 24-2013, Methods of Testing for Rating Liquid Coolers
This standard prescribes methods of testing for rating liquid coolers.

ANSI/ASHRAE Standard 25-2001 (R2016), Methods of Testing Forced Convection and Natural Convection Air Coolers for Refrigeration
This standard prescribes methods of testing the cooling capacities and airflow rates of forced convection and natural convection air coolers for refrigeration.

ANSI/ASHRAE Standard 26-2010, Mechanical Refrigeration and Air-Conditioning Installations Aboard Ship
The purpose of this standard is to provide the minimum general requirements for the design, construction, installation, operation, inspection, and maintenance of mechanical refrigerating and air-conditioning equipment aboard ship to permit the safe, efficient, and reliable operation of such systems.

This standard provides uniform methods for laboratory testing of the flow capacity of refrigerant capillary tubes.
This revision of Standard 29-2009 prescribes a method of testing automatic ice makers. Clarification has been incorporated in Section 5 on instrumentation, test equipment, and data acquisition. Section 6 has added detail on water and air temperature requirements during test. Section 7 provides more specific instructions for ice capacity determination sampling. Finally, Annex A has been significantly revised for determination of calorimeter constant and heat of fusion for ice product for continuous type ice makers.

The purpose of this standard is to specify uniform methods of testing for rating the capacity and efficiency of pre-mix and post-mix beverage dispensing equipment.

ANSI/ASHRAE Standard 33-2016, Methods of Testing Forced Circulation Air Cooling and Air Heating Coils
This standard prescribes laboratory methods of testing forced-circulation air-cooling coils, for application under nonfrosting conditions, and forced-circulation air-heating coils to ensure uniform performance information for establishing ratings.

ANSI/ASHRAE Standard 34-2013, Number Designation and Safety Classification of Refrigerants
This standard is intended to establish a simple means of referring to common refrigerants instead of using the chemical name, formula, or trade name. It also establishes a uniform system for assigning reference numbers and safety classifications to refrigerants.

ANSI/ASHRAE Standard 34a-2016, Designation and Safety Classification of Refrigerants
This addendum adds the zeotropic refrigerant blend R-449C in Table 4-2 and Table D-2.

ANSI/ASHRAE Standard 34ae-2016, Designation and Safety Classification of Refrigerants
This addendum adds the zeotropic refrigerant blend R-447B in Table 4-2 and Table D-2.

ANSI/ASHRAE Standard 34aj-2016, Designation and Safety Classification of Refrigerants
This addendum adds the zeotropic refrigerant blend R-458A in Table 4-2 and Table D-2.

ANSI/ASHRAE Standard 34j-2015, Designation and Safety Classification of Refrigerants
This addendum adds the zeotropic refrigerant blend R-451A, to Table 4-2 and Table D-2. The recommended flammability classification 2L is based on an LFL of 7.0 vol.%, a heat of combustion of 9,790 kJ/kg (4,209 BTU/lb), and a burning velocity less than 4 cm/s. The recommended toxicity classification A is based on an adopted OEL of 520 ppm v/v. The recommended ATEL is 100,000 ppm v/v.

ANSI/ASHRAE Standard 34k-2015, Designation and Safety Classification of Refrigerants
This addendum adds the zeotropic refrigerant blend R-452B, to Table 4-2 and Table D-2. The recommended flammability classification 2L is based on an LFL of 7.0 vol.%, a heat of combustion of 9,790 kJ/kg (4,209 BTU/lb), and a burning velocity less than 4 cm/s. The recommended toxicity classification A is based on an adopted OEL of 530 ppm v/v. The recommended ATEL is 100,000 ppm v/v.

ANSI/ASHRAE Standard 34l-2015, Designation and Safety Classification of Refrigerants
This addendum adds the zeotropic refrigerant blend R-513A, to Table 4-2 and Table D-2. The recommended flammability classification is 1. The recommended toxicity classification A is based on an adopted OEL of 650 ppm v/v. The recommended ATEL is 72,000 ppm v/v.

ANSI/ASHRAE Standard 34m-2015, Designation and Safety Classification of Refrigerants
This addendum adds the zeotropic refrigerant blend R-452A, to Table 4-2 and Table D-2. The recommended flammability classification is 1. The recommended toxicity classification A is based on an adopted OEL of 780 ppm v/v. The recommended ATEL is 100,000 ppm v/v.

ANSI/ASHRAE Standard 34n-2015, Designation and Safety Classification of Refrigerants
This addendum modifies Section 6.1.3, Flammability Classification, on required validation tests for burning velocity measurement.

ANSI/ASHRAE Standard 34a-2016, Designation and Safety Classification of Refrigerants
This addendum adds the zeotropic refrigerant blend R-407H, to Table 4-2 and Table D-2. The recommended flammability classification is 1. The recommended toxicity classification A is based on an adopted OEL of 1000 ppm v/v. The recommended ATEL is 92,000 ppm v/v.

This standard establishes a method of testing desiccants for use in refrigerant drying.

The purpose of this standard is to provide test methods for determining the cooling capacity of unitary air-conditioning equipment and the cooling or heating capacities, or both, of unitary heat pump equipment. These test methods do not specify methods of establishing ratings that involve factors such as manufacturing tolerances and quality control procedures.

This revision of Standard 40-2002 adds new definitions, corrects unit conversions for temperature in the definitions of ‘standard air’ and ‘standard temperature,’ revises several sections to use enforceable language, and clarifies Sections 2.3, 4, 9.2.2.1, and 10.10.4.1, 10.4.2, and 10.4.3. Overall, the standard provides test methods for determining the heating and cooling output capacities and energy inputs of unitary air-conditioning and heat pump equipment that is heat-operated.

This revision of Standard 41.1-1986 represents a significant update compared to the previous version that was published in 1986 and reaffirmed in 2006. Updates to this standard include methods for non-contact temperature measurement, additional information for thermistor type devices, descriptions for thermopiles, updated sample tree devices, and the inclusion of uncertainty analysis for temperature measurements.

This standard prescribes methods for refrigerant mass flow rate measurement using flowmeters. This standard applies where the entire flow stream of the refrigerant both enters and exits the flowmeter either as a “vapor only” or “liquid only” state.

ANSI/ASHRAE Standard 41.11-2014, Standard Methods for Power Measurement
This standard prescribes methods for power measurements under laboratory conditions and under field conditions when testing heating, ventilating, air-conditioning, and refrigerating systems and components.

ANSI/ASHRAE Standard 41.3-2014, Standard Methods for Pressure Measurement
This revision of Standard 41.3-1989 updates the descriptions of pressure measurement instruments and provides tables of information to help users quickly identify the specific types of instruments that best suit their applications. New sections have been added regarding the test requirements, measurement uncertainty calculations, and test report. Additionally, this revision meets ASHRAE’s mandatory language requirements.
ANSI/ASHRAE Standard 41.4-1996, Standard Method for Measuring the Proportion of Lubricant in Liquid Refrigerant
This revision of Standard 41.4-1996 prescribes a method for measuring the proportion of lubricant in liquid refrigerant. Test requirements and procedures are also more clearly specified.

ANSI/ASHRAE Standard 41.6-2014, Standard Method for Humidity Measurement
This revision of Standard 41.6-1994 is a result of the completion of ASHRAE research project 1460-15, 'Design Specifications for Water-Bulk Aspirator Apparatus.' Additional updates to this standard include the removal of moist air properties calculations, the inclusion of uncertainty analysis for humidity measurements, and changes to bring this standard into compliance with ASHRAE's mandatory language and SI (I-P) units' requirements. Also, the standard has been arranged consistent with recently published 41-series standards which include a classifications section and updated definitions and references.

This revision of Standard 41.7-1994 expands the scope of this standard to cover the breadth of gas flow measurement devices used for testing heating, ventilating, air-conditioning, and refrigeration systems and components, and to include field gas flow measurements in addition to laboratory gas flow measurements.

Standard 41.8-1989R prescribes methods for liquid flow measurement and applies to laboratory and field liquid flow measurement for testing heating, ventilating, air conditioning, and refrigerating systems and components.

This proposed revision of the Standard 41.9 updates the 2006 edition by citing the most recent reference sources, by making procedural revisions to the lubricant circulation rate measurement in Section 11, and by other revisions to bring this standard into compliance with ASHRAE's mandatory language requirement. Various minor changes make it more usable and easier to read.

ANSI/ASHRAE Standard 52.2-2012, Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size
Establishes a test procedure for evaluating the performance of air-cleaning devices as a function of particle size. Describes a method of laboratory testing to measure the performance of general ventilation air cleaning devices. This is the third public review for this standard. It previously appeared in the April 12, 1996 and November 8, 1996 issues of Standards Action. It is being resubmitted now due to substantive changes made to the original submittal.

ANSI/ASHRAE Standard 55-2013, Thermal Environmental Conditions for Human Occupancy
This fourth draft of Standard 55 contains independent substantive changes (ISC) to the third public review draft. Primary changes include the replacement of the 3 classes of thermal comfort with a single minimum set of requirements, deletion of references to responsible parties, clarifications to the method of compliance, and the addition of an input/output table to Addendum D. Only the indicated parts of the standard are open for comment.

Last Final Action 5/16/1991

This draft of Standard 62.2 focuses on a key issue from prior reviews. For the 2nd review the sound rating for intermittent exhaust fans was set at 1.5 sone maximum. In response to commenters in the home building industry, the requirement was limited to kitchen fans in the 3rd review. It has now been found that building a 1.5-sone fan is more costly than previously thought, so this draft proposes a requirement of 3 sone for both kitchen and bathroom fans. Fans larger than 400 cfm are exempt.

This revision of Standard 63.2-1996 improves clarity of the test procedure and associated calculations and adds test fluid options.

ANSI/ASHRAE Standard 64-2011, Methods of Laboratory Testing Remote Mechanical-Draft Evaporative Refrigerant Condensers
First published in 1974 and revised in 1989, 1995, and 2005, Standard 64 has been updated in this edition in several ways. SI units have now been made the primary units throughout the standard, language like 'should' and 'recommended' that is not enforceable has been removed or revised, references have been updated to the most recent editions, and various minor editorial improvements have been made.

ANSI/ASHRAE Standard 70-2006 (R2011), Method of Testing the Performance of Air Outlets and Air Inlets
The purpose of this standard is to define laboratory methods of testing air outlets and air inlets used to terminate ducted and unducted systems for distribution and return of building air.

ANSI/ASHRAE Standard 72-2014, Method of Testing Open and Closed Commercial Refrigerators and Freezers
This revision of Standard 72-2005 adds Energy Management Devices and Drawer Openings for units with drawers. It also clarifies 'Door and Drawer Openings;' 'Test Probe Locations' for units over 1220 mm (4') in width, 'Electrical Loads' that need to be on during the test,' 'Air Currents' with the test room, and 'Internal Volumes' in Appendix A.

This standard establishes a method for measuring the flow capacity of refrigerant suction line filters and filter-driers.

ANSI/ASHRAE Standard 79-2015, Method of Testing for Fan-Coil Units
This revision of Standard 79-2002 describes testing methods for the capacity of fan-coil units. This is a review of independent Substantive Changes.

This revision of ANSI/ASHRAE Standard 84 provides rules for the testing of air-to-air heat/energy exchangers in both the laboratory and the field. This new edition stipulates the desired uncertainty while allowing laboratories the flexibility of selecting various testing apparatus as long as the uncertainty limits are satisfied. This revision also provides reformatted versions of the fundamental effectiveness equations (1-1) and (1-2) and the developed effectiveness equation (30). Additionally, this edition addresses the impacts on test validity of testing at conditions in which condensate and frost can occur.

ANSI/ASHRAE Standard 86-2013 (R2016), Methods of Testing the Floc Point of Refrigeration Grade Oils
This standard provides a method for measuring the waxing tendency of refrigeration-grade oils.

7/24/1995 This Standard covers new residential dwelling units for human occupancy. For purposes of this Standard, residential dwelling units include single family houses and multi-family structures of three stories (above grade) or fewer including manufactured housing and mobile homes, and does not include transient housing such as hotels, motels, nursing homes, jails and barracks. This Standard covers building envelope, heating and air-conditioning equipment and systems, and provisions for overall building design alternatives and trade-offs. This Standard does not cover specific procedures for the operation, maintenance and use of residential buildings. This Standard does not cover portable products such as appliances and heaters. This Standard does not cover residential electric service wiring or lighting requirements.

ANSI/ASHRAE Standard 93-2010 (R2014), Methods of Testing to Determine the Thermal Performance of Solar Collectors
The purpose of this standard is to provide test methods for determining thermal performance of solar energy collectors that use single-phase fluids and have no significant internal energy storage.
ANSI/ASHRAE Standard 94.2-2010, Method of Testing Thermal Storage Devices with Electrical Input and Thermal Output Based on Thermal Performance
The purpose of this standard is to provide a standard procedure for determining the energy performance of electrically charged thermal energy storage devices used in heating systems.

ANSI/ASHRAE Standard 97-2007 (R2017), Sealed Glass Tube Method to Test the Chemical Stability of Materials for Use within Refrigerant Systems
The purpose of this standard is to establish a test procedure utilizing sealed glass tubes for the evaluation of materials for use in refrigerant systems.

A thorough review of Standard 180-2008 has resulted in improvements, revisions and updates to the tables in Section 5, Required Inspection and Maintenance Tasks. This proposed addendum makes changes deemed necessary to eliminate duplication, list equipment tables in alphabetical order for easier reference, and to consolidate similar equipment where appropriate.

This third public review of proposed Standard 180 makes independent substantive changes to the previous public review draft in response to comments received. Standard 180 is a collaborative effort between ASHRAE and ACCA, Air Conditioning Contractors of America. It establishes minimum HVAC inspection and maintenance requirements that preserve a system’s ability to achieve acceptable thermal comfort, energy efficiency, and indoor air quality in commercial buildings.

This standard establishes requirements for methods and procedures used to perform peak cooling and heating load calculations for buildings except low-rise residential buildings.

ANSI/ASHRAE/ASHE 170h-2016, Ventilation of Health Care Facilities
Currently, in the industry there is a discrepancy in several requirements for environmental conditions in areas of the Sterile Processing Department (SPD) between ASHRAE standards and AAMI standards. ASHRAE standards guide the design of these areas, while AAMI standards guide the operation of these areas. Therefore, some amount of agreement is required between these two groups. In April of 2015 representatives of ASHRAE, AAMI, FGI, AOIN, ASHE and APIC met to discuss these issues. This proposed addendum represents the recommendations for space temperature in several spaces from this group.

ANSI/ASHRAE/ASHE 170ad-2016, Ventilation of Health Care Facilities
This proposed addendum subdivides examination rooms beyond the current division of emergency and non-emergency rooms and establishes air change rates commensurate with the risk within those specialized rooms. Administrative controls (such as assignment of patients to specialized rooms) are an important preventive strategy to supplement the benefit of environmental controls. As such these administrative controls would be applied to people presenting with undiagnosed gastrointestinal, respiratory, or skin infection symptoms, e.g. phone triage, prompt triage to an area away from others, and assignment to a Special Examination Room.

ANSI/ASHRAE/ASHE 170d-2010, Ventilation of Health Care Facilities
Based on recent research, this proposed addendum reduces the lower limit of the design humidity range for eight space types listed in Standard 170-2008: one space in the DIAGNOSTIC AND TREATMENT classification and seven in the SURGERY AND CRITICAL CARE classification. For these eight spaces, which are intended for short-term patient treatment stays, this addendum proposes to reduce the lower design humidity limit from 30% to 20% RH.

ANSI/ASHRAE/ASHE 170f-2016, Ventilation of Health Care Facilities
This proposed addendum clarifies requirements for the Primary Supply Diffuser Array in Operating Rooms and similar spaces.

ANSI/ASHRAE/ASHE 170g-2011, Ventilation of Health Care Facilities
This proposed addendum revises the requirements concerning the application of different types of ventilation diffusers in certain spaces.

ANSI/ASHRAE/ASHE 170m-2016, Ventilation of Health Care Facilities
This addendum proposes an alternate form of providing humidification. It also includes a reorganization of Section 6.6 (Humidifiers) for clarity.

ANSI/ASHRAE/ASHE 170r-2012, Ventilation of Health Care Facilities
The changes included in this proposed addendum are primarily intended to coordinate with the 2010 Guidelines for the Design and Construction of Health Care Facilities. Specific changes include: - the addition of two new definitions: "absorption distance" and "essential accessories"; - a change to Section 5 to clarify that "equipment" refers to non-HVAC equipment, new 6.4.4 to minimize air leakage around filters; - new 6.7.3 on smoke barriers; - new 6.7.4 on smoke and fire dampers; - new 6.7.5 on duct penetrations; - new 6.8 on psychiatric patient areas; and - new 7.5.2 to improve infection control in spaces where patients are likely to be coughing.

ANSI/ASHRAE/ASHE Addendum 170a-2014, Ventilation of Health Care Facilities
This proposed addendum clarifies the separation distance between the outdoor air intake and the flue for a gas-fired packaged rooftop unit.

ANSI/ASHRAE/ASHE Addendum 170ac-2013, Ventilation of Health Care Facilities
This proposed addendum adds requirements for ducted returns for inpatient facilities.

ANSI/ASHRAE/ASHE Addendum 170ae-2014, Ventilation of Health Care Facilities
This proposed addendum represents several changes resulting from coordination with the Guidelines for Design and Construction of Hospital and Health Care Facilities. It adds room design parameters to Table 7-1 (Design Parameters) for continued care nurseries, updates the references to Standard 62.1 from the 2007 to the 2010 edition, and removes a reference to AIA (2001) from Standard 170. It is intended to clarify more stringent requirements for the more serious exhaust airstreams within the standard.

ANSI/ASHRAE/ASHE Addendum 170b-2014, Ventilation of Health Care Facilities
This proposed addendum updates the reference requirements of the Standard.

ANSI/ASHRAE/ASHE Addendum 170c-2016, Ventilation of Health Care Facilities
This proposed addendum updates the terminology requirements of the Standard for Laboratory Work Areas to align with FGI-2014 (reference 2.1-4.1.2) and clarifies minimum requirements.

ANSI/ASHRAE/ASHE Addendum 170c-2016a, Ventilation of Health Care Facilities
This proposed addendum updates the terminology requirements of the Standard for Laboratory Work Areas to align with FGI-2014 (reference 2.1-4.1.2) and clarifies minimum requirements.

ANSI/ASHRAE/ASHE Addendum 170c-2016b, Ventilation of Health Care Facilities
This proposed addendum updates the terminology used for Laboratories to align with FGI-2014 (reference 2.1-4.1.2) and includes provisions to reduce air total change rates in these spaces in certain circumstances.

ANSI/ASHRAE/ASHE Addendum 170d-2015, Ventilation of Health Care Facilities
This proposed addendum clarifies the requirements for certain exhaust discharges. Terminology for the Emergency Department public waiting area is made consistent within the Standard and with the FGI Guidelines (refer to paragraph 2.2-3.1.3.4 from the FGI-2014). Terminology for nuclear medicine hot lab is made consistent within the Standard and with the FGI Guidelines (refer to 2.2-3.6.6.16 paragraph from the 2014 draft, 2010 paragraph 2.2-3.6.3.3).

ANSI/ASHRAE/ASHE Addendum 170e-2014, Ventilation of Health Care Facilities
This proposed addendum clarifies that for spaces with pressure relationship requirements in Table 7.1, Design Parameters, controls shall not be allowed that change the pressure relationship between positive and negative. This requirement was previously only applicable to All Rooms.
ANSI/ASHRAE/ASHE Addendum 170f-2016, Ventilation of Health Care Facilities
This proposed addenda clarifies requirements for the Primary Supply Diffuser Array.

ANSI/ASHRAE/ASHE Addendum 170g-2015, Ventilation of Health Care Facilities
This proposed addenda completes the process of coordinating operating room and procedure room terminology with the 2014 FGI Guidelines.

ANSI/ASHRAE/ASHE Addendum 170k-2016, Ventilation of Health Care Facilities
This proposed addendum clarifies the requirements for Electro-Convulsive Therapy (ECT) Rooms. While these rooms are often referred to as 'procedure'&quot;221; rooms, they are not used to perform the procedures typically performed in Procedure Rooms.

ANSI/ASHRAE/ASHE Addendum 170L-2012, Ventilation of Health Care Facilities
This addendum proposes that the airflow requirements of Section 7.4.1 apply to both Caesarian delivery rooms and Operating/surgical cystoscopic rooms. Both of these spaces are typically already programmed as Class 8 surgeries. This addendum also proposes additional entries for Table 7-1.

ANSI/ASHRAE/ASHE Addendum 170M-2012, Ventilation of Health Care Facilities
This addendum proposes clarifying requirements for the use of fully ducted return systems by recognizing that some spaces require a negative pressure relationship with the adjacent space to ensure a fully ducted exhaust system rather than a return air system. This modification is made in Section 6.7.1, where the standard already has requirements for ducted return systems for spaces with a required pressure relationship. This addendum also proposes adding four additional spaces to meet the requirement for being fully ducted.

ANSI/ASHRAE/ASHE Addendum 170p-2012, Ventilation of Health Care Facilities
This proposed addendum adds entries to Table 7-1. A Nourishment Area or Room is defined by FGI-2010 2.1 -2.6.7. A Nourishment area which is not enclosed by a door is typically adjacent to a patient corridor and is treated similarly in Table 7-1.

This proposed addendum clarifies the Table 7-1 minimum requirements for gastrointestinal endoscopy procedure rooms. The design relative humidity for this short term stay space has been lowered similar to that which occurred for Addendum d (surgeries) and Addendum v (recovery room). It provides clarification concerning design relative humidity requirements for spaces which function to perform gastrointestinal endoscopy procedures and reduces the lower design humidity limit from 30% to 20% RH. It provides clarification concerning the pressure relationship to adjacent area requirements for spaces in which gastrointestinal endoscopy procedures are performed.

ANSI/ASHRAE/ASHE Addendum 170y-2013, Ventilation of Health Care Facilities
This proposed addendum adds restrictions on the use of duct lining. These requirements are similar to those of the 2010 FGI Guidelines for the Design and Construction of Health Care Facilities, but have been clarified.

This proposed addendum clarifies the Table 7-1 (Design Parameters) minimum requirements for Patient rooms. The Patient room table entry with footnote (s.) previously allowed 4 Minimum Total ACH for this space with the use of supplemental heating and/or cooling systems. The Patient room requirements have been clarified such that 4 Minimum Total ACH is the space requirement regardless of the use of supplemental heating and/or cooling systems. The last sentence of footnote (s.) was not revised by this addenda; it was relocated to a new footnote (x.) and reapplied to the same table entry for patient rooms.

This proposed addendum clarifies notes q and w to Table 7-1, Design Parameters.

This proposed addendum adds filtration requirements, in Table 6-1, for inpatient hospice and assisted living facilities. This addendum also adds design parameters, in Table 7-1, for resident unit corridors.

This proposed addendum clarifies requirements for an Emergency Department examination/treatment room. The function of the Emergency Department examination/treatment room is described in FGI-2010 Paragraph 2.2-3.1.3.6.

This proposed addendum revises the requirements for PE rooms regarding filter bank No. 2, exempts relief air from the separation requirements of Section 6.3.1, requires better construction of filter-bank blank-off panels to minimize bypassing, adds specific requirements for temperature control to operating rooms, adds a requirement for differential pressure for morgue and autopsy rooms, and makes various changes to the design parameters of Table 7-1. The aim of these changes is to coordinate the standard with both ASHRAE Standard 62.1-2007 and the Guidelines for Design and Construction of Hospital and Health Care Facilities.
This addendum proposes to add requirements for water bottle filling stations, which are intended to improve water efficiency and sanitation of public drinking water, and to reduce the environmental effects of plastic bottles.

This addendum adds new requirements for reverse osmosis and onsite reclaim water systems in order to reduce the likelihood of excessive water use due to poor design of water treatment and filter system.

This addendum adds new requirements for water softeners to reduce water consumption given the impact of their design and efficiency on water discharge water rates.

This addendum proposes to delete Performance Path B and sections of Appendix C, motivated in part by changes to the Performance Rating Method published in the 2015 Supplement to Standard 90.1-2013.

This addendum adds a requirement for an indoor Environmental Quality (IEQ) occupant satisfaction survey to be included in the post occupancy plan for operation.

The purpose of this addendum is to revise the lighting power density (LPD) requirements in Standard 189.1 to include parking structures.

This addendum revises the lighting power density (LPD) requirements in Standard 189.1 for exterior parking area.

This addendum revises the bi-level motion control requirements to better align with the recently approved Addendum A5 to ASHRAE/IES 90.1-2013.

This addendum updates the normative references in Section 11 and the informative references in Appendix G.

This addendum updates the broad reference in Section 8.3.1 to a wide range of requirements in both Standard 62.1 and Standard 170 to more narrowly cite the specific sections of those standards that are relevant to Standard 189.1.

This addendum proposes revisions to the existing purpose and scope of the standard to clarify the intended purposes of the standard and its application.

This addendum removes the performance option for water use and moves the prescriptive option into the mandatory section.

Addendum v was posted for public review in spring 2016. One public comment was submitted; the comment included both editorial and substantive revisions to the addendum. The revisions, shown below, include updating one of the referenced standards to the most recently published version: ASTM E2843-16a reflects changes that a) make it more compatible with legislative (code) text and b) add flexibility for designers and builders that aim to one section of its requirements.

Relief and return fans are not well addressed by the Standard. It is possible to have fans that have on/off cycling control which results in very poor building pressure control: before the fan comes on, building pressure can be excessive and once it comes on, the building can be pulled negative. This can cause building operators to disable the economizer to avoid these problems. The cost of adding modulating building pressure control is relatively small: the motor can be an ECM or have a VFD and a building pressure sensor is inexpensive.


This proposal establishes air leakage criteria for metal coiling doors where previously there were no criteria.

ANSI/ASHRAE/IES 90.1am-2016, Energy Standard for Buildings Except Low-Rise Residential Buildings

This proposal 1) increases the parking garage lighting reduction in response to no occupancy from 30% to 50%, 2) specifies a 50% reduction in lighting power in response to the presence of daylighting, and 3) removes a duplicate exemption.

ANSI/ASHRAE/IES 90.1an-2016, Energy Standard for Buildings Except Low-Rise Residential Buildings

This proposal removes mandatory local lighting control from restrooms and stairwells. Local control can still be installed when desired.


This addendum addresses how adiabatic and non-adiabatic humidification is handled in the baseline building energy model in Appendix G.


This addendum places the scope limitation of 5 hp fans in DX cooling controls so that it applies to fan horsepower limitation and VAV reset requirements, but not to fan airflow control or fractional horsepower fan motor efficiency, and clarifies that VAV setpoint reset is required only for multiple-zone VAV systems.


This addendum updates footnotes in Tables 6.8.1-1 and 6.8.1-2 and 6.8.1-5 for the requirements for residential air conditioners and heat pumps and furnaces that are covered by US Department of Energy.


The purpose of the proposed changes is to correct the omission of entering'&#8221; in the exhaust air which is equivalent to return air. In one area, 6.5.6.1, the original addendum AR left the word ‘return’&#8221; air while the other instances were changed to ‘exhaust’&#8221; air. This ISC corrects them all to refer to the ‘entering exhaust’&#8221; air of the energy recovery device.

ANSI/ASHRAE/IES 90.1as-2016, Energy Standard for Buildings Except Low-Rise Residential Buildings

This proposal would require activity sensing controls for parking lot lighting with low mounting heights (below 24 feet) and luminaire rated wattage greater than 78 Watts. These controls would reduce lighting power by at least 50% per luminaire when no activity is detected in the zone served by the lighting.

ANSI/ASHRAE/IES 90.1at-2016, Energy Standard for Buildings Except Low-Rise Residential Buildings

This addendum provides clarity for the calibration of daylighting controls by highlighting that having a person in the field of view of the sensor during the calibration would adversely affect the process. Various types of calibration systems exist.


This addendum provides more detail for the baseline model with regard to hot water pumps and chilled water pumps based on changed in Addendum ak to 90.1-2013.

ANSI/ASHRAE/IES 90.1av-2016, Energy Standard for Buildings Except Low-Rise Residential Buildings

This addendum generally adds the phrase 'configured to'&#8221; where 'capable of'&#8221; is used related to HVAC control requirements.


This addendum updates the Exhaust Air Energy Recovery Exceptions.


This addendum clarifies the intent of the standard that the method of attachment is irrelevant in section 5.4.3.1.3.a as the section pertains to materials that are deemed-to-comply air barriers.


This addendum is proposing to make an informative note mandatory, which will mean that all end use loads must be included in both the performance and baseline building designs.


The 2010 edition of the ASME Safety Code for Elevators and Escalators added allowances to permit varying the speed of escalators and moving walks to conserve energy. It does not yet permit automatically stopping and starting of escalators or moving walks. Variable speed technology is common for this application in other countries.


This public review draft modifies Appendix C and Appendix A in response to comments received on the previous addendum bb which modifies all fenestration and opaque assembly requirements in 90.1.


This addendum modifies the fan system operation requirements in the Performance Rating Method (Appendix G) so that fan energy does not have to explicitly be modeled.


This addendum revises the prescriptive criteria for doors in Tables 5.5-0 through 5.5-8. Proposed changes were developed using both cost effectiveness analysis and engineering judgment. Additionally an exception was added for doors with one row (panel) of glazing.


This proposal requires monitoring central chiller plant efficiency in large electric motor driven chilled water plants. The requirement is for plants with a peak chilled water output greater than 1,500 tons. This proposal is designed to help commissioning and ongoing operations of the aforementioned chilled water plants.


This proposal incorporates the requirement to make collected energy related data available with any applicable control systems in a manner that would be useful to building operators.
ANSI/ASHRAE/IES 90.1bi-2016, Energy Standard for Buildings Except Low-Rise Residential Buildings
This addendum limits heating the DOAS supply air to 60°F when the majority of the building is expected to require cooling. This can be established based either on zone conditions or outside air temperature.

This addendum adds a new section for Chilled Water Coil Selection. The analysis showed that the fan energy increase due to the larger coil was more than offset by the pump energy savings, and net first costs were reduced due to smaller piping and pumps, offsetting higher coil costs.

This addendum addresses control of fans in fan powered parallel VAV boxes. The fan is only required during heating; however, these fans may be programmed to run continuously during occupied hours. The addendum also requires the fan operation to be used as the first stage of heating and allows for operation in response to DCV ventilation requests.

This addendum clarifies that water economizers may use dry coolers. Any type of heat or mass transfer is allowed whether dry or evaporative.

- Currently Standard 62.1 establishes the minimum outside air required for ventilation; however there is no upper limit for ventilation in 90.1 prescriptive requirements. This addendum proposes three options for compliance.

This addendum clarifies the wording for exception 5 to Section 5.5.4.4.1 related to the SHGC credit for shading by permanent projections.

ANSI/ASHRAE/IES 90.1bp-2016, Energy Standard for Buildings Except Low-Rise Residential Buildings
This addendum makes the economizer high limit shutoff temperature requirements in Appendix G consistent with the prescriptive requirements in Section 6.

This addendum clarifies when the reheat coil needs to be energized in systems 6 and 8 when using the Performance Rating Method (Appendix G).

ANSI/ASHRAE/IES 90.1br-2016, Energy Standard for Buildings Except Low-Rise Residential Buildings
This revision to Standard 90.1 was developed in response to the update of ASHRAE Standard 169 -2013, Climatic Data for Building Design Standards. This addendum covers criteria for Climate Zone 0 of Section 6, and for the mechanical systems portions Appendix C and G.

This reinstates the current minimum EER levels for air-source variable refrigerant flow (VRF) products above 65,000 Btu/h.

This addendum updates all of the efficiency values for low-voltage dry-type transformers to be consistent with federal law.

ANSI/ASHRAE/IES 90.1bv-2016, Energy Standard for Buildings Except Low-Rise Residential Buildings
This addendum exempts baselines with purchased cooling and heat from the reset control requirements in Appendix G.

This proposed change will provide a baseline for lighting controls consistent with Addendum BM. Credit for automatic occupant control of lighting that is not required in the Appendix G baseline is now established with the occupancy control reduction factors listed in Table G3.7.

This addendum requires a modeler to use the design set point, for multi-zone thermostat systems, which will result in the lowest supply air cooling or highest supply air heating setpoint when modeling per Appendix G.

This addendum requires pipe insulation on the first 8 feet of branch piping.

This addendum replaces the current Table 6.8.1-11 in its entirety and replaces it with a new table to account for the new rating conditions. These new rating conditions add 3 application classes.

The treatment of laboratory exhaust fans is currently not specified. Laboratory exhaust design requires sufficient momentum of exhaust volume to exit the building wake in order to prevent re-entrainment of exhaust air. The standard design approach to accomplish this for VAV supply systems utilizes an outside air bypass damper that ensures a constant stack discharge (brings in OA air to supplement any decrease in exhaust volume from the building). Clarifying this as the baseline approach will make it clear to design teams that other approaches consider to be energy reduction strategies will be acknowledged as such and appropriately credited.

ANSI/ASHRAE/IES 90.1ca-2016, Energy Standard for Buildings Except Low-Rise Residential Buildings
This proposed addendum updates the duct insulation requirements in 90.1 that have been in effect since the 2001 edition of the Standard.

This proposed addendum replaces the definition of sidelighting effective aperture that was inadvertently deleted in ASHRAE 90.1-2013. This definition matches the definition in the ASHRAE 90.1-2013 users manual and ASHRAE 189.1-2014.

This addendum adds a new product class and corresponding efficiency requirements for Dedicated Outdoor Air Systems (DOAS). The addendum specified minimum requirements for both air source and water source heat pump models in terms of an Integrated Seasonal Coefficient of Performance (ISCOP).

ANSI/ASHRAE/IES 90.1ce-2016, Energy Standard for Buildings Except Low-Rise Residential Buildings
This addendum increases the minimum ERV requirements from zero to a reasonable minimum size for smaller units. With this addendum, the supply air requirements at various outside air fractions are reduced so at least 40 cfm of outside air is available for recovery for continuous ventilation systems in the coldest climate zones.
This proposed addendum modifies the exterior Lighting Power Densities for both space by space and building area to include LED technology as part of the basis for the LPD values. This draft and announcement replaces the announced 30 day public review from Dec. 4, 2016.


This addendum was modified for a second public review in response to comments received on the first public review draft. The changes involve clarification of the proper design wet bulb temperature to use for selecting the cooling tower as well as the design cooling tower approach, which is defined as the leaving water temperature minus the entering air wet-bulb temperature.


This proposed addendum adjusts the equations for fenestration orientation in Section 5.5.4.5 by requiring a lower SHGC for west and east facing fenestration, and by allowing the use combinations of fenestration area, exterior shading, and SHGC to demonstrate compliance.


This addendum makes a change to control set point for the cooling tower to better scale with its climate, clarifies the operation of the condenser water pump as a constant volume pump, and modifies the exception for pump W/GPM for water side economizer by changing the increased power of 5 W/GPM to 3 W/GPM.


This addendum revises Table 7.8 to relocate the minimum efficiency requirements for residential water heaters and pool heaters which are established by the U.S. Department of Energy in an informative appendix.

**ANSI/ASHRAE/IES 90.1cm-2016, Energy Standard for Buildings Except Low-Rise Residential Buildings**

This addendum clarifies and simplifies the default U-factors within appendix A for wood panels and wood sub-floors, corrects the dimensional lumber sizes in the tables, and re-organizes the material list by putting similar materials together.


This revision to Standard 90.1 was developed in response to the update of ASHRAE Standard 169 -2013, Climatic Data for Building Design Standards and covers additional criteria for Climate Zone 0 applicable to Appendix G.


The purpose of this addendum is to provide a U-factor calculation procedure for metal building wall assemblies with filled cavity insulation systems and to add U-factor values to Table A3.2.3 calculated using this procedure.


Motors on heat rejection equipment often are supplied with service factors in order to allow for startup and operation in all climates with no motor overload. This clarifies that the maximum motor horsepower based on the service would be used to establish compliance.


While water is the most popular heat transfer fluid in economizers that indirectly cool supply air and reject heat to the atmosphere, any fluid may be used. Lately products using refrigerant as the fluid have come onto the market. These products still have to meet the same requirements for sizing and integration as economizers using water as the fluid.


This proposal updates the motor efficiency standards that are currently shown in Section 6 due to new federal standards will go into effect on June 1, 2016.


This proposal establishes a product class and minimum efficiency for indoor Pool Dehumidifiers.


This addendum clarifies that trade-off credit is not available for unmodified existing building components when using Appendix G as a method for compliance with the standard. It also clarifies that future building components (those not yet designed) are assumed to meet the requirements of Sections 6, 7, and 9 as required by Table G3.1.


This addendum modifies the standard to try to use consistent terminology when a building official or rating authority is responsible for reviewing a model when using the Energy Cost Budget Method or Performance Rating Method.


As a part of process of updating the Normative References in Chapter 12, the reference to Standard SS-2010 was updated to Standard SS-2013. In the 2013 version of Standard SS, the sections referenced by 90.1, Appendix G were renumbered.

**ANSI/ASHRAE/IES 90.1de-2016, Energy Standard for Buildings Except Low-Rise Residential Buildings**

In April 2015 ISO published ISO 25745-2 Energy performance of lifts, escalators and moving walks - Part 2: Energy calculation and classification for lifts (elevators). This addendum references that standard and requires the designer of each new elevator to specify an efficiency level.


This revision to Standard 90.1 provides guidance on the air leakage requirements of two new types of entrance doors, aligns the text of 90.1 with the testing protocol required for Sectional and metal coiling doors, and provides default U-factors for unlabeled metal non-swinging doors.


This addenda makes it clear that exempted display lighting in 9.2.2.3 cannot be provided an allowance in the interior lighting power calculation.

The motor efficiencies for Standard 90.1-2004 were reproduced for Appendix G and use the totally enclosed, four pole, 1800 RPM motors. The language was updated to reference this table. Since this was the last reference to efficiency requirements from other sections the sentence referring to the other sections was removed.


This Addendum proposes an increase in the minimum efficiency requirement for axial fan closed circuit cooling towers as listed in Table 6.8.1-7, Performance Requirements for Heat Rejection Equipment.


The addendum proposal makes changes to section 6.4.1.2 of the ASHRAE 90.1-2013 Standard based on work done by the AHRI 550/590 Engineering committee. In the new AHRI 550/590 (IP)-2015 and AHRI 551/591 (SI)-2015 changes have been made to the IP rating conditions that require an update to the Kadj correction factor in section 6.4.1.2.


This proposal clarifies which pumps in a heating- or chilled-water system are required to be variable flow.


Currently, lighting in dwelling units in high-rise buildings is exempt in both ASHRAE 90.1 and 90.2. The proposed requirements below are similar to those in Energy Star for high efficacy lighting. For this 90.1 proposal, they are simplified to apply to anticipated dwelling units in commercial buildings, support compliance, and are conservative to allow design flexibility. In general, the efficacy requirements will eliminate the use of INC/Halogen sources as well as less efficacious CFL and LED products.

ANSI/ASHRAE/IES 90.1dp-2016, Energy Standard for Buildings Except Low-Rise Residential Buildings

This proposal clarifies the automatic lighting controls requirements for small office spaces.


With new LED technology becoming commonplace, the retail display allowance used for highlighting merchandise and retail displays can be reduced. The proposed new values are based on several sets of analysis that look at the various options for replacing traditional fluorescent and incandescent sources with appropriate LED and LED mix options, and a conservative 25% reduction is proposed for the retail lighting allowance.


With new LED technology becoming commonplace, the additional decorative allowance used for decorative elements in lighting design can be reduced. A conservative 25% reduction is proposed for the decorative lighting allowance.


This addendum corrects the definitions of primary sidelighted area, secondary sidelighted area, and sidelighting effective area to use the term 'vertical fenestration' instead of 'window' to clarify that glazed doors and other fenestration products are included as well as windows. Additionally, the definition of daylight area under rooftop monitors is corrected to include the spread of light beyond the width of the rooftop monitor glazing.


This addendum re-instates a requirement that sensors in high ceiling applications must have a readily accessible calibration point to avoid excessively tall ladders or lifts to perform periodic calibrations.


This proposal corrects the definition of Lighting Power Density (LPD) and adds two related terms, and in addition corrects the use of these terms in the language in Chapters 9 and 11.


This addendum requires water-side economizers for non-fan chilled water systems such as radiant cooling or passive chilled beam systems and for active chilled beam systems.


This addendum updates the language related to the reference to Standard 140. The reference update to Standard 140-2014 was already made in Addendum CO.


The efficiency for the motors used in hydraulic elevators is substantially different than the motor efficiencies used for traction elevators. In addition the hydraulic elevator motors are usually not a type covered by the standard. This change to Addendum dw adds efficiencies for hydraulic elevator motors.


Modifies Appendix G of Standard 90.1 to create a consistent baseline building envelope for the Performance Rating Method. The current version of the Standard specifies that the baseline building envelope of an existing building reflect the existing conditions, rather than the minimum prescriptive requirements of the Standard as specified for new buildings and additions.


This revision to Standard 90.1 generally addresses minor inconsistencies in terminology in sections 5 thru 11 that have developed over time. Terminology is coordinated with the definitions in Section 3.


When preparing documentation to explain the derivation of each number in Table 4.2.1.1 (Building Performance Factors), a single number was found to be inconsistent with the derived values.


The HVAC System Types that apply to Section G.3.1.3.18 Dehumidification did not include some logical system types. This addendum adds HVAC System Types 11, 12 and 13 to that section.

ANSI/ASHRAE/IES 90.1ef-2016, Energy Standard for Buildings Except Low-Rise Residential Buildings

This addendum proposes changes to Table G3.1.1-2, based on updated 2012 CBECs information for baseline service water heating systems.

ANSI/ASHRAE/IES 90.1eg-2016, Energy Standard for Buildings Except Low-Rise Residential Buildings

The sentence that is being removed is no longer necessary since the most common building energy modeling programs are able to simulate integrated water economizers.

ANSI/ASHRAE/IES 90.1ej-2016, Energy Standard for Buildings Except Low-Rise Residential Buildings

This addendum modifies the text to use correct terminology for LED drivers.
- This addendum establishes baseline commercial refrigeration limits for Appendix G which are based on the California Energy Commission Appliance Efficiency Regulations 2005

ANSI/ASHRAE/IES 90.1el-2016, Energy Standard for Buildings Except Low-Rise Residential Buildings
This proposal adds a mandatory requirement for air-cooled direct expansion cooling units with economizers to have basic fault detection and diagnostic (FDD) systems, and were developed in consultation with unitary system and economizer control manufacturers.

This addendum clarifies the exception to the automatic daylight responsive controls requirements for daylight areas under skylights.

ANSI/ASHRAE/IES 90.1g-2011, Energy Standard for Buildings Except Low-Rise Residential Buildings
Adds an additional table 6.8.11 defining the minimum efficiency requirements for commercial refrigerators and freezers. Also adds a reference to AHRI standard 1200 and AHAM standard HRF-1 in Chapter 12.

Amends the minimum energy efficiency standards for water-to-air heat pumps (water loop, ground water and ground loop) listed in Table 6.8.18 of ASHRAE 90.1. These new minimums meet or exceed the Energy Star Tier 1 levels for Ground Water and Ground Source heat pumps that were in effect until 90.1. These new minimums meet or exceed the and ground loop) listed in Table 6.8.1B of ASHRAE criteria for Climate Zone 0 in most climate zone buildings. Criteria are now specified for Climate Zone 0 in most sections of Standard 90.1. The buildings covered by the deleted Exception 2 may potentially use the newly numbered Exceptions 2 and 4 for compliance.

ANSI/ASHRAE/IES 90.1i-2016, Energy Standard for Buildings Except Low-Rise Residential Buildings
This revision to Standard 90.1 was developed in response to the update of ASHRAE Standard 169 -2013, Climatic Data for Building Design Standards. Standard 169-2013 includes more-recent weather data and the creation of a new Climate Zone 0. Criteria are now specified for Climate Zone 0 in most sections of Standard 90.1. The buildings must perform in Section 6.5.3.2.3.

This proposal is in response to comments from the first public review which result in additional revisions to be added in for the transfer air requirements in order to prevent mixing of air between spaces.

Makes the transformer test procedure references in Section 8 consistent with other references in Chapter 6.

ANSI/ASHRAE/IES 90.1L-2016, Energy Standard for Buildings Except Low-Rise Residential Buildings
This public review draft is in response to comments received on the first public review. It moves the whole building air leakage testing into existing Air Leakage and adds clearer guidance on testing representative portions of very large buildings and adds a new exception for buildings unable to comply with the required air leakage rate. It also modifies the verification section to reference the relocated whole building air leakage testing now located in the existing Air Leakage Section of the Standard.

This proposal is in response to comments from the first public review which result in additional exceptions to be added in for the transfer air requirements in order to prevent mixing of air between spaces.

ANSI/ASHRAE/IES 90.1n-2016, Energy Standard for Buildings Except Low-Rise Residential Buildings
This addendum updates the text in Section 3.2 on the definition of conditioned space in Section 3.2 reflects the reduction in loads due to greater energy efficiency.

This proposed change eliminates references to the type of DDC control system, and just specifies how the system must perform in Section 6.5.3.2.3

This addendum modifies the definition in table G3.1 to explain when a conditioned space needs to be modeled in the design model.

This addendum adds requirements for the mechanical systems portions of Section 6, Appendix C, and Appendix G will be included in a separate addendum.

This addendum adds requirements for when a baseline system model should be modeled with a preheat coil.

This addendum adds requirements for when a conditioned space needs to be modeled in the design model.

This addendum updates the text in Section 3.2 on the definitions used with motors, and Section 10.4.1 on the text for small electric motors. For the definitions, many small motors provide information on the input and output power, and the revision will clarify the power rating used for efficiency requirements of small (and large) electric motors.
This independent substantive change accepts in principle a public review comment on addendum "af" that suggested adding the word 'metal' to Section 6.5.4.5.

This addendum covers the addition of a flow turndown requirement to the Standard which will require the use of cooling towers capable of handling modulation of condenser water flow as a means to save energy, and as virtually all heat rejection equipment utilize VSDs on the 7.5 HP fans and above, a requirement to operate the maximum number of fans in a multi-fan installation to minimize energy for a given duty has been added as 6.5.5.2.2.

This addendum limits mechanical cooling for vestibules. An exception for temperature limits is allowed when the vestibule is tempered with transfer air or heated with recovered energy.

This addendum adds requirements for Electronically Commutated Motors (ECM) which are more efficient and are cost effective compared to standard (PSC) motors in applications where the fan runs many hours per day (e.g. toilet exhaust fans, series fan-powered VAV boxes, and fan-coil units) other than those in the airstream that operate only when heating a space since the motor in that case behave essentially as an electric resistance heater.

This addendum adds turndown requirements for boiler systems with design input of at least 1,000,000 Btu/h.

This addendum proposes a new alternative path (power usage effectiveness - PUE) to allow the use of developing technologies for the data center industries for which there are no energy modeling tools available. This is a significant issue to design professionals in that without a simulation program available to model these systems, they have to receive approval from the Authority Having Jurisdiction (AHJ) for an Exceptional Calculation Method, which in most cases is beyond the AHJ’s knowledge level.

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This second public review of addendum "af" makes minor changes to the 1st public review to improved clarity and to address issues identified in sections 6.5.1.3.a and 6.5.3.2.1.

This addendum limits the scope of 6.5.4.1 to heating and cooling hydronic systems since 6.5.4.4 addresses condenser water systems, clarifies the text in the section, lowers the flow limit from 50% to 25%, removes the 10 horsepower size exception, and requires valve position reset for chilled hot water and hot water temperature for DDC systems.

This addendum increases in the minimum efficiency of open circuit axial fan cooling towers from the current 38.2 gpm/HP to 40.2 gpm/HP (at the rated condition of 95°F entering water temperature, 85°F entering water temperature, and 75°F leaving water temperature, and 75°F leaving water temperature, and 75°F leaving water temperature).

This addendum adds a fan power deduction for systems without any central heating or cooling device, a requirement that the sound attenuation credit is only available if there are background noise criteria requirements, and a fan power deduction for systems with electric resistance heating.

This addendum removes the mechanical cooling exception for economizer use in Tier IV datacenters.

This addendum proposes a new alternative path (power usage effectiveness - PUE) to allow the use of developing technologies for the data center industries for which there are no energy modeling tools available. This is a significant issue to design professionals in that without a simulation program available to model these systems, they have to receive approval from the Authority Having Jurisdiction (AHJ) for an Exceptional Calculation Method, which in most cases is beyond the AHJ’s knowledge level.

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This addendum adds a requirement for window switches that integrate operable window positioning to the mechanical ventilation controls.

This addendum adds automatic lighting control to guestroom type spaces for additional energy savings and allow captive key systems that provide similar savings control to also comply...
This addendum modifies the requirements to the functional testing of lighting controls for the common controls required by the standard and adds some clarification to the description of entities allowed to perform the testing and verification.

This addendum makes minor changes to ensure the intended scope of the lighting section.

This addendum increases the spaces where plug shutoff control is required, clarifies the application of the receptacle control requirement to furniture systems, states a labeling requirement, and restricts the use of non-permanent equipment.

This addendum updates the exception related to storm windows under envelope alterations. Storm windows / glazing panels added over existing windows can be either inside or outside, but this is not clear in the current language. Additionally, these products are often referred to by names other than storm windows, and the term 'panel' is more accurate, particularly for products added to the interior of the window.

This addendum modifies the Lighting Power Density tables to make them consistent with the new IES lighting Handbook. In addition, some new occupancy spaces have been added to the table.

This Independent Substantive Change (ISC) to Standard 90.1-2007 Addendum bi provides updates based on comments received during the first public review that closed on August 3, 2009. Addendum bi addresses the requirements for pipe insulation.

This addendum harmonizes the minimum energy efficiencies of 3-phase air-cooled commercial air conditioners and heat pumps less than 65,000 Btu/h with the efficiencies adopted by DOE for residential central air conditioners.

This addendum re-establishes the product class for small duct high velocity air conditioners and heat pumps. The minimum energy efficiency levels proposed are 11 SEER for air conditioners and 11 SEER/6.8 HSPF for heat pumps which are identical to the efficiencies established by DOE for single-phase residential SDHV products.

This proposal amends the minimum energy efficiency requirements for standard-size packaged terminal air conditioners and raises the minimum EER to the same level as the packaged terminal heat pumps. This new minimum efficiency will become effective on January 1, 2015.

This addendum includes a methodology for removing the fan energy from packaged equipment efficiency ratings. This methodology is consistent with that currently in use by other codes and guidelines such as the State of California, Title 24 and the New Buildings Institute, Comnet. The inclusion of this methodology is necessary for maintaining consistent baseline building packaged equipment efficiency ratings between all users.

This addendum takes the requirements from 90.1-2004 and makes them the baseline for modeling when using Appendix G. In addition, it allows Appendix G to be used as a compliance path in 90.1. Changes to the previous version allow for more specificity for building types in climate zones.

The addendum expands the submetering requirements to cover all fuels that are used by a building.

This proposed addendum adds requirements for the use of gas condensing service water heaters in newly constructed buildings. The modifications in the ISC draft are in response to comments received during the first public review to improve the clarity of the requirements.

This Addendum adds minimum efficiencies for evaporative condensers used in ammonia based refrigeration systems, and updates references to cooling tower references published by the Cooling Tower Institute.

This proposal adds mechanical and lighting efficiency requirements for refrigerator freezer display cases.

This addendum updates the motor definitions in Chapter 3 and the motor efficiency tables in Chapter 10 to make sure that end-users and code officials have the most updated information. In addition, the efficiency requirements for motors that were produced before December 19, 2010, have been removed, since they are no longer allowed to be manufactured in or imported into the United States.

This proposed addendum revises the requirements for the use of exhaust air energy recovery as defined in table 6.5.6.1.

This addendum modifies the labeling requirements to make it simpler for determining compliance.

This revision of the toplighting requirements reduces the space area threshold, adds single-story buildings, and expands the list of spaces where daylight would not adversely affect operation of the space (such as a movie theater seating area where daylight is not appropriate).

This revision to the building/fenestration orientation requirements provides more specific requirements for east and west facing fenestration while also providing more flexibility for complying. Analyses indicate that east and west facing fenestration increases building energy consumption compared to north and south facing glazing in all climates.

This addendum is promoting alternative methods of heating perimeter spaces with high heat losses other than the use of a VAV box with terminal reheat (i.e. radiant heat, parallel fan powered box, etc)


The purpose of this proposal is to remove confusion about how the exceptions to the occupancy sensor requirement work and to eliminate one of those exceptions since technology changes make that exception no longer needed.


This proposal increases the stringency of the standard by (a) requiring the use of certain lighting controls in more spaces types and (b) shortening times until the lights being automatically reduced or shut off and (2) The design community has asked for a tabular structure for specifying the controls requirements. It is felt that by putting these requirement into a tabular format the provisions will be clearer and thereby more likely to be complied with and easier to enforce.(3) Modifications have also been made to correct the errors for the wattage threshold for sidelighting and toplighting for daylight responsive controls.


Section 8.4.1 previously separated feeder conductors from branch circuits when limiting voltage drop. By specifying the same combined voltage drop over the combination of components, this proposal reduces first costs in certain projects while remaining neutral on energy costs.


This change closes a loophole in the fan power allowances for Variable Air Volume (VAV) systems. Standard VAV systems are multi-zone systems with terminal units containing control dampers to vary airflow to individual zone


The proposed addendum requires that vestibule heating be locked out when outside air is above 45&deg;F, the same temperature that lockout of freeze protection or ice melting systems is required in section 6.4.3.8. An exception is allowed when the vestibule is unheated or tempered with transfer air rather than directly heated.


This addendum includes a number of changes to require simple systems to meet prescriptive outdoor air damper requirements, allow backdraft dampers only for exhaust and relief dampers in buildings less than three stories in height, require backdraft dampers on outdoor air intakes to be protected from wind limiting wind blown infiltration through the damper


This addendum removes the 10,000 cfm threshold for optimum start and adds a threshold for systems controlled by DDC. The addendum also expands the requirement beyond air-based systems so that convectors and radiant systems would be included. Language is added so that it is clear that optimum start is only required for systems with setback control requirements.


This addendum fixes a mistake in the way 8" pipe was analyzed. RS Means data for threaded pipe was used for 8" when welded pipe data should have been used. It also includes a minor editorial change since it is not possible to operate more than 8760 hrs/yr.


This addendum adds minimum efficiencies for both axial and centrifugal fan evaporative condensers with R-507A as the test fluid to Table 6.8.1G. Because of the numerous halocarbon refrigerants that can be utilized, a footnote has been added to the table that clarifies that evaporative condenser models intended for use with halocarbon refrigerants other than R-507A must meet the minimum efficiency requirements listed for R-507A as the test fluid.


This addendum clarifies what to do with other piping system accessories that are not in series with the piping circuit, such as expansion tanks, fill lines, chemical feeders, and drains, were not intended to be included because they do not have the same heat losses/gains and pressure drop


This additional control requires that all spaces (unless exempted) have multilevel control capability (also commonly known as bi-level switching).


This addendum establishes package single zone systems as the baseline HVAC system type for all retail occupancies of two stories and less. Prior to this change, large retail facilities would have VAV reheat baseline systems which are not at all common in that building type.


Stairwell lighting represents the ‘Emergence Egress Light Level’ with stairwell occupancy. However the occupancy percentage of a stairwell is only 10%, thus offering savings. Various case studies and demonstrations have shown significant energy savings for this strategy


Since the publication of addendum f (which established baseline building window-to-wall ratios for different building types in Appendix G) new data has become available that has enabled the establishment of a window-to-wall ration for retail strip mall buildings, which is added in this addendum.


This addendum was modified for a second public review in response to comments received on the first public review draft. The proposed changes to Section 11 and Appendix G involve clarification of the wording to make sure that credits for lighting controls are only applied to the lighting system being controlled.


This addendum makes changes to the requirements for air and water cooled chillers as defined in section 6.4.2.1 and the efficiency requirements listed in table 6.8.1C. This change is a continuation of the efficiency improvements that were implemented in 2010 by further improving the efficiency requirements


Modifies Appendix G (Performance Rating Method) to modify the requirements for economists and how they are modeled in computer rooms.


This addendum requires the use of dual maximum control for VAV zone control when the building has DDC controls.

Based on a comment received during the first public review, the ISC modifies the IEER requirements for the air-cooled air conditioners ≥65,000 Btu/hr and <135,000 Btu/hr to increase the IEER from 12.8 to 12.9 for electric-resistance heating units and 12.6 to 12.7 for gas-fired units. The ISC will also revise the air-cooled heat pumps ≥65,000 Btu/hr and <135,000 Btu/hr for electric-resistance heating units from 12.0 to 12.2 and from 11.8 to 12.0 for gas-fired units.


This addendum allows laboratory designs that incorporate strategies to reduce peak airflows and minimum unoccupied airflows to document energy savings associated with reduced outside air volumes.


This addendum corrects the calculation of hotel- and motel-type guestroom spaces based on an error in applying the room geometry of the space type, which then changes the associated whole building LPDs for hotels and motels. The calculation results produced a nearly identical value for both building types and nearly identical value for both building types and hotels and motels. The calculation results produced a multiple of systems and as such should be assigned to a single path.


This Addendum develops baseline energy use guidance for Public Assembly spaces toward assessing energy performance achievement of a proposed building. Public Assembly spaces are typically designed and operated quite differently than the surrounding building that supports these spaces.


This addendum revises the requirements for the use of exhaust air energy recovery as defined in 6.5.6.1. In 2012, addendum BT to the 2010 standard was developed to expand the range for the use of exhaust air recovery down to 10% rates ventilation. In addition, the requirements were adjusted based on the latest performance and economics analysis and energy recovery was removed for climate zones 3B, 3C, 4B, 4C, and 5B for >70% outside air.


Section 303 of the Energy Independence and Security Act of 2007 (EISA 2007) increased the federal minimum efficiency standards for residential-sized (“NAECA covered”) boilers. This section increased the minimum AFUE for gas and oil-fired boilers, along with establishing design requirements for certain types of new boilers that are manufactured or imported for use in the United States. All of the efficiency and design requirements took effect for equipment built on or after September 1, 2012. The revisions to the table and the new footnotes will ensure that ASHRAE 90.1-2013 is consistent with federal law.


This addendum adds deeper thermostat setups and setbacks and ventilation control to unrented hotel guestrooms and more clarity to the existing hotel guestroom requirements.


This addendum provides two compliance paths for equipment built on or after September 1, 2012. The revisions to the table and the new footnotes will ensure that ASHRAE 90.1-2013 is consistent with federal law.


This addendum provides an exception for certain systems serving laboratory spaces from the design airflow rate requirement in Appendix G. In addition it clarifies that the system fan power shall have the same proportion as in the proposed design.


This proposal is being presented to address an error which is in Standard 90.1 Addenda 'bc', contained within Table 5.5-3, under the category “Floors, Steel Joist” and in the cells assigned to the “residential” occupancy.


This proposal is intended to correct a possible flaw in previous proposed addenda BC and BV in that there could be some confusion as to what to do when one room within a suite becomes empty. This proposal is meant to make it obvious that each room is handled individually.


This revision clarifies the exception to re-roofing and roof re-covering.


This addendum splits the 'generic lobby' from common elevator lobbies and LPDs were adjusted to reflect specific space needs. In addition, this removes the fitness center audience seating.


This proposed addendum revises the design point for waterside economizers when utilized in computer room applications based on Computer Room stakeholder feedback.


This addendum provides an exception for certain systems serving laboratory spaces from the design airflow rate requirement in Appendix G. In addition it clarifies that the system fan power shall have the same proportion as in the proposed design.


The proposed text would add a definition for the term ‘field-fabricated fenestration’ used in section 5.4.3.2, consistent with an official interpretation approved by SSPC 90.1 and similar language in California’s Title 24


This addendum changes the reference to the ANSI/CRRC Standard from the 2010 version to the 2012 version.


The proposed text sets requirements for parking garage ventilation.

The purpose of this addendum is to prohibit the use of fossil fuels and electricity for humidification above 30% RH and dehumidification to 60% RH, except in special circumstances. Where control is required within the 30-60% region, a deadband is required. Where even tighter control is mandated, the system is exempted.


This addendum limits the fan energy allowance for energy recovery devices to values that approximate the results of the economic analysis, with some allowance to permit adequate pressure drop for products near the minimum recovery effectiveness of 50%. A separate allowance is also created for coil runaround loop systems.


This addendum offers an increase in electrical/mechanical rooms in cases where the current proposed allowance of 0.42 W/sqft (addendum ‘by’) is not considered sufficient to provide needed vertical and horizontal illuminance given the varied configuration of electrical/mechanical rooms. The additional allowance would have to separate control and could not be traded off to other spaces in the building.


This addendum adds clarity and instruction to the users of Appendix C, the envelope trade off option, for new skylighting and daylighting requirements that were added in addendum ‘al’, ‘bc’ and ‘bn’.


This addendum eliminates the exemption for wattage used in spaces where lighting is specifically designed for those with age related or other medical condition related eye issues where special lighting or light levels might be needed. Newly developed addenda ‘bh’ and ‘cr’ now provide specific LPD values to address these issues and accommodate the needed lighting for spaces such as these and the exception is no longer applicable. The 5-Watt-per-square foot limit for exit signs is now a federal product requirements and therefore no longer needed in the Standard.


This addendum gives instruction to the users of Appendix C, the envelope trade off option on how to model the base envelope design and the proposed envelope design on how to comply with the cool roof provisions of Section 5.


This addendum corrects the calculation of hotel- and motel-type guestroom spaces based on an error in applying the room geometry of the space type and combines them into a single value since the calculated value are determined to be the same for code purposes.


The addendum adds a size limit for vestibules in large buildings; additionally exemptions are added for semi-heated spaces and for elevators in parking garages provided that they have a lobby.


This public review draft shows changes in Appendix G relative to addendum ‘cj’ (computer rooms ) to 90.1-2007.


This proposed addendum revises the requirements for the use of hot gas bypass as defined in section 6.5.9 and table 6.5.9. Based on this, there no need to have such large capacity allowances for hot gas bypass and the values should be reduced, which is the purpose of this addendum. In addition, the addendum also eliminates the use of hot gas bypass on DX constant volume systems where modern-day controls can effectively cycle compressors to maintain capacity without the use of inefficient hot gas bypass.


This addendum attempts to clearly establish the goals and requirements of the lighting system including controls and to ensure that the owner is provided all the information necessary to best use and maintain the lighting systems.


This proposal is updating referenced standards in various provisions covering mechanical systems in 90.1-2010.


This addendum modifies language introduced in addendum ar to 90.1-2010, specifically it revises the definition of ‘walk-in cooler’ to match the temperature definitions in federal regulations.


This addendum modifies the calculations found in Appendix C in order to reflect modifications to the modeling assumptions in the equations.


This addendum is in response to a CMP. The economic analysis did not extend above 24’ pipe size, so requirements for larger pipes have been eliminated.


The original purpose for this provision was to limit the use of inefficient lighting sources for high wattage applications when there was not a comprehensive table of exterior LPD limits. With the table of requirements now in the 2007 and beyond versions of the standard, the need for this limit is superseded.


This addendum was generated in response to a continuous maintenance proposal to remove requirements to control lighting that is not part of the building permit to exempt some sign lighting in the lighting control wattage calculation.


Since Section 6.5.4.1 requires most systems to be variable flow and since system flow rate for variable flow systems is more a function of valve demand than of how many pumps are on, arguably the second issue is more important, yet it is not addressed in the current standard. The first issue only needs be addressed for constant flow systems where pumps are staged with the chillers or boilers. This addendum revises the current wording accordingly. An exception is added for chiller plant pumps where it is possible that running fewer condenser water pumps can improve plant performance in cool weather.

Electronic enthalpy switches are eliminated because they have been supplanted in the marketplace by better performing and lower cost switches that use superior fixed enthalpy plus fixed dry-blub logic. The dewpoint high limit that was added in the 2004 version is also proposed to be deleted since does not make sense theoretically and did not perform well in our simulations. The addendum also adds tolerances to the high limit change over sensors which are aligned with tolerances recently added to the Title 24 2013 standard.


At the January 2013 Dallas meeting the SS&C 90.1 approved to send out for public reviews Addenda ‘bm’ ‘co’ and ‘cr’ as 2nd PR-ISCs and a new Addendum ‘dl’ for publication/public review While these addenda are out for public review these changes reflected by Addenda ‘co’, ‘cr’ and ‘dl’ are not reflected in the 2nd PR-ISC of Addendum ‘bm’, so this new addendum has been created to address those changes.


This addendum relaxes the existing threshold for lighting control alterations but captures a lot of energy efficiency by requiring more of the control requirements. The cost of lighting controls has decreased and can probably be expected to decrease further, so the cost of adding these lighting controls in an alteration no longer represents a large barrier.


This change to the first public review of Addendum f specifies that the baseline building vertical fenestration percentage for the retail building area type applies only to stand alone retail buildings and not retail strip malls. This is shown in recognition that the study from which the original glazing fraction data was derived did not provide data for strip malls.


The wording in 90.1-2013 regarding the fan power pressure drop limitation adjustment can be interpreted in two ways. This change is intended to clarify which equation is the one that the committee intended and that was originally used in the economic analysis.


This proposed addendum modifies the language to provide an efficiency rating for the compressor and condensing unit of the packaged equipment that does not include the fan energy but reflects the standard’s minimum performance requirement. Additionally, it provides a method of calculating the appropriate fan power to include in the model for heating and cooling fan energy.


Updates the minimum EERs and COPs listed in Table 6.8.1D and establishes a new product class for space constrained products. This new product class is specifically intended to address SPVACs and SPVHPs used in space-constrained applications.


The change proposed in this addendum removes the exception to the Variable Air Volume system ventilation optimization when Energy Recovery Ventilation is installed.


This addendum requires envelope assemblies to comply with Appendix A when complying with the Energy Cost Budget Method in Appendix G.


This addendum fixes a mistake in Section 6.5.3.1.2 for fan brake horsepower methodology.


- Adds power density and control requirements to capture additional savings; - Adds a needed exemption for practical application; - Includes submittal requirements; and - Changes control credits to apply only to lamps in multi-lamp fixtures that are controlled.


This addendum updates the text in Section 10.4.1 on electric motors to provide information about the required efficiency of small electric motors shown in Tables 10.8-4 and 10.8-5. In addition, small electric motors were not included in the scope of the 2007 law, but now have performance requirements and are being added to the standard.


The intent of this addendum is to clarify that the total lumens/Watt for the entire elevator cab is being required to meet the efficiency requirement, but that it is not required that each individual light source must comply.


This proposed change clarifies the wording regarding duct seal class to avoid any possible misinterpretation that compliance with the text that is struck out could substitute for the seal class requirement.


Updates the fenestration air leakage provisions to clarify the requirements for glazed sectional garage doors. A new definition for sectional garage doors is also added.


Adds a reference to CRRC-1 for cool roofs testing requirements.


- CTI Standard 201 in Table 6.8.1-7 has been updated. This certification standard has been divided into Standard 201 RS and Standard 201 OM. This change indicates that the 201 RS standard is required for compliance.


Updates the ASHRAE dynamic glazing definition to match the National Fenestration Rating Council dynamic glazing definition.


This proposed change limits the systems that can take advantage of the fan power pressure allowance for fully ducted return and/or exhaust air systems.
This addendum provides direction with regards to setpoint and schedules requirements for modeling systems that provide occupant thermal comfort via means other than other than directly controlling the air dry bulb and wet bulb temperature (i.e. radiant cooling/heating, elevated air speed, etc.).

Section G3.1.1 Baseline HVAC System Type and Description is revised to confirm the hierarchy for selecting baseline HVAC systems, clarify what floors to count, and specify what building type to use when no one use is predominant. Table G3.1.1-3 Baseline HVAC System Types is revised so heading names are consistent with Section G3.1.1.

Large amounts of fan energy can be wasted when zones report incorrect information to the control system, which causes the supply fan speed to increase, often to maximum speed. This addendum requires additional safeguards to prevent this, and for non-DDC systems requires location of sensors in locations that do not require high setpoints.

Exception 2 to 6.5.2.1 addresses single duct VAV reheat systems with DDC. It unintentionally places undue requirements on other VAV systems with DDC that have an alternate means of heating such as fan-powered boxes, dual duct, and baseboard, and even non-VAV systems such as DOAS with radiant or chilled beams. This is resolved by making Exception 1 also apply to systems with DDC but with lower reheat minimums compared to systems without DDC (e.g. pneumatic control).

This addendum proposes a fan efficiency metric was developed with fans being classified based on fan efficiency grades.

Requires that the controlled receptacles be appropriately identified so that users can clearly distinguish between controlled and non-controlled receptacles.

Clarifies the credits for renewable energy and purchased energy in Section 11 (Energy Cost Budget Method) and Appendix G (Performance Rating Method)

These tables will update the standard to include the new federal energy efficiency standards in Section 10.8 for motors used in HVAC equipment that will be in effect starting in 2015.

This addendum modifies Appendix G for outdoor air thermostats when identifying heat pumps in energy modeling.

ANSI/ASHRAE/IES Standard 100-2015, Energy Efficiency in Existing Buildings
This revision of Standard 100-2006 provides greater guidance and a more comprehensive approach to the retrofit of existing buildings for increased energy efficiency and addresses minor and minor modifications for both residential and commercial buildings and single and multiple activity buildings with variable occupancy periods and it identifies the approach for 53 building types (Per CBECS and RECS) in 16 climate zones. It identifies requirements for buildings with and without energy target and provides multiple levels of compliance. After review of comments and further committee work the following independent substantive changes are offered for public review.

The purpose of this proposed standard is to identify the minimum acceptable Commissioning Process for buildings and systems. The standard provides procedures, methods, and documentation requirements for each activity for project delivery from pre-design through occupancy and operation. It presents the minimum requirements for the Commissioning Process without focusing on specific building types, systems or assemblies, or on specific project sizes.
This addendum adds new requirements for daylighting.

This addendum as a whole proposes modifications to Section 11, the Energy Cost Budget (ECB) Method, in order to incorporate items from Appendix G that apply. This second public review draft includes several independent substantive changes to the first public review draft to incorporate improvements suggested by reviewers. The changes are intended to add clarity and specificity to a number of different paragraphs.

This proposed addendum a) improves compliance consistency, b) expands application coverage to properly address complex systems, and c) strengthens stringency for simple systems with an easy to use format / structure. There will be consistent compliance requirements, while maintaining nameplate horsepower approach allowing simple demonstration of compliance. In addition, changes have been made to Informative Appendix G to update the requirements to match the changes made.

This addendum extends the control factors to other types of spaces when automatic, as opposed to manually operated controls are employed, using the assumption that automated control systems give a similar performance irrespective of building type.

This proposed addendum adds a roofing product rating program developed by the Cool Roof Rating Council (CRRC) as a credible and readily available means to determine radiative energy performance and to establish compliance with the standard. The test procedure is considered comparable to the ASTM solar reflectance test methods currently cited. A roofing product can be verified by a label placed on it (or its container or technical literature) or through the CRRC’s web site directory.

This addendum adds requirements for liquid to liquid heat exchangers.

This proposal updates referenced standards for ARI 340/360 and ARI 1230 in various provisions covering mechanical systems in 90.1-2010.

This second public review draft of proposed addendum ae further modifies the occupancy sensor control requirement to provide exemptions for spaces with multi-scene control where control conflicts may arise, for shop and lab classrooms where safety issues may arise, and for preschool through twelfth-grade classrooms where occupancy is generally constant and therefore less energy savings is available.

The changes to Section 11 and Appendix G clarify the way lighting power is to be modeled. An average lighting power density for each thermal block should be determined and used in the simulation model.

This proposal recommends adding a requirement for insulating the surfaces of radiant panels that do not face conditioned spaces.

This Addendum attempts to correct the equivalent minimum efficiency requirement for hydronic systems by providing guidance for designers, contractors, and owners to properly size system piping to balance ongoing energy costs and first cost.

The following change clarifies that only HVAC fans that provide outdoor air for ventilation need to be modeled as running continuously.

This clarifies the requirement by stating that condenser heat recovery must be included in the budget building model if it is a prescriptive requirement for the building. This is consistent with the way the issue is dealt with in Appendix G and simply repeats the language in Appendix G. The exception recognizes that many simulation programs cannot model this prescriptive requirement. It allows the model to not include a simulation of the heat recovery system as long as the system itself is included in the Proposed Building design.

The new exception b proposed to G3.1.2.9.1 allows the baseline building design supply air to be sized based on the same humidity ratio difference of the proposed design. New proposed section G3.1.3.18 requires the baseline building design to count only 25% of the total energy used to reheat the supply air stream.

This addendum clarifies how distribution pump energy is to be addressed when using purchased heat or purchased chilled water.

This addendum updates Section 11 and Appendix G to be consistent with three addenda to 90.1-2007. The changes to 11.3.2(b) and G3.1.2.1 is in response to Addendum M from 90.1-2007 which introduced the two paths for chiller efficiency. The new row for Table G3.1.3 is in response to Addendum O from 90.1-2007 which added new requirements for distribution transformers. The changes to G3.1.2.8 and Tables G3.1.2.6A, G3.1.2.6B and 11.3.2D are in response to Addendum cy from 90.1-2007.

First, this proposal is another test method that will allow additional roof products to meet the high albedo roof requirements of Standard 90.1 and allow more paths towards compliance. Second, Standard 90.2-2004 contains this test method and therefore there is an attempt to bring both standards into near agreement on the subject of high albedo roof provisions.

This second public review draft of proposed Addendum ak makes several independent substantive changes to the first draft: it removes Note d from the table and updates two references. The main purpose of Addendum ak is to restore the testing requirements (CTI STD-201) that were removed by Addendum b to Standard 90.1-2001, in effect canceling most of the changes that were made to the standard by Addendum b.

The purpose of this proposed addendum is to correct terminology contained in Appendix A, Section A2.3 Metal Building Roofs and to clarify the construction options presented in Table A2.3 Assembly U-Factors for Metal Building Roofs.

ANSI/ASHRAE/IESNA 90.1am-2010, Energy Standard for Buildings Except Low-Rise Residential Buildings
This independent substantive change to the first public review draft allows additional options for air leakage testing for fenestration and door and proposes values for air leakage of different types of windows and doors.

The intent of this addendum is to expand the table of default U-Factors for single digit rafter roofs.
This addendum corrects errors in table 6.8.1e, re-orders footnotes, and changes one efficiency

This addendum modifies the requirements for Demand Control Ventilation (DCV).

This proposed addendum removes Table 6.3.2 and replaces it with a new table 6.3.2 "Alternate Compliance Path to Airside Economizers for Unitary Equipment" with a new table 6.3.2 "Alternate Compliance Path to Airside Economizers for Unitary Equipment"

This proposed addendum clarifies how credits for overhangs will apply to louvered overhangs.

This proposed addendum excludes bathroom lighting from ‘master’ switch control in hotel/motel guest rooms by placing a 60 minute time limit on bathroom lighting allowing for potential safety or convenience concerns.

The current wording of Standard 90.1 limits simultaneous heating and cooling in Zone Controls, hydronic systems, dehumidification systems, and humidification systems. The existing wording does not limit simultaneous heating and cooling in some air handling equipment serving multiple zones. This addendum is intended to limit some of these cases.

The proposed changes are mostly meant to clear up inconsistencies and conflicts regarding damper requirements found in several places in Chapter 6.

This addendum removes Table 6.3.2 and replaces it with a new table 6.3.2 "Alternate Compliance Path to Airside Economizers for Unitary Equipment"

This proposed addendum modifies the requirements for Energy Rise by expanding them to cover the use of energy recovery by weather zone and for outside air percentages equal to or greater than 30%.

The proposed language provides performance requirements for air leakage of the opaque envelope.

The proposed language distinguishes Subtype I and Subtype II motors. Addendum ‘aj’ to ASHRAE Standard 90.1-2007 first incorporated these changes into Standard 90.1. This proposed language has different minimum efficiency requirements as called out in EISA 2007, Section 313 and clarified in the Federal Register.

This proposed addendum modifies the requirements for VAV applications. This change has a payback of 0.6 years for typical VAV applications.

This independent substantive change to the first functional testing requirements for lighting.

This independent substantive change to the first functional testing requirements for lighting.

This change removes emergency circuits not used for normal building operation from the requirements which will lead to increased compliance

The proposed language distinguishes Subtype I and Subtype II motors. Addendum ‘aj’ to ASHRAE Standard 90.1-2007 first incorporated these changes into Standard 90.1. This proposed language has different minimum efficiency requirements as called out in EISA 2007, Section 313 and clarified in the Federal Register.

ANSI/ASHRAE/IESNA 90.1bl-2010, Energy Standard for Buildings Except Low-Rise Residential Buildings
This proposed addendum modifies the requirements for chillers with secondary coolants (glycol or brine). In additions, there are changes to footnote a to Table 6.8.1c in recognition of lower practical scope limits for positive displacement (both air- and water-cooled) and corrects for the lower limit introduced in Addendum M for centrifugal chillers.

This proposed change adds an exterior zone 0 to cover very low light requirement areas.

ANSI/ASHRAE/IESNA 90.1br-2010, Energy Standard for Buildings Except Low-Rise Residential Buildings
This addendum adds vivariums to the list of spaces that require specific humidity levels to satisfy process needs in Section 6.5.2.3.

This proposed addendum adds vivariums to the list of spaces that require specific humidity levels to satisfy process needs in Section 6.5.2.3.

This proposed addendum modifies the requirements in both the lighting and envelope sections of 90.1 to provide appropriate provisions to better allow daylighting.

This proposed addendum modifies the requirements for Energy Recovery by expanding them to cover the use of energy recovery by weather zone and for outside air percentages equal to or greater than 30%.

This proposed addendum modifies the requirements for Energy Rise by expanding them to cover the use of energy recovery by weather zone and for outside air percentages equal to or greater than 30%.

This proposed addendum raises the minimum efficiency standard for 3-phase air-cooled central air conditioners and heat pumps less than 65,000 BTU/h in Tables 6.8.1A and 6.8.1B of Standard 90.1, 2004 to 13 SEER/7.7 HPF to be consistent with federal minimum standards for single-phase residential equipment. The proposal also removes the products class for small duct high velocity (SDHV) equipment to be consistent with the DOE final rule.

ANSI/ASHRAE/IESNA 90.1g-2006, Energy Standard for Buildings Except Low-Rise Residential Buildings

This proposed addendum amends the minimum efficiency levels of air-cooled air conditioners and heat pumps greater or equal to 65,000 BTU/h contained in Tables 6.8.1A and 6.8.1B of Standard 90.1, 2004.


This proposed addendum revises the exceptions to Sections 6.4.3.1.2 and 6.4.3.6 in Standard 90.1, 2004. Table 2.1 of ASHRAE’s Thermal Guideline for Data Processing Environments (pg. 10), provides environmental conditions for electronic equipment such as that found in data processing centers. This more recent publication found that electronic equipment can perform under more relaxed conditions than were previously believed. In light of this new information, it makes sense to remove these types of spaces from having specific exceptions on temperature and humidification dead bands.

ANSI/ASHRAE/IESNA 90.1i-2006, Energy Standard for Buildings Except Low-Rise Residential Buildings

This proposed addendum adds language to Section 9.1.4(b) that allows additional flexibility in assigning wattage to luminaires with multi-level ballasts where other luminaire components would restrict lamp size. In these cases the manufacturer’s labeling of maximum wattage based on these restrictions would be allowed as the maximum value for compliance calculation.


This addendum is intended to update the mechanical test procedures and references in ASHRAE/IESNA Standard 90.1-2007. The proposed changes modify a reference in Table 6.8.1E, the normative references in Chapter 12 and informative references in Informative Appendix E.


This addendum revises Tables 6.8.1E and Table 7.8 in 90.1-2007 identifying the specific sections of the referenced standards. Table 7.8 is also being updated to reflect the current Federal efficiency levels for residential water heaters. Additionally, a requirement in Table 7.8 for Electric table Top Water Heaters has been added.


The purpose of this Addendum is to add minimum efficiency and certification requirements for both axial and centrifugal fan closed circuit cooling towers (also known as fluid coolers) into Table 6.8.1G. In addition, reference to ATC-105S, the Cooling Technology Institute (CTI) test standard for closed circuit cooling towers, has been added to Section 12, Normative References.


This is the second PR for addendum m (ISC). Footnote d is removed from Table 6.8.1C, and some modifications were made in response to commenters for min and max water temperatures.


This is the second PR for addendum n (ISC. 1. Provide a lower fan turndown for units with chilled water cooling. The 2/3 fan speed in the original requirement was provided for DX cooling units to prevent coil freezing. 2. Step up the implementation date for chilled water cooling units. 3. Retain ECB Table 11.3.2A which was marked for deletion due to an error in Addendum n (the table was struck out in the motion as the committee wanted the ECB subcommittee to address the changes to Table 11.3.2A as a separate Addendum). 4. Clarify the threshold for 'low cooling demand.'


This is the second PR for addendum o (ISC. It modifies the requirements for dry-type transformers in response to comments.


This proposed modification addresses the often special lighting needs of certain groups of individuals other than just the #&8220;visually impaired#&8221; where spaces are designed specifically for their use. The standard industry light level and design recommendations on which the standard LPSs are based do not specifically include special categories and adjustments for persons with special lighting needs. Therefore, the existing exemption for #&8220;visually impaired#&8221; has been reworded to more clearly indicate where lighting exemptions may be granted for medical condition needs.


This addendum modifies the vestibule requirements for Climate Zone 4.


The following removes the use of a Conservative Engineering Factor to reduce the savings when using the exceptional calculation method. In addition, it removes requirements to compare the method used with other simulation programs that might be able to simulate the item directly.


This proposal updates the COP at 170 efficiency levels for commercial heat pumps and introduces a new part load energy efficiency descriptor for all commercial unitary products above 65,000 Btu/h of cooling capacity.


This proposal removes the terms ‘replacement’ and ‘new construction’ from the product classes listed in Table 6.8.1 D and replaces them with the terms ‘non-standard size’ and ‘standard size’ respectively to clarify that one product class is intended for applications with non-standard size exterior wall openings, while the other is intended for applications with standard size exterior wall openings. The proposal also amends section 6.4.1.5.2 and footnote b to Table 6.8.1 D to clarify that non-standard size packaged terminal equipment have sleeves with an external wall openings of certain sizes.


This addendum modifies the requirements for axial fan open circuit cooling towers.


This is an addendum to set requirements for pump sizing.


This addendum contains two changes. The first change to the footnote of Table G3.1.1A is to make it clear that the Exception (a) to Section G3.1.1 is also applied here. The second change to the exception to G3.1.2.10 on Exhaust Air Energy Recovery for multifamily buildings because they are unlikely to have a centralized exhaust air system needed to effectively recover heat.
This revision to the energy standard updates the requirements for automatic lighting shutoff, adds specific occupancy sensor applications, and provides additional clarification.

Provides another test method to allow high albedo roofs.

ANSI/ASHRAE/IESNA 90.2z-2010, Energy Standard for Buildings Except Low-Rise Residential Buildings
This change clarifies the language in the unmet load hour definition as to how throttling range effects are evaluated. It was decided that the baseline and proposed shall have the same thermostat throttling range. This required additional language in the unmet load hour definition to how throttling range effects are determined. The definition for an unmet load hour along with additional language in Table 6.3.1 and Table G3.1, Design Model sections.

These additions 1) strengthen the language to actually require exterior control rather than just require the control capability; 2) add bi-level control for general all-night applications such as parking lots to reduce lighting when not needed; 3) add control for fan & #231;ade and landscaping lighting not needed after midnight.

This addendum reduces the threshold for daylighting from 1000 sqft to 250 sqft.

This change incorporates bi-level control for parking garages to reduce the wasted energy associated with unoccupied periods for many garages AND allows an exception for lighting in the transition (entrance/exit) areas to accommodate IES recommendations.

The intent of this addendum is to establish that an Appendix G baseline shall be based on the minimum ventilation requirements required by local codes or a rating authority and not the proposed design ventilation rates.

ANSI/ASHRAE/IESNA Addendum 90.1db-2010, Energy Standard for Buildings Except Low-Rise Residential Buildings
This proposed change originated with a continuous maintenance proposal to address information received on addendum bs on receptacles after the public review period closed and which the committee found to have merit.

This addendum replaces the IPLV descriptor for condensing units with the new IEER metric and amends the EERs with more stringent efficiency standards. Third, the proposal replaces the undefined terms "heated space" and "cooled space". The definition for an unmet load hour is currently in place in 90.2, which was previously implied in the labels of "Leaving Chiller Water Temperature, Entering Condenser Water Temperature and Condensing Water Temperature Rise", but has now been more clearly defined.

These changes address corrections and clarification necessary to Section 11, Table 11.3.1 section 11 Service Hot Water Systems.

This addendum proposes to add energy efficiency requirements for service water pressure booster systems.
ANSI/ASHRAE/IESNA Addendum 90.1dd-2010, Energy Standard for Buildings Except Low-Rise Residential Buildings
This addendum further modifies the daylighting and skylighting requirements and thresholds for controls when daylighting is available.

This addendum adds a requirement for joint insulation.

This addendum modifies requirements for Heat Pump and Water-Cooled Unitary Air-Conditioners, Differential Pressure Reset, fan power limitations, chilled water cooling, and deletion of 10 HP from 6.5.4

This proposal adds an additional exception to addendum “al” for non-rated architectural skylights and other daylight providing devices.

This addendum adds requirements for how to determine the wattage of exterior lighting equipment in the determination of the installed exterior lighting power for the project in Section 9.1.3

This modifies the equation for heat recovery proposed in the first public review of addendum “as”.

This new requirement will provide the means for non-critical receptacle loads to be automatically controlled (turned off) based on occupancy or scheduling without additional individual desk top or similar controllers.

This addendum modifies the computer room efficiency requirements based on comments received during the first public review.

The addendum modifies efficiency requirements for packaged terminal air conditioner (PTAC).

This proposes new Lighting Power Densities for both the whole building and space-by-space compliance methods. In addition, the Lighting Power Density may be re-calculated based on room geometry.

This addendum modifies Appendix G and Section 11 to account for advances in cooling tower technology.

This addendum expands zone level demand controlled ventilation to include various forms of system level strategies.

The proposed text would clarify how to interpret the use of dynamic glazing products which are designed to be able to vary a performance property such as SHGC, rather than having just a single value.

The proposed text clarifies how to interpret the use of dynamic glazing products given the requirements in proposed addendum bb (envelope requirements) to 90.1-2007

This modifies the 3rd public review draft of this addendum which sets requirements for high albedo roofs.

This proposed addendum updates the building envelope criteria for metal buildings.

The new exception (exception b) largely addresses the apparent conflict between Standards 55, 62.1 and 90.1 and also takes advantage of the energy savings potential of DDC controls.

This proposal will apply a 4-zone lighting power density approach to exterior lighting requirements.

This addendum provides the necessary pressure credits for laboratory exhaust systems that allow prescriptive compliance of systems serving fume hoods.

This addendum adds a rating condition for Heat pump pool heaters in Table 7.8

The Purpose of this standard (hereafter referred to as code) is to provide minimum requirements for the energy-efficient design of buildings except low-rise residential buildings. This code provides: (a) minimum energy-efficient requirements for the design and construction of; 1. New buildings and their systems, 2. New portions of buildings and their systems, and 3. New systems and equipment in existing buildings, (b) criteria for determining compliance with these requirements. 2.2 The provisions of this code apply to: (a) the envelope of buildings that the enclosed spaces are; 1. heated by a heating system whose output capacity is greater than or equal to 3.4 Btu/h*ft² (10W/m²), or 2. cooled by a cooling system whose sensible output capacity is greater than or equal to 5 Btu/h*ft² (15 W/m²); (b) the following systems and equipment used in conjunction with buildings; 1. heating, ventilating, and air conditioning, 2. service water heating, 3. electric power distribution and metering provisions, 4. electric motors and belt drives, and 5. lighting. 2.3 The provisions of this code do not apply to: (a) single-family houses, multi-family structures of three stories or fewer above grade, manufactured houses (mobile homes), and manufactured houses (modular), (b) buildings that do not use either electricity or fossil fuel, or (c) equipment and portions of building systems that use energy primarily to provide for industrial manufacturing or commercial processes. 2.4 Where specifically noted in this code, certain buildings or elements of buildings shall be exempt. 2.5 This code shall not be used to circumvent any safety, health or environmental requirements.
The proposed language provides requirements for multiple zone HVAC systems (that include simultaneous heating and cooling) to include controls that automatically raise the supply-air temperature when the spaces served are not at peak load conditions.

The proposed language adds an exception within Appendix G that allows users to claim energy cost savings credit for the increased ventilation effectiveness of certain HVAC system designs.

The intent of this addendum is to coordinate terminology for visible transmittance with NFRC 200.

This proposed addendum limits poorly oriented fenestration. Compliance can be shown by having more south facing fenestration than west facing fenestration. For those buildings affected by this requirement, this reduces envelope loads, energy usage and thereby costs.

This proposed change allows the use of control that provides automatic 50% auto on with the capability to manually activate the remaining 50% and has full auto-off.

This proposed language changes the requirements for retail space lighting which will make use of more recent lamp technology that is readily available.

ANSI/ASHRAE/NEMA Standard 201-2016, Facility Smart Grid Information Model
The purpose of this standard is to define an abstract, object-oriented information model to enable appliances and control systems in homes, buildings, and industrial facilities to manage electrical loads and generation sources in response to communication with a ‘smart’ #8221; electrical grid and to communicate information about those electrical loads to utility and other electrical service providers.

ANSI/ASHRAE/SMACNA Standard 126-2016, Method of Testing HVAC Air Ducts
This revision of Standard 126-2008 shall be used to determine the structural strength, dimensional stability, durability, and leakage characteristics of HVAC air ducts.

This addendum clarifies the requirements for Visible Transmittance (VT) of Skylights and Roof Monitors apply only to those products when they are used to comply with the minimum daylighted area requirements.

This addendum corrects a mistake made in the original proposed addendum with regards to the threshold upright ratings and updates a reference made by this section.

Updates references to the newly approved ANSI/BIFMA M7.1-2011, ANSI/BIFMA X7.1-2011 and ANSI/BIFMA e3-2011 in Sections 8-Indoor Environmental Quality (IEQ) and Section 11-Normative References. It deletes all of Normative Appendix E IAQ Limit Requirements for Office Furniture Systems and Seating, making reference to the relevant material in Section 8-Indoor Environmental Quality (IEQ).

This addendum groups outdoor air definitions for easier reference. The Addendum does not change the requirements of the Standard, because the definitions are reorganized and outdoor airflow rates are still permitted to be greater than the minimum requirements. The current definition of design outdoor airflow rate is being proposed for deletion, and the occurrences of this term in the standard are being modified to be more clear.

Standard 189.1-2009 references CA/DHS/ELHB/R-174 (commonly referred to as California Section 01350). In February of 2010, this document was updated, and this addendum proposes to modify the standard to update the reference to CDPH/ELHB/Standard Method V1.1 (commonly referred to as California Section 01350)

This addendum clarifies the intent of this exception to relax the limitations of 150 feet and 100 feet for the case of low-impact trails.

This addendum clarifies the requirements of E1.1, corrects cited references in Section 11 and adds one reference as it relates to the clarifications made in Appendix E. All requirements remain the same.

This addendum updates Standard 189.1-2011 references to Energy Star.

This addendum updates the modeling requirements for on-site renewable energy systems in Normative Appendix D.

This addendum is intended to modify Table 6.3.2.1 Plumbing Fixtures and Fittings Requirements to make it consistent with the text of paragraph 6.3.2.1b.

Updates references to ASHRAE Standards 55, 62.1, and 90.1, and ENERGY STAR. In addition, a clarification is made in Chapter 9 for material waste management and harvesting.

Updates 189.1-2009 to reference 90.1-2010 instead of 90.1-2007 and the resulting changes that are required to section 7.4.3, Heating, Ventilating, and Air Conditioning requirements.

Removes many of the requirements in Appendix D and replaces them with relevant requirements to Appendix G 90.1-2010.

This addendum clarifies the exceptions contained under Prohibited Development Activity provisions for fish/wildlife habitat conservation areas and wetlands.
This addendum augments provisions for connection of on-site walkways and bicycle paths to street sidewalks and bicycle paths. Facilitating pedestrian and bicycle connectivity reduces the need to drive short distances, thereby reducing transportation impacts, such as air pollution and greenhouse gas emissions. In addition, such connectivity can improve building occupant productivity by providing opportunities to walk or cycle to get places while improving health through physical activity.

This addendum modifies the proposed language to delete the requirement for a minimum initial SRI value. It also editorially restructures Section 5.3.2.4 (Solar Reflective Index) to separate roofing and non-roofing products to give clarity.

This addendum modifies Chapters 5, 7, 8, 11 as well as Appendices A and E, to reflect the addition of Climate Zone 0 in ASHRAE Standard 169-2013, Climatic Data for Building Design Standards. This addendum modifies the proposed language to delete the requirement for a minimum initial SRI value. It also editorially restructures Section 5.3.2.4 (Solar Reflective Index) to separate roofing and non-roofing products to give clarity.

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ANSI/ASHRAE/USGBC/IES Addendum 189.1av
This addendum updates control requirements to be compatible with ANSI/ASHRAE/IES Standard 90.1.

ANSI/ASHRAE/USGBC/IES Addendum 189.1aw
This addendum will increase the range of products and materials that are considered under Section 9.4.1, Reduced Impact Materials.

ANSI/ASHRAE/USGBC/IES Addendum 189.1ax
This ISC modifies the original addendum by not allowing the use of any control factors from Table 9.6.3, Control Factors Used in Calculating Additional Interior Lighting Power Allowances, of ANSI/ASHRAE/IES 90.1, Energy Standard for Buildings Except Low-Rise Residential Buildings, for lighting control methodologies.

ANSI/ASHRAE/USGBC/IES Addendum 189.1ay
This addendum modifies the demand control ventilation (DCV) requirements to make them more compatible with recent changes to the DCV requirements in ANSI/ASHRAE/IES Standard 90.1

ANSI/ASHRAE/USGBC/IES Addendum 189.1b
-2010, Standard for the Design of High-Performance Green Buildings Except Low-Rise Residential Buildings
This addendum changes the height of illuminance calculations required for the performance option of daylighting simulations from 3’ to 2.5’ to coincide with standard industry practice.

ANSI/ASHRAE/USGBC/IES Addendum 189.1b
This addendum modifies the mandatory requirement for peak load reduction in Section 7.3.4 relative to what was in addendum ce, not yet approved for publication.

ANSI/ASHRAE/USGBC/IES Addendum 189.1b
This addendum adds a new section to modify the U-factor requirements for high speed doors that open and close quickly compared to traditional doors.

ANSI/ASHRAE/USGBC/IES Addendum 189.1bc
This addendum updates the normative and informative references to more recent versions.

ANSI/ASHRAE/USGBC/IES Addendum 189.1bd
This addendum simplifies fenestration orientation requirements and provides more flexibility.

ANSI/ASHRAE/USGBC/IES Addendum 189.1bf
This addendum deletes the criterion for peak electricity use; because of changes in the modeling rules for the fuel source of the baseline building.

ANSI/ASHRAE/USGBC/IES Addendum 189.1bh
This ISC addresses the issue of a designer or owner having the ability to designate site features for preservation not necessarily designated by the AHJ.

ANSI/ASHRAE/USGBC/IES Addendum 189.1bi
This addendum updates Appendix D, which contains the modeling rules for the Performance Option for energy efficiency, to incorporate changes made to Appendix G in ANSI/ASHRAE/IES Standard 90.1.

ANSI/ASHRAE/USGBC/IES Addendum 189.1bj
This addendum creates two optional performance paths for compliance with the energy requirements within this standard. Both performance options have criteria for both whole building total energy cost and equivalent carbon dioxide emissions (CO2e).

ANSI/ASHRAE/USGBC/IES Addendum 189.1bk
This revision adds a fan-efficiency requirement in 189.1 that is slightly more stringent than the fan-efficiency section included into ANSI/ASHRAE/IES 90.1 -2013.

ANSI/ASHRAE/USGBC/IES Addendum 189.1bm
This addendum adds more building components and clarifies salvaged material requirements in ANSI/ASHRAE/USGBC/IES 189.1-2011 Section 9.4.1.1.

ANSI/ASHRAE/USGBC/IES Addendum 189.1bn
This addendum adds a requirement for an automated pre-occupancy outdoor air purge in order to ameliorate indoor contaminant buildup that may occur during extended periods of time during which ventilation systems are off.

ANSI/ASHRAE/USGBC/IES Addendum 189.1bo
This addendum updates the requirements for economizers to reflect requirements in ANSI/ASHRAE/IES 90.1-2013.

ANSI/ASHRAE/USGBC/IES Addendum 189.1bp
This addendum revises language in the exhaust air energy recovery section to reflect requirements in ANSI/ASHRAE/IES Standard 90.1-2013.

ANSI/ASHRAE/USGBC/IES Addendum 189.1bq
This addendum updates the efficiency requirements for Electrical-Operated Unitary Air Conditioners and Condensing Units

ANSI/ASHRAE/USGBC/IES Addendum 189.1br
The addendum updates the requirements for air and water cooled chillers.

ANSI/ASHRAE/USGBC/IES Addendum 189.1bs
This addendum revises requirements for Single Packaged Vertical Air Conditioners, Single Packaged Vertical Heat Pumps, Room Air Conditioners, and Room Air Conditioner Heat Pumps.

ANSI/ASHRAE/USGBC/IES Addendum 189.1bt
This addendum updates requirements for Gas and Oil Fired Boilers.

ANSI/ASHRAE/USGBC/IES Addendum 189.1bu
This addendum updates requirements for water heating equipment.
This addendum adds new requirements for VRF (Variable Refrigerant Flow) Air Conditioners and Heat Pumps.

This addendum proposes to update the Performance Requirements for Heat Rejection Equipment.

This addendum is intended to revise the existing requirements for addressing moisture in building envelopes to be more stringent and to use largely performance-based design criteria.

This addendum intends to provide a higher level of indoor moisture control, primarily to reduce the likelihood of microbial growth on interior surfaces and within the building envelope, than is currently required.

This addendum replaces an existing requirement in the standard to address outdoor air quality impacts of construction vehicles with a requirement that limits vehicle idling and requires signage.

This addendum narrows the scope of the reference to 90.1 to just those sections involved with exterior lighting

This addendum modifies Table D1.1 (Modifications and Additions to Table G3.1 of Appendix G in ANSI/ASHRAE/IES Standard 90.1) to reflect new fenestration orientation requirements made by an earlier addendum.

This addendum adds measures that will reduce the entry of contaminants from entering occupied spaces within the construction area or those that are immediately adjacent.

This addendum modifies the mandatory and prescriptive requirements for peak load reduction.

This addendum corrects and clarifies a potentially confusing requirement in which a designer may conclude that bonus lighting power control factors from Table 9.6.3 Control Factors Used in Calculating Additional Interior LPD of ANSI/ASHRAE/IES Standard 90.1 cannot be used.

This addendum provides control credits for institutional tuning that are in addition to the control factors that already exist in ANSI/ASHRAE/IES Standard 90.1-2013.

This addendum modifies the renewable energy requirements so the on-site requirement is based on roof area rather than conditioned space.

ANSI/ASHRAE/USGBC/IES Addendum 189.1g -2016, Standard for the Design of High-Performance Green Buildings Except Low-Rise Residential Buildings
These proposed changes to ANSI/ASHRAE/IES/USGBC Standard 189.1 are intended to provide a higher level of indoor moisture control than is currently required by reference to ANSI/ASHRAE/Standard 62.1.

Addendum h clarifies the requirements for a continuous air barrier in section 7 of the standard as well as the requirements for airtightness commissioning in section 10.

Adds a requirement to 189.1 for exterior LPDs such that they are 90% of those allowed by 90.1-2010. The 90% factor for the interior LPDs is not affected by this proposal and is being reviewed separately.

This addendum clarifies shading provided by vegetation for the site hardscape and walls for heat island mitigation (5.3.2.1 and 5.3.2.2).

This updates portions of section 5 (Site Sustainability) to improve clarity, to improve requirements related to tree-growth rate, and to add a mandatory requirement related to invasive plants.

ANSI/ASHRAE/USGBC/IES Addendum 189.1l -2011, Standard for the Design of High-Performance Green Buildings
This updates portions of section 5 (Site Sustainability) to improve clarity related to heat island reduction provisions, treating porous pavers and open graded aggregate as separate category from paving materials.

ANSI/ASHRAE/USGBC/IES Addendum 189.1m -2013, Standard for the Design of High-Performance Green Buildings Except Low-Rise Residential Buildings
This proposal recommends the inclusion into ASHRAE Standard 189.1 a new Table C-17 which contains the minimum efficiencies of transformers for buildings that are following path B of Section 7.4.3.1 (b) i.e. those buildings that have a lower amount of on-site renewable generation and have required minimum efficiencies greater than the minimum federal efficiencies.

This clarifies the climates where condensate collection would be required for air conditioning units by exempting dry climates where little if any condensate would be expected.

This addendum adds lighting quality requirements to Standard 189.1, recognizing that following good lighting practices is part of creating a high-performance building where occupants will be productive, comfortable, safe, and healthy.


This adds a mandatory requirement to section 5.3 (Site Sustainability) to introduce pedestrian friendly environments through the use of designated walkways.


Clarifies pervious area exceptions for brownfield sites in section 5.4.1.1 (Site Sustainability).


Provides exceptions for safety and functionality in section 5 (Site Sustainability) and will better align 189.1 with 90.1-2010.


To ensure and clarify that systems that require commissioning also include commissioning of the associated control systems.


Modifies the interior LPD requirement, in section 7 (Energy Use Efficiency), by adding multipliers in Standard 189.1. This addresses some issues related to the update to 90.1-2010.


Addendum s clarifies the requirements for outdoor airflow monitoring in Section 8, along with operational requirements for such monitoring in Section 10. The attached document is ‘as modified’ during committee discussions.’


This addendum increases the water use stringency for toilets, clothes washers, dishwashers and green roofs. The 2nd public review draft reflects a number of revisions made in response to comments submitted during the first public review.


This addendum provides specific bicycle parking design requirements.


This addendum adds new language requiring a plan for the formal maintenance of roofs.


Addendum z ISC adds new requirements in Table C-16 in Appendix C, of ASHRAE Standard 189.1 which covers efficiency requirements for commercial refrigeration equipment.


This addendum adds new language requiring a plan for the formal maintenance of roofs.


This addendum modifies the motor efficiencies within the standard, citing minimum motor efficiencies included in ANSI/ASHRAE/IES Standard 90.1-2010 Energy Standard for Buildings Except Low-Rise Residential Buildings.


This addendum adds a new mandatory requirement to section 5.3 (Site Sustainability) to introduce pedestrian friendly environments through the use of designated walkways.


The purpose of this addendum is to strengthen the standard’s stormwater management requirements.


This addendum clarifies the requirements for heating, ventilating, air conditioning, and service water heating equipment when compliance path is chosen for the building project where federal minimum preemptive efficiency requirements are applicable.


This addendum changes the daylighting definitions to coincide with those in 90.1 to facilitate consistent use of these terms.


This standard provides minimum criteria that apply to new buildings and major renovation projects (new portions of buildings and their systems): a building or group of buildings, including on-site energy conversion or electric-generating facilities, which utilize a single submittal for a construction permit or which are within the boundary of a contiguous area under single ownership and Address sustainable sites, water use efficiency, energy efficiency, the building’s impact on the atmosphere, materials and resources, and indoor environmental quality (IEQ). This fourth public review shows changes made to the third public review draft in response to comments receiv

ASIS (ASIS International)

ANSI ASIS PSC.1-2012, Management System for Quality of Private Security Company Operations - Requirements with Guidance

Builds on the Montreux Document and the International Code of Conduct (ICCoC) for Private Security Service Providers to provide requirements and guidance for a management system with auditable criteria for Quality of Private Security Company Operations, consistent with respect for human rights, legal obligations and good practices related to operations of private security services provider companies in conditions where governance and the rule of law have been undermined by conflict or disaster. It provides auditable requirements based on the Plan-Do-Check-Act model for third-party certification of private security services providers working for any client.

ANSI ASIS PSC.2-2010, Conformity Assessment and Auditing Management Systems for Quality of Private Security Company Operations

Provides requirements and guidance for conducting conformity assessment of the ANSI/ASIS PSC.1-2012, Management System for Quality of Private Security Company Operations Standard. It provides requirements for bodies providing auditing and third party certification of PSCs - private security providers working for any client in conditions where governance and the rule of law have been undermined by conflict or disaster. It provides requirements and guidance on the management of audit programs, conduct of internal or external audits of the management system and private security company operations, and competence and evaluation of auditors.

ANSI ASIS PSC.3-2013, Maturity Model for the Phased Implementation of a Quality Assurance Management System for Private Security Service Providers

This standard will benefit private security service providers (PSC) in improving their quality of services consistent with respect for human rights and legal and contractual obligations. It provides a basis for managing risk while reducing costs, demonstrating legal compliance, enhancing stakeholder relations, and meeting client expectations. The model outlines 6 phases ranging from no process in place for quality assurance management, to going beyond the requirements of the Standard. Criteria based on core elements of ANSI/ASIS PSC.1-2012.
ANSI (American Society of Mechanical Engineers)

ANSI B94.21-1968 (R2014), Gear Shaper Cutters
This standard covers types, sizes, tolerances, marking and nomenclature for ground, finishing type gear shaper cutters for generating involute spur and helical gears, splines, and serrations. It also covers ground, finishing type involute herringbone gear shaper cutters for generating herringbone gears.

ANSI CSA B44.1/ASME A17.5-2014, Elevator and Escalator Electrical Equipment
The requirements of this Standard apply to the following electrical equipment for elevators, escalators, moving walks, dumbwaiters, material lifts, and elevating devices for persons with physical disabilities (platform lifts and stairway chairlifts): (a) motor controllers; (b) motion controllers; (c) operation controllers; (d) operating devices; and (e) all other electrical equipment not listed/certified and labelled/markeds according to another product safety standard or code.

ANSI/API 579-1/ASME FFS-1-2016, Fitness-for-Service
Fitness-For-Service (FFS) assessments are quantitative engineering evaluations that are performed to demonstrate the structural integrity of an in-service component that may contain a flaw or damage, or that may be operating under a specific condition that might cause a failure. This Standard provides guidance for conducting FFS assessments using methodologies specifically prepared for pressurized equipment. The guidelines provided in this Standard can be used to make run-repair-replace decisions to help determine if components in pressurized equipment containing flaws that have been identified by inspection can continue to operate safely for some period of time. These FFS assessments are currently recognized and referenced by the API Codes and Standards (510, 570, & 653), and by NB-23 as suitable means for evaluating the structural integrity of pressure vessels, piping systems and storage tanks where inspection has revealed degradation and flaws in the equipment.

Example problems illustrating the use and calculations required for Fitness-For-Service Assessments described in API 579-1/ASME FFS-1 are provided in this document. Example problems are provided for all calculation procedures in both SI and US Customary units.

ANSI/ISO/ASME 14414-2015, Pumping System Energy Assessment
This joint ISO/ASME international standard sets the requirements for conducting and reporting the results of a pumping system assessment (hereafter referenced as “assessment”) that considers the entire pumping system, from energy inputs to the work performed as the result of these inputs. The objective of a pumping system energy assessment is to determine the current energy consumption of an existing system and identify ways to improve system efficiency. These requirements consist of — organizing and conducting an assessment, — analysing the data from the assessment, and — reporting and documenting assessment findings. This International standard is designed to be applied, to open and closed loop pumping systems typically used at industrial, institutional, commercial, and municipal facilities, when requested. This International standard is focused on assessing electrically-driven pumping systems, which are dominant in most facilities, but is applicable with other types of drivers, such as steam turbines and engines, and drives such as belt.

ASME B17.1-1967 (R2013), Keys and Keyseats
This Standard establishes a uniform relationship between shaft size and key size for parallel and taper keys retaining similar basic sizing.

ASME A112.1.2-2012 (R2017), Air Gaps in Plumbing Systems (for Plumbing Fixtures and Water-Connected Receptors)
This Standard identifies methods of providing protection against backflow through means of an air gap and establishes physical requirements and methods of testing air gaps for plumbing fixtures and water receptors.

ASME A112.13-2000 (R2015), Air Gap Fittings for Use With Plumbing Fixtures, Appliances, and Appurtenances
This Standard establishes physical requirements and methods of testing for air gap fittings for protecting against back siphonage and back pressure backflow.

ASME A112.14-1.2003 (R2017), Backwater Valves
This Standard establishes requirements for dimensions, performance requirements, connections, materials and finishes, testing, and marking of backwater valves. Types of backwater valves covered in this Standard include horizontal backwater valves, combination horizontal backwater valves and manual gate valves, terminal backwater valves, combination floor drains with backwater valves, vertical or 90 deg backwater valve, and related products.

ASME A112.14.3-2000 (R2014), Grease Interceptors
This Standard covers general product requirements as well as the performance criteria for the testing and rating of grease interceptors, whose rated flows are 100 gpm (380 L/m) or less.

ASME A112.14.4-2001 (R2017), Grease Removal Devices
This Standard establishes requirements for grease interceptors that are equipped with automatic grease removal devices (GRD). It includes testing requirements and performance criteria designed to ensure conformance to this Standard.

ASME A112.14.6-2010 (R2015), FOG (Fats, Oils & Greases) Disposal Systems
This Standard establishes requirements for FOG (fats, oils, and greases) disposal systems. FOG disposal systems shall be designed to(a) remove FOG from effluent(b) retain separated FOG(c) internally dispose retained FOG by means and methods of mass and volume reduction as required by para. 4. 3. 2

ASME A112.18.1-2012/CSA B125.1-2012, Plumbing Fixture Fittings
This Standard covers plumbing supply fittings and accessories located between the supply stop and the terminal fitting, inclusive, as follows: (a) automatic compensating valves for individual wall-mounted showering systems; (b) bath and shower supply fittings; (c) bidet supply fittings; (d) clothes washer supply fittings; (e) drinking fountain supply fittings; (f) humidifier supply stops; (g) kitchen, sink, and lavatory supply fittings; (h) laundry tub supply fittings; (i) lawn and sediment faucets; (j) metering and self-closing supply fittings; (k) shower heads, hand-held showers, and body sprays; and (l) supply stops.

ASME A112.18.2/CSA B125.2-2015, Plumbing Waste Fittings
This Standard covers plumbing waste fittings of sizes NPS-2 and smaller.

ASME A112.18.3-2002 (R2017), Performance Requirements for Backflow Protection Devices and Systems in Plumbing Fixture Fittings
The purpose of this Standard is to establish performance requirements and statistically valid evaluation methods including durability tests for the manufacture of safe, efficient, and reliable backflow protection devices and systems for plumbing fixture fittings.

ASME A112.18.6/CSA B125.6-2017, Flexible Water Connectors
This Standard covers flexible water connectors for use in water supply systems under (a) continuous pressure in accessible locations and (b) intermittent pressure in recreational vehicles only.

ASME A112.18.8-2009 (2014), In-Line Sanitary Waste Valves for Plumbing Drainage Systems
This Standard establishes minimum requirements for materials in the construction of sanitary waste valves (hereinafter referred to as “the valve”) for use as an alternate to tubular p-traps, and prescribes minimum test requirements for the performance of the valve, together with methods of marking and identification.
This Standard shall show material and performance specifications and use of protectors/insulators for exposed waste and supplies for public/commercial and private/residential buildings used product covered under this Standard.

ASME A112.19.1/CSA B45.2-2013, Enamelled Cast Iron and Enamelled Steel Plumbing Fixtures

This Standard covers enamelled cast iron and enamelled steel plumbing fixtures and specifies requirements for materials, construction, performance, testing, and markings. This Standard covers the following plumbing fixtures: (a) bathtubs; (b) drinking fountains and water coolers; (c) lavatories; (d) shower bases; and (e) sinks: (i) kitchen and bar sinks; (ii) laundry sinks; (iii) service sinks; and (iv) utility sinks.

ASME A112.19.10-2017, Retro Dual Flush Devices for Water Closets

This Standard establishes physical, material, testing and marking requirements for retrofit dual flush devices that are installed within gravity type water closet tanks and have a maximum full flush volume of 4.8 Lpf (1.28 gpf) or greater volume.


This Standard establishes physical requirements and tests addressing structural strength; adjustments; materials; drain line hydraulics; mechanical, material, testing, marking, and document at ion requirements for wall mounted and pedestal mounted adjustable, elevating, tilting and pivoting lavatory, sink, and shampoo bowl carrier systems intended to facilitate use by individuals who are physically challenged. The use of alternate materials or methods are permitted, provided the proposed material and method complies with the performance requirements and intent of this Standard.

ASME A112.19.14-2013, Six-Liter Water Closets Equipped with a Dual Flushing Device

This Standard establishes physical, material, testing, and marking requirements for 6 L water closets that incorporate a water-conserving, dual-flushing feature into the fixture. The tests specified in this Standard are for the removal of liquid wastes and toilet tissue or other comparable waste loads that are expected when actuating the reduced flush feature of the unit. The use of alternate materials or methods is permitted, provided that the proposed material and method comply with the performance requirements and intent of this Standard.

ASME A112.19.15-2012 (R2017), Bathtubs/Whirlpool Bathtubs with Pressure Sealed Doors

This Standard establishes material, mechanical, electrical, marking, and testing requirements for bathtubs/whirlpool bathtubs with doors that are made water tight by the use of a pressure seal.
ASME A112.4.2/CSA B45.16-2015, Water Closet Personal Hygiene Devices
This Standard covers personal hygiene devices for water closets and specifies requirements for materials, construction, performance, testing, and markings. Products covered by this Standard include bidet sprayers and other retrofit personal hygiene devices intended (a) for water closets and water closet seats; and (b) to be used with hot and cold water or cold water only.

ASME A112.4.3-1999 (R2015), Plastic Fittings for Connecting Water Closets to the Sanitary Drainage System
This Standard establishes physical, performance, and testing requirements applicable to the joint that connects water closet to the sanitary drain piping of a plumbing system.

ASME A112.4.4-2017, Plastic Push-Fit Drain, Waste and Vent (DWV) Fittings
This Standard covers reversible push fit drain, waste and vent fittings intended for quick assembly of IPS Schedule 40 series PVC and ABS DWV plastic pipe and fittings for applications above and below ground operating at temperatures between 32°F (0°C) and 140°F (60°C), and specifies requirements for materials, physical characteristics, performance testing, and markings.

ASME A112.6.1M-1997 (R2017), Floor-Affixed Supports for Off-the-Floor Plumbing Fixtures for Public Use
This Standard applies to floor-affixed supports for off-the-floor plumbing fixtures, including combination carriers and waste fittings for water closets, and carriers for urinals, lavatories, sinks, and water coolers.

ASME A112.6.2-200x (R2010), Framing-Affixed Supports For The Off-The-Floor Water Closets With Concealed Tanks
This Standard establishes minimum performance requirements for framing-affixed supports for off-the-floor water closets with concealed tanks. It is not intended to limit the use of other materials, finishes, and designs that equal or exceed the requirements of this Standard.

ASME A112.6.3-2016, Floor and Trench Drains
This Standard covers floor, area, adjustable floor, and trench drains that are used inside of, or outside and immediately adjacent to, building structures. This Standard specifies design requirements, definitions, nomenclature, outlet types and connections, grate-free area, top loading classifications, materials and finishes.

ASME A112.6.4-2003 (R2012), Roof, Deck, and Balcony Drains
This Standard establishes minimum design requirements for roof drains, including general purpose, gutter and cornice, parapet and promenade, balcony, or deck types, which convey rainwater from the roof area of building structures. It includes definitions, nomenclature, outlet types and connections, dome or grate-free area, top loading classifications, materials and finishes, and accessories.

ASME A112.6.7-2010 (R2015), Sanitary Floor Sinks
This Standard applies to sanitary floor sinks and includes requirements for material, construction, inspection, testing, and marking.

ASME A112.6.9-2005 (R2015), Siphonic Roof Drains
This Standard establishes minimum requirements and provides guidelines for the proper design, installation, examination, and testing of siphonic roof drains. It includes definitions of terms and parameters involved in the proper design of siphonic drainage systems. This Standard applies to roof drains designed, manufactured, and installed in piping systems that are intended to operate under depressurized siphonic conditions created by the connected piping system.

ASME A120.1-2014, Safety Requirements for Powered Platforms and Traveling Ladders and Gantry for Building Maintenance
This Standard establishes safety requirements for powered platforms (scaffolds) for buildings where window cleaning and related services are accomplished by means of suspended equipment at heights in excess of 35 ft (11 m) above a safe surface (e.g., grade, street, floor, or roof level). Additionally, this Standard establishes safety requirements for permanent traveling ladders and gantries (TLG).

ASME A13.1-2015, Scheme for the Identification of Piping Systems
This Standard is intended to establish a common system to assist in identification of hazardous materials conveyed in piping systems and their hazards when released in the environment.

ASME A17.1/CSA B44-2016, Safety Code for Elevators and Escalators
This standard covers safety requirements for elevators, escalators, dumbwaiters, moving walks and material lifts.

ASME A17.2-2014, Guide for Inspection of Elevators, Escalators, and Moving Walks
This Guide covers recommended inspection and testing procedures for electric and hydraulic elevators, escalators, and moving walks required to conform to the Safety Code for Elevators and Escalators. NOTE: This Guide may not reflect the latest requirements in the current ASME A17.1/CSA B44 and ASME A17.3 Codes. This guide also includes Canadian references and applicable exceptions for CSA B44-00 and later editions.

ASME A17.3-2015, Safety Code for Existing Elevators and Escalators
This Code is intended to serve as the basis for state and local jurisdictional authorities in adopting retroactive requirements for existing elevators and escalators to enhance the safety of the general public. It is also intended as a standard reference of safety requirements or the guidance of architects, engineers, insurance companies, manufacturers, and contractors, and as a standard of safety practices for building owners and managers of structures where existing elevator equipment covered in the scope of the Code is used.

ASME A17.4-2015, Guide for Emergency Personnel
Guide for emergency personnel (fire, police, etc.), building owners, lessees, and building operating managers explaining the proper procedures to be used for the safe removal of passengers from stalled elevators. As well as providing information with regard to elevator firefighters’ service procedures.

ASME A17.6-2010, Standard for Elevator Suspension, Compensation and Governor Systems
This Standard covers the means and members of suspension, compensation and governor systems for elevators within the Scope of ASME A17.1/CSA B44. This Standard includes the material properties, design, testing, inspection, and replacement criteria for these means. It includes the requirements for Steel Wire Rope, Aramid Fiber Rope and Non-Circular Elastomeric Coated Steel Suspension Members and provides direction for future constructions as new technology develops.

ASME A17.7/CSA B44.7-2006 (R2012), Performance Based Safety Code for Elevators and Escalators
This Code covers the design, construction, operation, inspection, testing, maintenance, alteration, and repair of the following equipment and its associated parts, rooms, spaces, and hoistways, where located adjacent to or adjacent to a building or structure: (a) hoisting and lowering mechanisms, equipped with a car, that move between or two or more landings; (b) power-driven stairways and walkways for carrying persons between landings. This equipment includes, but is not limited to, escalators and moving walks; and (c) hoisting and lowering mechanisms, equipped with a car, that serve two or more landings and are restricted to the carrying of material by their limited size or limited access to the car. This equipment includes, but is not limited to, dumbwaiters and material lifts.

ASME A17.8-2016/CSA B44.8-2016, Standard for Wind Turbine Elevators
ASME A17.8 applies to elevators permanently installed in a wind tower to provide vertical transportation of authorized personnel and their tools and equipment only. Such elevators are typically subjected to extreme temperatures, humidity variations, and substantial horizontal motions where, by reason of their limited use and the types of construction of the structures served, full compliance with ASME A17.1/CSA B44 Part 2 is not practicable or necessary.

ASME A18.1 2014, Safety Standard for Platform Lifts and Stairway Chairlifts
This safety Standard covers the design, construction, installation, operation, inspection, testing, maintenance, and repair of inclined stairway chairlifts and inclined and vertical platform lifts intended for transportation of a mobility impaired person only. The device shall have a limited vertical travel, operating speed, and platform area. Operation shall be under continuous control of the user/attendant. The device shall not penetrate more than one floor. A full passenger enclosure on the platform shall be prohibited.
ASME ANS9.1-2015, Safety Standard for Belt Manlifts

This Standard applies to the manufacture, installation, maintenance, inspection, and operation of manlifts. Manlifts covered by this scope consist of steps and accompanying handholds mounted on, or attached to, an endless belt operating vertically in one direction only and being supported by, and driven through, pulleys at the top and bottom. These manlifts are intended for conveyance of persons only. It is not intended that this scope cover moving stairways, elevators with enclosed platforms, gravity lifts, or conveyors used only for conveying materials.

ASME AG-1-2017, Code on Nuclear Air and Gas Treatment

This Code provides requirements for the performance, design, fabrication, installation, inspection, acceptance testing, and quality assurance of equipment used in air and gas treatment systems in nuclear facilities.

ASME AG-1a-2009, Code on Nuclear Air and Gas Treatment

The Code provides requirements for the performance, design, construction, acceptance testing, and quality assurance of equipment used as components in nuclear safety-related air and gas treatment systems in nuclear facilities. This standard is not intended to be submitted for consideration as an ISO or ISO/IEC JTC 1 standard.

ASME AG-1b-2011, Code on Nuclear Air and Gas Treatment

Provide requirements for the performance, design, construction, acceptance testing, and quality assurance of equipment used as components in nuclear safety-related air and gas treatment systems in nuclear facilities.

ASME ANDE-1-2015, ASME Nondestructive Examination and Quality Control Central Qualification and Certification Program

This Standard includes both performance-based and prescriptive requirements to be used for an ASME Nondestructive Examination and Quality Control Central Qualification and Certification Program that applies to NDE personnel and QC Inspection personnel.

ASME B1.1-2003 (R2008), Unified Inch Screw Threads (UN and UNR Thread Form)

This Standard specifies the thread form, series, class, allowance, tolerance, and designation for unified screw threads. In order to emphasize that unified screw threads are based on inch modules, they may be denoted unified inch screw threads. Several variations in thread form have been developed for unified threads; however, this Standard covers only UN and UNR thread forms. For easy reference, a metric translation of this Standard has been incorporated as Nonmandatory Appendix C. Nonmandatory Appendices A through E contain useful information that is supplementary to the sections of this Standard.

ASME B1.10M-2004 (R2014), Unified miniature Screw Threads

This Standard specifies the thread form, series, tolerance, and designation for the Unified miniature Screw Threads. The series covers a diameter range of 0.30 mm to 1.40 mm, extending the metric M-Profile and unified thread series that begin at 1.6 mm.

ASME B1.11-1958 (R2016), Microscopic Objective Thread

This standard covers the screw thread used for mounting the objective assembly to the body or lens turret of microscopes. It is based on, and intended to be interchangeable with, the screw thread introduced and adopted many years ago by the Royal Microscopical Society of Great Britain, generally known as the rms thread and now almost universally accepted as the basic standard for microscope objective mountings.

ASME B1.12-1987 (R2013), Class 5 Interference - Fit Thread

This Standard provides dimensional tables for external and internal plastic flow interference-fit (Class 5) threads of modified National thread form in the coarse thread series (NC) in sizes 0.250 in. through 1.500 in. This is not the ANSI B1.1 UN thread form. It is intended that designs conforming with this Standard will provide adequate torque conditions which fall within the limits shown in Table 8. The minimum torques are intended to be sufficient to insure that externally threaded members will not loosen in service; the maximum torques establish a ceiling below which seizing, galling, or torsional failure of the externally threaded components is reduced. This Standard provides for the maximum allowable interference. Appendices A, B, C, and D contain useful information that is supplementary to this Standard, such as reprints of the obsolete tentative and alternate Class 5 standards, U. S. Navy ship specifications for elastic interference-fit coarse thread series from 0.250 in. through 2.000 in., U. S. Navy ship specifications for Class 5 Modified which includes nickel-copper-aluminum alloy external threads, and an interference metal comparison of standard to nonstandard interference-fit threads.

ASME B1.13M-2005 (R2015), Metric Screw Threads: M Profile

This Standard contains general metric standards for a 60 deg symmetrical screw thread with a basic ISO 6-1 profile designated M profile. The M profile thread of tolerance class 6H/6g are intended for metric applications where inch class 2A/2B have been used.

ASME B1.16M-1984 (R2016), Gages and Gaging for Metric M Screw Threads

This Standard provides essential specifications and dimensions for the gages used on M series metric screw threads, and covers the specifications and dimensions for the thread gages and measuring equipment. The basic purpose and use of each gage are also described.

ASME B1.2-1983 (R2017), Gages and Gaging for Unified Inch Screw Threads

This Standard provides essential specifications and dimensions for the gages used on Unified inch screw threads UN [unified] and UNR [external threads only] thread form, and covers the specifications and dimensions for the thread gages and measuring equipment. The basic purpose and use of each gage are also described.

ASME B1.20-1-2013, Pipe Threads, General Purpose (Inch)

This Standard covers dimensions and gaging of pipe threads of the following series below: NPT, NPS, NPTR, NPSM, NPSL.

ASME B1.20.3-1976 (R2013), Dryseal Pipe Threads (Inch)

This standard covers two classes of NPTF Dryseal pipe threads; Class 1 and Class 2. The classes differ only in inspection requirements, with Class 1 threads exactly those standardized in ANSI B2.2-1968 (inspection of root and crest truncation not specified). Class 2 threads are identical to Class 1 threads except that inspection of root and crest truncation is required. For Class 2 threads, direct measurement of crest and root truncation is the referee method. These classes do not apply to other than NPTF Dryseal pipe threads.

ASME B1.20.5-1991 (R2014), Gaging for Dryseal Pipe Threads (Inch)

The scope of this Standard is to provide information regarding practical dryseal thread inspection methods and commonly used gages for production evaluation purposes. All dimensions are in inches unless otherwise specified.

ASME B1.20.7-1991 (R2013), Hose Coupling Screw Threads (Inch)

The purpose of this document is to provide standards for application to the threaded parts of hose couplings, valves, nozzles, and all other fittings used in direct connection with hose intended for domestic, industrial, and general service in nominal sizes of 1/2, 5/8, 3/4, 1, 1 1/4, 1 1/2, 2, 2 1/2, 3, 3 1/2, and 4 in.

ASME B1.21M-1997 (R2013), Metric Screw Threads – MJ Profile

This Standard establishes the basic triangular profile for the MJ thread form; provides a system of designations; lists the standard series of diameter/pitch combinations for diameters from 1.6 to 200 mm; and specifies limiting dimensions and tolerances. It specifies the characteristics of the MJ metric series of threads having a minimum 0.15011P radius at the root of the external thread, and also having the minor diameter of the external and internal threads increased above the ASME B 1.13M thread form to accommodate the external thread root radius.

ASME B1.22M-1985 (R2016), Gages and Gaging for MJ Series Metric Screw Threads

This Standard provides essential specifications and dimensions for the gages used on MJ series metric screw threads, and covers the specifications and dimensions for the thread gages and measuring equipment. The basic purpose and use of each gage are also described.
ASME B1.3-2007 (R2017), Screw Thread Gaging Systems for Acceptability: Inch and Metric Screw Threads (UN, UNR, UNJ, M, and MJ)

This Standard presents screw thread gaging systems suitable for determining the acceptability of Unified [UN], UNR [external threads only], UNJ [internal and external threads], M and MJ screw threads on externally and internally threaded products. It establishes the criteria for screw thread acceptance when a gaging system is used.

ASME B1.30-2002 (R2017), Screw Threads: Standard Practice for Calculating and Rounding Dimensions

The purpose of this Standard is to establish uniform and specific practices for calculating and rounding the numeric values used for inch and metric screw thread design data dimensions only.

ASME B1.5-1997 (R2014), Acme Screw Threads

This Standard provides for two general applications of Acme threads: namely, general purpose and centralizing. The limits and tolerances in this Standard relate to single-start Acme threads and may be used, if considered suitable, for multiple-start Acme threads. The latter threads are used to provide relatively fast traversing motion when necessary. The three classes (2G, 3G, and 4G) of general purpose threads have clearances on all diameters for free movement. This thread relies on the thread flanks to maintain concentric operation. The three classes of centralizing threads have a limited clearance at the major diameters of the external and internal threads so that a bearing at the major diameter maintains approximate alignment of the thread axis and prevents wedging on the flanks of the threads. For any combination of the three classes of threads covered in this Standard, some end play or backlash will result. This is unavoidable for interchangeable products. When backlash or end play is objectionable, some mechanical means should be provided to eliminate the condition. In any case, sufficient end play must be left to provide a close running fit. In addition to limiting dimensions for the standard series of diameters and pitches of ACME single-start threads, tables of tolerances, in terms of pitch and diameter, provide for a wide choice of diameters for a given standard pitch. By using the formulas for diameter and pitch increments, the pitch diameter tolerances for special diameters and pitches can be determined for each class. Formulas and data are also provided for allowances on external threads and major and minor diameter allowances and tolerances. The Appendices provide text and

ASME B1.7-2006 (R2016), Nomenclature, Definitions, and Letter Symbols for Screw Threads

The purpose of this Standard is to establish a uniform practice for standard screw threads with regard to the following: (a) screw thread nomenclature; (b) letter symbols for designating features of a screw thread for use on drawings, in tables that set forth dimensional standards, in other records, and for expressing mathematical relationship.

ASME B1.8-1988 (R2016), Stub Acme Screw Threads

This Standard specifies the thread form, allowance, tolerance, designation and gaging for Stub ACME threads. Stub ACME threads are used in those applications where a coarse-pitch thread of shallow depth is required due to mechanical or metallurgical considerations.

ASME B1.9-1973 (R2017), Buttress Inch Screw Threads (7 deg./45 deg. Form with 0.6 Pitch Basic Height of Thread Engagement)

This Standard relates to screw threads of buttress form and provides: a) A form of 7 degrees/45 degrees buttress thread with 0.6p basic height of thread engagement; b) A table of preferred diameter-pitch combinations; c) A formula for calculating pitch diameter tolerances; d) Tolerances for major and minor diameters; e) A system of allowances between external and internal threads; f) Recommended methods of measuring and gaging; g) Dimensional acceptability of buttress product.

ASME B107.100-2010, Flat Wrenches

This standard defines essential performance and safety requirements specifically applicable to combination wrenches, box wrenches, double head, open end wrenches, double head, flare nut, adjustable wrenches, body repair tools and ratchetting box wrenches. It specifies test methods to evaluate performance related to the defined requirements and safety, and indicates limitations of safe use.

ASME B107.110-2012, Socket Wrenches

B107.110 defines essential performance and safety requirements specifically applicable to hand sockets wrenches, socket wrenches for spark plugs, nut drivers, handles and attachments for hand sockets, and driving and spindle ends for portable hand, impact, air and electric tools. It specifies test methods to evaluate performance related to the defined requirements and safety, and indicates limitations of safe use. Principal changes are the uniform inclusion of performance requirements and test methods that evaluate both performance and safety as well as uniform format for sections on definitions, references, performance requirements, tests, and safety requirements and limitations of use.

ASME B107.17-2015, Gages and Mandrels for Wrench Openings

This Standard establishes final inspection gage sizes and test mandrel sizes for wrench openings and spark plug wrench openings for inch and metric sizes. This Standard does not cover every available size, but only those most commonly manufactured.

ASME B107.300-2010 (R2016), Torque Instruments

The purpose of B107.300 is to define essential performance and safety requirements for the following three types of torque instruments: (a) manually operated torque instruments, commonly used for mechanical measurement of torque for control of the tightness of threaded fasteners (b) electronic torque testers used for checking manually operated hand-held torque wrenches and screwdrivers (c) manually operated electronic torque instruments with integral or interchangeable heads. It requires performance for endurance, torque value ranges, and accuracy for these torque instruments. It specifies test methods to evaluate performance related to the defined requirements and safety, and indicates limitations of safe use.

ASME B107.41-2008, Nail Hammers

This Standard provides performance and safety requirements for nail hammers that are intended specifically for use in driving or pulling unhardened nails and ripping apart or tearing down wooden components. It is intended to serve as a guide in selecting, testing, and using the hand tools covered herein. This Standard may be used as a guide by state authorities or other regulatory bodies in the formulation of laws or regulations. It is also intended for voluntary use by establishments that use or manufacture the tools covered.

ASME B107.42-2008, Hatchets and Axes

This Standard provides performance and safety requirements for hatchets (that are intended specifically for use in driving unhardened nails or striking wood products or both; cutting, notching, and shaping wood products or wall board products, or both; cutting, spacing, and aligning soft roofing products, and pulling unhardened nails when the tool is provided with a nail slot) and axes (that are intended primarily for use in felling, trimming, and pruning trees; splitting and cutting wood; notching and shaping logs and timbers; driving wooden or plastic stakes; pulling unhardened nails when the tool is provided with a nail slot; or digging when the particular tool is provided with a digging blade).


This Standard provides performance and safety requirements for glaziers' chisels, wood chisels, ripping chisels and flooring/electricians' chisels. Glaziers' chisels are intended for installing and removing putty around window panes and for general wood chisel work relating to glazing. Wood chisels are intended for making rough and finish cuts in wood. Ripping and flooring/electricians' chisels are intended for use in cutting wood and light prying, such as cutting the tongue of installed flooring sections and raising and removing floor planks. It is intended to serve as a guide in selecting, testing, and using the hand tools covered. It is not the purpose of this Standard to specify the details of manufacturing.
ASME B107.4M-2005 (R2011), Driving and Spindle Ends for Portable Hand, Impact, Air, and Electric Tools

Applies to portable power tools for drilling, grinding, polishing, sawing, and driving threaded fasteners & hand tools for driving threaded fasteners. Other tools not classed as percussion tools belong in this category and may be added by revision, or by addition, through the usual procedure. This Standard includes dimension and tolerances for both driving and driven elements where such coordination is important and not established by reference to the pertinent American National Standards. All dimensions are in inches and millimeters.

ASME B107.50-2007, Brick Chisels, Brick Sets, and Star Drills

Provides performance and safety requirements for brick chisels, brick sets and hand-held star drills. Brick chisels and brick sets are intended specifically for use in scoring and cutting brick and masonry block. Star drills are intended for use in drilling holes in brick, tile, concrete, or stone. Inclusion of dimensional data in this Standard does not mean that all products described herein are stock production sizes. Consumers should consult with manufacturers concerning lists of stock production sizes. This Standard may be used as a guide by state authorities or other regulatory bodies in the formulation of laws or regulations. It is also intended for voluntary use by establishments that manufacture the tools covered. This Standard is also meant to serve as a guide in developing manuals and posters for training personnel to work safely.

ASME B107.500-2010, Pliers

The purpose of B107.500 is to define essential performance and safety requirements for three types of torques instruments: (a) manually operated torque instruments, commonly used for mechanical measurement of torque for control of the tightness of threaded fasteners, (b) for electronic torque testers used for checking manually operated hand-held torque wrenches and screwdrivers and (c) for manually operated electronic torque instruments with integral or interchangeable heads. It includes requirements for endurance, torque value ranges, and accuracy for these torque instruments. It specifies test methods to evaluate performance related to the defined requirements and safety, and indicates limitations of safe use.

ASME B107.52-2007, Nail Puller Bars And Pry Bars

This Standard provides performance and safety requirements for nail puller bars intended primarily for use in extracting nails, and for pry bars that are intended for separating, prying, ripping, lifting, scraping, and aligning applications. It is also intended to serve as a guide in selecting and using the hand tools covered. It is not the purpose of this Standard to specify the details of manufacturing. This Standard is also meant to serve as a guide in developing manuals and posters and for the training of personnel in safe practices. This Standard may be used as a guide by state authorities or other regulatory bodies in the formulation of laws or regulations. It is also intended for voluntary use by establishments that use or manufacture the tools covered. The methods employed to ensure compliance with this Standard shall be determined by the proper regulatory or administrative authority.

ASME B107.53-2008, Ball Peen Hammers

This Standard provides performance and safety requirements for ball peen hammers. Ball peen hammers have a striking face on one end of the head for use in striking punches and chisels, and a ball peen on the opposite end for use in riveting, shaping, and straightening unhardened metals. This Standard is intended to serve as a guide in selecting, testing, and using the hand tools covered herein. This Standard may be used as a guide by state authorities or other regulatory bodies in the formulation of laws or regulations. It is also intended for voluntary use by establishments that use or manufacture the tools covered.

ASME B107.54-2008, Heavy Striking Tools - Safety Requirements

This Standard provides safety requirements for the design, construction, testing and use of the following styles of heavy striking tools: Blacksmith's Double-Face Sledges, Hand Drilling Hammers, Woodchoppers' Maul, Railroad Spike Maul, Spalling Hammers, Stone Sledge, Bush hammers, Boat Mauls and Lineman's or Farrier's Turning Hammers.

ASME B107.56-2007, Body Repair Tools

This Standard provides performance and safety requirements for body repair hammers, dolly blocks, and spoons that are intended specifically for the reshaping of sheet metal panels normally found on bodies and fenders of motor vehicles. They are intended to be used separately or together for these repairs. This Standard provides guidelines in selecting, testing and using the hand tools covered herein. It is not the purpose of this Standard to specify the details of manufacturing.


This Standard provides performance and safety requirements for riveting, scaling, and tinner's setting hammers that are used in specific applications. (a) Riveting hammers: Intended specifically for driving, spreading, and setting unhardened rivets in hardened materials (also called tinner's or machinist's riveting hammers). (b) Scaling hammers: Intended specifically for removing scale, paint, welding flux, rust, or other similar flaking material from the surface of unhardened metal (also called chipping hammers). (c) Tinner's setting hammers: Intended specifically for closing, forming, and peening sheet metal (also called peening hammers). This Standard is also intended to serve as a guide for the development of manuals and posters and for training personnel to work safely. This Standard may be used as a guide by state authorities or other regulatory bodies in the formulation of laws or regulations. It is also intended for the voluntary use by establishments that use or manufacture the tools covered. The methods employed to ensure compliance with this Standard shall be determined by the proper regulatory or administrative authority.

ASME B107.59-2007, Slugging and Striking Wrenches

This Standard provides performance and safety requirements for slugging and striking wrenches that are intended for torquing of fasteners. It is intended to serve as a guide in selecting, testing, and using the hand tools covered herein. It is not the purpose of this Standard to specify the details of manufacturing. This Standard is also meant to serve as a guide for the development of manuals and posters and for training personnel to work safely.

ASME B107.600-2016, Screwdrivers and Screwdriver Bits

This Standard covers straight handle-type screwdrivers of flat tip, PHILLIPS® and POZIDRIV® designs intended for manual operation in driving or removing screws with slotted and PHILLIPS® or POZIDRIV® recesses. It also covers hexagonal shank flat tip and PHILLIPS® (PH1) and POZIDRIV® (PZ2) design screwdriver bits intended for manual (non-power) operation in driving or removing screws with slotted heads and screws with PHILLIPS or POZIDRIV recesses. Additionally, it specifies two types of penetration gaging of Phillips (PH) and Pozidriv (PZ) screwdrivers and supplements the ASME blade and bit standards.

ASME B133.8-2011 (R2017), Gas Turbine Installation Sound Emissions

This Standard is applicable to land-based, or shoreside, barge-mounted gas turbines in single or multiple arrangements, for indoor or outdoor stationary installations. Applications may include, but are not limited to, gas turbine-driven generators, compressors, or pumps, in simple-cycle gas turbines or combined-cycle gas turbines with simple-cycle bypass capabilities.
This Standard covers Classes 25, 125, and 250 Gray Iron Pipe Flanges and Flanged Fittings. It includes (a) pressure–temperature ratings (b) sizes and method of designating openings of reducing fittings (c) marking (d) materials (e) dimensions and tolerances (f) bolting and gaskets (g) pressure testing

ASME B16.10-2017, Face-to-Face and End-to-End Dimensions of Valves
This Standard covers face-to-face and end-to-end dimensions of straightway valves, and center-to-face and center-to-end dimensions of angle valves.

ASME B16.11-2016, Forged Fittings, Socket-Welding and Threaded
This Standard covers ratings, dimensions, tolerances, marking, and material requirements for forged fittings, both socket-welding and threaded, as illustrated in Tables 1 through 5 and Tables I-1 through I-5, inclusive.

ASME B16.12-2009 (R2014), Cast Iron Threaded Drainage Fittings
This Standard for cast iron threaded drainage fittings covers (a) sizes and method of designating openings in reducing fittings (b) marking (c) material (d) dimensions and tolerances (e) threading (f) ribs (g) coatings (h) face bevel

ASME B16.14-2013, Forrrous Pipe Plugs, Bushings, and Locknuts with Pipe Threads
This Standard covers the following: (a) pressure–temperature ratings (b) size (c) marking (d) materials (e) dimensions and tolerances (f) threading (g) pattern taper

ASME B16.15-2013, Cast Copper Alloy Threaded Fittings
This Standard covers cast Classes 125 and 250 copper alloy threaded pipe fittings with provisions for substituting wrought copper alloys for plugs, bushings, caps, and couplings in small sizes. This Standard includes the following: (a) pressure–temperature ratings (b) size and method of designating openings of reducing pipe fittings (c) marking requirements (d) minimum requirements for casting quality and materials (e) dimensions and tolerances in SI (metric) and U.S. Customary units (f) threading requirements (g) pressure test requirements Mandatory Appendix I provides table values in U.S. Customary units.

ASME B16.18-2012, Cast Copper Alloy Solder Joint Pressure Fittings
This Standard for cast copper alloy solder joint pressure fittings designed for use with copper water tube, establishes requirements for: (a) pressure-temperature ratings; (b) abbreviations for end connections; (c) sizes and method of designating openings of fittings; (d) marking; (e) material; (f) dimensions and tolerances; and (g) tests

ASME B16.20-2012, Metallic Gaskets for Pipe Flanges (Ring-Joint, Spiral-Wound, and Jacketed)
This Standard covers materials, dimensions, tolerances, and markings for metal ring-joint gaskets, spiral-wound metal gaskets, metal-jacketed gaskets, and grooved metal gaskets with covering layer. These gaskets are dimensionally suitable for use with flanges described in reference flange standards ASME B16.5, ASME B16.47, API Specification 6A, and ISO 10423.

ASME B16.21-2016, Nonmetallic Flat Gaskets for Pipe Flanges
This Standard covers types, sizes, materials, dimensions, tolerances, and markings for nonmetallic flat gaskets. These gaskets are dimensionally suitable for use with flanges described in the referenced flange standards.

ASME B16.22-2013, Wrought Copper and Copper Alloy Solder Joint Pressure Fittings
This Standard establishes specifications for wrought copper and wrought copper alloy, solder-joint, seamless fittings, designed for use with seamless copper pipe conforming to ASTM B88 (water and general plumbing systems), B280 (air conditioning and refrigeration service), and B819 (medical gas systems), as well as fittings intended to be assembled with soldering materials conforming to ASTM B32, brazing materials conforming to AWS A5.8, or with tapered pipe thread conforming to ASME B1.20.1. This Standard is allied with ASME B16.18, which covers cast copper alloy pressure fittings. It provides requirements for fitting ends suitable for soldering. This Standard covers the following: (a) pressure–temperature ratings (b) abbreviations for end connections (c) size and method of designating openings of fittings (d) marking (e) material (f) dimensions and tolerances (g) tests

ASME B16.23-2016, Cast Copper Alloy Solder Joint Drainage Fittings: DWV
This Standard establishes specifications for cast copper alloy solder joint drainage fittings, designed for use in drain, waste, and vent (DWV) systems. These fittings are designed for use with seamless copper pipe conforming to ASTM B306, Copper Drainage Tube (DWV), as well as fittings intended to be assembled with soldering materials conforming to ASTM B32, or tapered pipe thread conforming to ASME B1.20.1.

ASME B16.24-2016, Cast Copper Alloy Pipe Flanges, Flanged Fittings, and Valves: Classes 150, 300, 600, 900, 1500, and 2500
This Standard covers cast copper alloy: (a) threaded pipe flanges and blind flanges having rating class designations 150, 300, 600, 900, 1500, and 2500, (b) flanged fittings having rating class designation 150 and 300, and (c) threaded and flanged valves having rating class designations 150, 300, 600, 900, 1500, and 2500. 1.2 It establishes requirements for (a) pressure-temperature ratings (b) size and method of designating openings for reduced fittings (c) markings (d) materials (e) dimensions (f) bolting and gaskets (g) tolerances (h) nondestructive examination for valves (i) tests

ASME B16.25-2012, Butt Welding Ends
This Standard covers the preparation of butt welding ends of piping components to be joined into a piping system by welding. It includes requirements for welding bevels, for external and internal shaping of heavy-wall components, and for preparation of internal ends (including dimensions and tolerances). Coverage includes preparation for joints with the following: (a) no backing rings (b) split or noncontinuous backing rings (c) solid or continuous backing rings (d) consumable insert rings (e) gas tungsten arc welding (GTAW) of the root pass Details of preparation for any backing ring must be specified when ordering the component.

ASME B16.26-2013, Cast Copper Alloy Fittings for Flared Copper Tubes
This Standard establishes specifications for cast copper alloy fittings and nuts used with flared seamless copper tube conforming to ASTM B88 (water and general plumbing systems). Included are requirements for the following: (a) pressure rating (b) size (c) marking (d) material (e) dimensions (f) threading (g) hydrostatic testing

ASME B16.29-2012, Wrought Copper and Wrought Copper Alloy Solder Joint Drainage Fittings - DWV
This Standard for wrought copper and wrought copper alloy solder-joint drainage fittings, designed for use with copper drainage tube conforming to ASTM B 306, covers the following: (a) description (b) pitch (slope) (c) abbreviations for end connections (d) sizes, and method of designating openings for reducing fittings (e) marking (f) material (g) dimensions and tolerances

ASME B16.3-2016, Malleable Iron Threaded Fittings - Classes 150 and 300
This Standard covers malleable iron threaded fittings, Classes 150 and 300. It also contains provisions for using steel for caps and couplings in Class 150 for NPS 378 and smaller. This Standard includes (a) pressured €’temperature ratings (b) size and method of designating openings of reducing fittings (c) marking (d) material (e) dimensions and tolerances (f) threading (g) coatings Mandatory Appendix I provides table values in U.S. Customary units.

ASME B16.33-2012, Manually Operated Metallic Gas Valves for Use in Gas Piping Systems up to 125 PSI
This Standard covers requirements for manually operated metallic valves sizes NPS 1/2 through NPS 2, for outdoor installation as gas shut-off valves at the end of the gas service line and before the gas regulator and meter where the designated gauge pressure of the gas piping system does not exceed 175 psi (12.1 bar). The Standard applies to valves operated in a temperature environment between 20°F and 150°F (729°C and 66°C).
ASME B16.34-2017, Valves - Flanged, Threaded, and Welding End

This Standard applies to new construction and covers pressure-temperature ratings, dimensions, tolerances, materials, nondestructive examination requirements, testing, and marking for cast, forged, and fabricated flanged, threaded, and welding end and wafer or flangeless valves of steel, nickel-base alloys, and other alloys.

ASME B16.36-2015, Orifice Flanges

This Standard covers pressure-temperature ratings, materials, dimensions, tolerances, testing and marking of flanges that have orifice pressure differential connection.

ASME B16.38-2012, Large Metallic Valves for Gas Distribution (Manually Operated, NPS 2 1/2 (DN 65) to NPS 12 (DN 300), 125 psig (8.6 bar) Maximum)

This Standard covers requirements for manually operated metallic valves in nominal sizes 2 1/2 (DN 65) through 12 (DN 300) having the inlet and outlet on a common centerline. These valves are intended for controlling the flow of gas from open to fully closed positions, for use in distribution and service lines where the maximum gage pressure does not exceed 125 psig (8.6 bar). Valve seats, seals, and stem packing may be nonmetallic.

ASME B16.39-2014, Malleable Iron Threaded Pipe Unions

This Standard covers threaded malleable iron unions, Classes 150, 250, and 300. It also contains provisions for using steel for NPS 1/8 unions. This Standard includes (a) design (b) pressure-temperature ratings (c) size (d) marking (e) materials (f) joints and seats (g) threads (h) hydrostatic strength (i) tensile strength (j) air pressure test (k) sampling (l) coatings (m) dimensions Mandatory Appendix I provides tables in U.S. Customary units.

ASME B16.4-2016, Gray Iron Threaded Fittings Classes 125 and 250

This Standard for gray iron threaded fittings, Classes 125 and 250, covers (a) pressure-temperature ratings (b) sizes and method of designating openings of reducing fittings (c) marking (d) material (e) dimensions and tolerances (f) threading (g) coatings Mandatory Appendix I provides tables in U.S. Customary units.

ASME B16.40-2013, Manually Operated Thermoplastic Gas Shutoffs and Valves in Gas Distribution Systems

This Standard covers manually operated thermoplastic valves in nominal valve sizes 1/2 through 12. These valves are intended for use below ground in thermoplastic fuel gas distribution mains and service lines. The maximum operating pressure (MOP) at which such distribution piping systems may be operated is in accordance with the Code of Federal Regulations (CFR) Title 49, Part 192, Transportation of Natural and Other Gas by Pipeline; Minimum Safety Standards, for temperature ranges of -20°F to 140°F (-29°C to 60°C).

ASME B16.42-2016, Ductile Iron Pipe Flanges and Flanged Fittings Classes 150 and 300

This Standard covers minimum requirements for Classes 150 and 300 cast ductile iron pipe flanges and flanged fittings. The requirements covered are as follows: (a) pressure-temperature ratings (b) sizes and method of designating openings of reducing fittings (c) marking (d) material (e) dimensions and tolerances (f) bolts, nuts, and gaskets (g) tests

ASME B16.44-2010, Manually Operated Metalastic Gas Valves for Use in Aboveground Piping Systems up to 5 psi

This Standard applies to new valve construction and covers quarter turn manually operated metallic valves in sizes NPS 4 1/4 and tubing sizes 1 1/4 O. D. These valves are intended for indoor installation as gas shutoff valves when installed in aboveground fuel gas piping downstream of the gas meter outlet and upstream of the inlet connection to a gas appliance. The valves covered by this Standard are intended for service at temperatures between 32°F (0°C) and 125°F (52°C) at pressure ratings not to exceed 5 psi (0.34 bar). When so designated by the manufacturer, these valves may be installed for service outdoors and/or at temperatures below 32°F (0°C) and/or above 125°F (52°C).

ASME B16.47-2017, Large Diameter Steel Flanges

This Standard covers pressure-temperature ratings, materials, dimensions, tolerances, marking, and testing for pipe flanges in sizes NPS 26 through NPS 60.

ASME B16.48-2015, Line Blanks

This Standard covers pressure-temperature ratings, materials, dimensions, tolerances, marking, and testing for operational line blanks in sizes NPS 1/2 through NPS 24 for installation between ASME B16.5 flanges in the 150, 300, 600, 900, 1500, and 2500 pressure classes.

ASME B16.49-2012, Factory-Made Wrought Steel Butt-welding Induction Bends for Transportation and Distribution Systems

This Standard covers design, material, manufacturing, testing, marking, and inspection requirements for factory-made pipeline bends of carbon steel materials having controlled chemistry and mechanical properties, produced by the induction bending process, with or without tangents. This Standard covers induction bends for transportation and distribution piping applications (e.g., ASME B31.4, B31.8, and B31.11). Process and power piping have differing requirements and materials that may not be appropriate for the restrictions and examinations described herein and, therefore, are not included in this Standard.

ASME B16.5-2017, Pipe Flanges and Flanged Fittings NPS 1/2 Through NPS 24 Metric/Inch Standard

This Standard covers pressure-temperature ratings, materials, dimensions, tolerances, markings, testing, and methods of designing openings for pipe flanges and flanged fittings. Included are flanges with rating class designations 150, 300, 400, 500, and 1500 in sizes NPS 1/2 through NPS 24 and flanges with rating class designation 2500 in sizes NPS 1/2 through NPS 12.

ASME B16.50-2013, Wrought Copper and Copper Alloy Brake-Joint Pressure Fittings

This Standard establishes requirements for wrought copper and wrought copper alloy brake-joint seamless fittings designed for use with seamless copper tube conforming to ASTM Standard Specification, B88 (Water and General Plumbing Systems), B280 (Air Conditioning and Refrigeration Service), and B819 (Medical Gas Systems). This Standard covers joints assembled with brazing materials conforming to ANSI/AWS A5.8. This Standard is allied to ASME standards B16.18 and B16.22. It provides requirements for fitting-ends suitable for brazing. This Standard covers: (a) pressure-temperature ratings; (b) abbreviations for end connections; (c) size and method of designating openings of fittings; (d) marking; (e) material; (f) dimensions and tolerances; and (g) testing.

ASME B16.51-2013, Copper and Copper Alloy Press-Connect Pressure Fittings

This Standard establishes requirements for cast copper alloy, wrought copper, and wrought copper alloy, press-connector pressure fittings for use with hard drawn seamless copper water tube conforming to ASTM B88 for piping systems conveying water. The press-connect system (tube, fitting, and joint) conforming to this Standard is for use at a maximum pressure of 1,380 kPa (200 psi) over the temperature range from 0°C to 93°C (32°F to 200°F). This Standard provides requirements for fittings suitable for press-connect joint and covers the following: (a) size designations (b) pressure-temperature ratings (c) terminology (d) dimensions and tolerances (e) materials (f) design qualification (g) required installation instructions (h) markings

ASME B16.9-2012, Factory-Made Wrought Butt-welding Fittings

This Standard covers overall dimensions, tolerances, ratings, testing, and markings for factory-made wrought butt-welding fittings in sizes NPS 1/2 through NPS 48 (DN 15 through DN 1200).

ASME B17.2-1967 (R2013), Woodruff Keys and Keyseats

This standard covers nomenclature, definitions, identification number, dimensions and tolerances of Woodruff Keys and Keyseats.

ASME B18.1.1-1972 (R2016), Small Solid Rivets

This standard covers complete general and dimensional data for those types of small solid rivets recognized as “American National Standard”. All other types of small solid rivets, within the limits of the diameters contained herein, are to be considered special.
This Standard covers general and dimensional data for those types of large solid rivets recognized as "American National Standard" together with dimensional data applicable to manufactured heads after driving, driven heads, and hold-on (dolly bar) and rivet set impressions.

ASME B18.1.3M-1983 (R2016), Metric Small Solid Rivets
This Standard covers general and dimensional data for those types of metric small solid rivets recognized as American National Standard.

ASME B18.10-2006 (R2016), Track Bolts and Nuts
This Standard covers the complete general and dimensional data for inch series oval neck and elliptic neck track bolts and square nuts intended for use with these bolts, and recognized as an American National Standard.

ASME B18.11-1961 (R2017), Miniature Screws
This standard establishes head types, their dimensions, and lengths of slotted head miniature screws, threaded.

ASME B18.12-2012, Glossary of Terms for Mechanical Fasteners
This Standard covers nomenclature and terminology for mechanical fasteners (bolts, studs, screws, nuts, washers, rivets, pins, sems, retaining rings and similar fasteners).

ASME B18.13-2017, Screw And Washer Assemblies - Sems (Inch Series)
This Standard covers general and dimensional data pertinent to the various types of screw and captive washer assemblers, otherwise known as SEMS. SEMS products may include screws, tapping screws, or bolts in sizes #0 through ½" diameters in various grades and materials. The word SEMS is recognized in the United States as a generic term applicable to screw and washer assemblies. Also included in this Standard are appendices to illustrate the relative proportions of plain and conical washer SEMS.

ASME B18.13M-2011 (R2016), Screw and Washer Assemblies: Sems (Metric Series)
This Standard covers the general, dimensional, material, and mechanical requirements for metric through-hardened (property classes 8.8, 9.8, and 10.9) machine screws and case-hardened tapping screws from 5 mm to 12 mm captivated washer assemblies (SEMS). The covered washer types are helical, plain, conical, and toothed.

ASME B18.15-2015, Forged Eyebolts
This Standard is limited to dimensions and capacities for carbon and stainless steel forged threaded eyebolts in sizes ½ through 2-1/2 inch for steel and ¼ through 1-1/2" for corrosion resistant stainless steel intended primarily for lifting applications, and covers the following types and styles. Type 1, Plain pattern (straight shank) (see Tables 1 and 3) Style A, Long length Style B, Short length Style 2, Shoulder pattern (see Tables 2 and 4) Style A, Long length Style B, Short length Appendices A and B contain descriptive and cautionary information pertinent to forged eyebolts. Appendix D provides information on eyebolts with metric threads M6 through M36 and corresponding material and performance information.

ASME B18.16.4-2009 (R2013), Serrated Hex Flange Locknuts 90,000 PSI (Inch Series)
This Standard covers the general, dimensional, and mechanical performance requirements for low strength carbon steel, case hardened, regular and large serrated flange locknuts (inch series), recognized as American National Standard.

ASME B18.16.6-2017, Prevailing Torque Locknuts (Inch Series)
This standard covers the complete general, dimensional, mechanical, and performance requirements (proof load, prevailing torque, and torque-tension) for carbon steel inch series nylon insert locknuts of grades N2, NS, and N8 in styles NE (1/4" - 1 1/2"), NTE (1/4" - 1 1/2"), NU (1/4" - 3"), NTU (1/4" - 3"), NM (2" - #12), NTM (#2 – #12), and hex flange (1/4" - 3/4").

ASME B18.16M-2004 (R2016), Prevailing-Torque Type Steel Metric Hex Nuts and hex Flange Nuts
This Standard covers the complete general, dimensional, mechanical, and performance data for metric prevailing-torque hex nuts and hex flange nuts of property classes 5, 9, and 10 as defined in ASTM A563M.

ASME B18.18-2017, Quality Assurance for Fasteners
This quality focused Standard establishes in-process and final inspection requirements for fastener products as well as a receiving inspection plan for fastener purchasers. This Standard identifies four categories, recognizing that fastener users have widely varying requirements. The four categories covered are as follows: (a) Category 1 — A receiving inspection plan for purchasers (b) Categories 2 and 3 — Utilizes documented and verifiable in-process controls structured at the producer’s discretion (c) Category 4 — Includes all of the requirements of Category 2 plus 100% inspection for a specific feature or features

ASME B18.2.1-2012, Square and Hex Bolts and Screws - Inch
This Standard covers the dimensional requirements for nine product types of inch series bolts and screws recognized as American National Standard. Also included are appendices covering gaging procedures, grade markings for bolts and screws, formulas on which dimensional data are based, and a specification to assist in identifying a product as being a screw or a bolt. Where questions arise concerning acceptability of product, the dimensions in the tables shall govern over recalulation by formula. Heavy hex structural bolts, formerly covered in ASME B18. 2. 1 are now covered in ASME B18. 2. 6. The inclusion of dimensional data in this Standard is not intended to imply that all of the products described herein are stock production sizes. Consumers should consult with suppliers concerning lists of stock production sizes.

ASME B18.2.2-2015, Nuts for General Applications: Machine Screw Nuts, Hex, Square, Hex Flange, and Coupling Nuts (Inch Series)
This Standard is intended to cover the complete general and dimensional data for the various types of inch series square and hex nuts, including machine screw nuts and coupling nuts, recognized as American National Standard. Also included are appendices covering gaging of slots in slotted nuts, wrench openings for nuts, and formulas on which dimensional data are based. It should be understood, however, that where questions arise concerning acceptance of product, the dimensions in the tables shall govern over recalulation by formula. The inclusion of dimensional data in this Standard is not intended to imply that all of the products described herein are stock production sizes. Consumers are requested to consult with manufacturers concerning lists of stock production sizes.

ASME B18.2.3.3M-2007 (R2014), Metric Heavy Hex Screws
This Standard covers the complete general and dimensional data for metric heavy hex screws.

ASME B18.2.3.5M-1979 (R2016), Metric Hex Bolts
This standard covers the complete general and dimensional data for metric hex bolts.

ASME B18.2.3.9M-2001 (R2014), Metric Heavy Hex Flange Screws
This Standard covers the complete dimensional and general data for metric series heavy hex flange screws recognized as American National Standard.

ASME B18.2.4.3M-2017, Flange Nuts
This Standard covers the dimensional and performance requirements for inch series square and hex flange nuts, including machine screw nuts and coupling nuts, recognized as American National Standard. Also included are appendices covering gaging of slots in slotted nuts, wrench openings for nuts, and formulas on which dimensional data are based. It should be understood, however, that where questions arise concerning acceptance of product, the dimensions in the tables shall govern over recalulation by formula. The inclusion of dimensional data in this Standard is not intended to imply that all of the products described herein are stock production sizes. Consumers are requested to consult with suppliers concerning lists of stock production sizes.

ASME B18.2.4.5M-2004, Hex Nuts
This Standard covers the dimensional and performance requirements for inch series square and hex nuts, including machine screw nuts and coupling nuts, recognized as American National Standard. Also included are appendices covering gaging of slots in slotted nuts, wrench openings for nuts, and formulas on which dimensional data are based. It should be understood, however, that where questions arise concerning acceptance of product, the dimensions in the tables shall govern over recalulation by formula. The inclusion of dimensional data in this Standard is not intended to imply that all of the products described herein are stock production sizes. Consumers are requested to consult with suppliers concerning lists of stock production sizes.

ASME B18.2.4.6M-2008, Hex Flange Nuts
This Standard covers the dimensional and performance requirements for inch series square and hex flange nuts, including machine screw nuts and coupling nuts, recognized as American National Standard. Also included are appendices covering gaging of slots in slotted nuts, wrench openings for nuts, and formulas on which dimensional data are based. It should be understood, however, that where questions arise concerning acceptance of product, the dimensions in the tables shall govern over recalulation by formula. The inclusion of dimensional data in this Standard is not intended to imply that all of the products described herein are stock production sizes. Consumers are requested to consult with suppliers concerning lists of stock production sizes.
ASME B18.2.5M-203, Metric Flanged 12-Point Head Screws

This Standard covers the complete dimensional and general data for metric series 12-point flange screws recognized as American National Standard. The inclusion of dimensional data in this Standard is not intended to imply that all products described are stock production items.

ASME B18.2.6 (Supplement)-2010, Fasteners for Use in Structural Applications (Supplement)

Covers the complete general and dimensional data for five products in the inch series recognized as an American National Standard.

ASME B18.2.6-2010, Fasteners for Use in Structural Applications

This Standard covers the complete general and dimensional data for five products in the inch series recognized as American National Standard. These five structural products include: (a) Heavy Hex Structural Bolts: ASTM A 325 or and ASTM A 490, (b) Heavy Hex Nuts: ASTM A 563, (c) Hardened Steel Washers; Circular, Circular Clipped and Beveled; ASTM F 436, (d) Compressible Washer-Type Direct Tension Indicators: ASTM F 959, (e) Twist-Off-Type Tension Control Structural Bolts: Heavy Hex and Round: ASTM F 1852 and F 2280

ASME B18.2.6M-2012, Metric Fasteners For Use In Structural Applications

This Standard covers the complete general and dimensional data for products in the metric series recognized as American National Standard. These five metric structural products include: (a) Metric Heavy Hex Structural Bolts: ASTM A 325M and ASTM A 490M (b) Metric Heavy Hex Nuts: ASTM A 563M (c) Hardened Metric Steel Washers; Circular, Circular Clipped and Beveled: ASTM F 436M (d) Metric Compressible Washer-Type Direct Tension Indicators: ASTM F 959M

ASME B18.2.8-1999 (R2017), Clearance Holes for Bolts, Screws, and Studs

This Standard covers the recommended clearance hole sizes for #0 through 1.5 in. and M1 .6 through M100 metric fasteners in three classes of clearance using a close-, normal-, and loose-fit category.

ASME B18.2.9-2010 (R2017), Straightness Gage and Gaging for Bolts and Screws

This Standard describes the gage and procedure for checking bolt and screw straightness at maximum material condition (MMC) and provides default limits when not stated in the applicable product standard.


This Standard covers the dimensional requirements, physical properties, and related test methods for helical spring-lock washers (#0 through 3 in.), tooth-lock washers (# 2 through 1 3/4 in.), and plain washers (# 0 through 3 in.).

ASME B18.21.2M-1999 (R2014), Lock Washers (Metric Series)

This Standard covers the dimensions, physical properties, and methods of testing for helical spring and tooth lock washers.

ASME B18.21.2M-1999 (R2014), Lock Washers (Metric Series)

This Standard covers the dimensions, physical properties, and methods of testing for helical spring and tooth lock washers.

ASME B18.21.3-2008 (R2013), Double Coil Helical Spring Lock Washers for Wood Structures

This Standard covers the dimensional and physical properties and methods of testing for double coil helical spring lock washers for wood structures.

ASME B18.22M-1981 (R2017), Metric Plain Washers

This Standard covers general specifications and dimensions for flat, round hole washers, both soft (as fabricated) and hardened, intended for use in general purpose applications.

ASME B18.24-2015, Part Identifying Number (PIN) Code System Standard for B18 Fastener Products

This Standard is intended to provide all users (manufacturers, distributors, design and configuration, parts control, inventory control, test and maintenance functions) with the capability to identify externally threaded, internally threaded and nonthreaded fastener products by a preselected order of coding as specified herein. The B18 PIN is a self-contained code, with distinct identification linkage to individual ASME B18 fastener product standards. The PIN code concept provides for direct traceability back to the applicable B18 product standard. In case of conflict with this document and the B18 product standard, the B18 product standard shall take precedence. This Standard is not intended for use as a substitute for the correct usage of the B18 standards for fastener selection and specification. The PIN code is intended as an alternative to the plain text product callout as prescribed in the “Designation” or “Ordering” section of the source B18 product standard. The existence of a PIN code for B18 fastener description is not intended to imply that all products described are available.

ASME B18.27-1998 (R2017), Tapered and Reduced Cross Section Retaining Rings (Inch Series)

This Standard covers data for external and internal (heavy duty, bowed, inverted, beveled, self locking/interlocking) and c ring, e ring, and external bowed locking prongs of retaining rings.

ASME B18.29.1-2010 (R2017), Helical Coil Screw Thread Inserts - Free Running and Screw Locking (Inch Series)

This Standard delineates the dimensional data for the inch series helical coil screw thread inserts and the threaded holes into which they are installed.

ASME B18.29.2M-2005 (R2017), Helical Coil Screw Thread Inserts - Free Running and Screw Locking (Metric Series)

This Standard delineates the dimensional, mechanical, and performance data for the metric series helical coil screw thread insert and threaded hole into which it is installed.

ASME B18.3-2012, Socket Cap, Shoulder, Set Screws, and Hex Keys (Inch Series)

This Standard covers complete general and dimensional data for various types of hexagon socket cap screws, shoulder screws, set screws, and hexagon keys recognized as an American National Standard. Also included are appendices that provide specifications for hexagon socket gages and gaging, tables showing applicability of keys and bits to various socket screw types and sizes, drill and counterbore sizes for socket head cap screws, and formulas used for dimensional data. However, where questions arise concerning acceptance of product, the dimensions in the tables shall govern over recalculation by formula. Recess dimensions for Type VI recesses are in mandatory appendix IV.

ASME B18.31.1M-2008 (R2016), Metric Continuous and Double End Studs

This Standard covers the complete dimensional and general data for continuous-thread and double-end metric series studs recognized as an American National Standard. The following configurations are covered: continuous-thread stud: studs that are threaded over their complete length. double-end stud (clamping-type): studs designed to be installed in a tapped hole and usually with different threaded lengths on each end. The tap-end studs covered by this Standard have the same thread form on each end with the length of the tap-end threads equal to approximately 1.75 times the nominal thread diameter. NOTE: Both types of double-end studs in this Standard may be installed with a nut on each end. Similarly, one end of each type may be set in a tapped hole, usually with a locking compound. Double-end studs of the following body diameters are covered: (a) reduced-diameter body. See para. 6.1 for dimensions. (b) full body. See para. 6.2 for dimensions.

ASME B18.31.2-2014, Continuous Thread, Flange (Stud Bolt), and Double-End Studs (Inch Series)

This Standard covers the complete dimensional and general data for continuous thread, flange studs (stud bolts), and double-end inch-dimensioned studs recognized as American National Standard.

ASME B18.31.3-2014 , Threaded Rod (Inch Series)

This Standard covers the complete general and dimensional data for inch series threaded rods. Included are the following thread configurations and diameters: • UNC threads #4 through 4 inches • UNF threads #4 through 1 1/2 inches • 8 UN threads 1 1/8 through 4 inches • Acme threads 1/4 through 5 inches
ASME B18.31.4M-2009 (R2017), Threaded Rod (Metric Series)
This Standard covers the complete general and dimensional data for metric series threaded rod.

ASME B18.31.5-2011 (R2016), Bent Bolts (Inch Series)
This Standard establishes general requirements for parts classified as bent bolts. Dimensional requirements are provided in tables for U-bolts of differing bends, eyebolts, hook bolts of differing bends, and J-bolts. General requirements are provided for offset round bend, J-bolts, square bend hook bolts, vee bend U-bolts, and slant U-bolts.

ASME B18.5-2012, Round Head Bolts (Inch Series)
Covers the complete general and dimensional data for the various types of inch series bolts generally classified as round head bolts and recognized as American National Standard. The inclusion of dimensional data in this Standard is not intended to imply that all of the products described are stock production sizes. Consumers should consult with manufacturers concerning availability of products.

ASME B18.6.1-1981 (R2016), Wood Screws (Inch Series)
This standard covers the complete general and dimensional data for the various types of doted and recessed head wood screws recognized as “American National Standard.” Also included are appendixes which provide specifications and instructions for penetration gaging and wobble gaging of recessed head screws; documentation for screw head types relegated to non-preferred status; and formulas on which dimensional data are based. It shall be understood, however, that where questions arise concerning acceptance of product, the dimensions in the tables shall govern over recalculation by formula.

ASME B18.6.2-1998 (R2010), Slotted Head Cap Screws, Square Head Set Screws And Slotted Headless Set Screws
This Standard covers data for slotted head cap screws and square head and slotted headless set screws, thread runout sleeve gages, protrusion gaging, and wrench openings.

ASME B18.6.3-2013, Machine Screws, Tapping Screws, and Metallic Drive Screws (Inch Series)
This Standard is intended to cover the complete general and dimensional data for the various types of slotted and recessed head machine screws, tapping screws, and metallic drive screws recognized as American National Standard. Also included are appendices that provide specifications and instructions for the protrusion gaging of flat countersunk head screws; across corners gaging of hex head screws; penetration gaging and wobble gaging of recessed head screws; approximate hole size for tapping screws; wrench openings for hex and square products; thread dimensions for the No. 0000, No. 000, and No. 00 sizes; means for determining effective grip lengths on screws; documentation for screw types and head types relegated to not-recommended or limited-usage status; and formulas on which dimensional data are based. It shall be understood, however, that where questions arise concerning acceptance of product, the dimensions in the tables shall govern over recalculation by formula. The inclusion of dimensional data in this Standard is not intended to imply that all of the products described are stock production sizes. Consumers should consult with suppliers concerning the availability of products.

ASME B18.6.8-2010 (R2017), Thumb Screws and Wing Screws (Inch Series)
This Standard covers the general and dimensional data for the various types of thumb screws and wing screws.

ASME B18.6.9-2010 (R2017), Wing Nuts (Inch Series)
This Standard covers complete general and dimensional data for nine various types and styles of wing nuts.

ASME B18.7-2007 (R2017), General Purpose Semi-Tubular Rivets, Full Tubular Rivets, Split Rivets, and Rivet Caps
This Standard covers complete general and dimensional data for semi-tubular rivets, full tubular rivets, split rivets, and rivet caps for use in general purpose applications.

ASME B18.7.1M-2007 (R2017), Metric General Purpose Semi-Tubular Rivets
This Standard covers the general and dimensional data for oval head semi-tubular rivets for use in general purpose applications.

ASME B18.8.1-2014, Clevis Pins And Cotter Pins (Inch Series)
This Standard covers the complete dimensional and general data for steel clevis pins (3/16 through 1 inch) and carbon steel and stainless steel cotter (split) pins (1/32 through ¾ inch).

ASME B18.8.2-2000 (R2010), Taper Pins, Dowel Pins, Straight Pins, Grooved Pins And Spring Pins (Inch Series)
This Standard covers data for taper, dowel, straight, grooved, and spring pins and information for the drilling of holes for taper pins and the testing of pins in double shear.

ASME B18.9-2012 (R2017), Plow Bolts
This Standard covers general and dimensional data for inch series plow bolts.

This Standard applies to the design, construction, installation, maintenance, inspection, and operation of conveyors and conveying systems in relation to hazards.

ASME B27.6-1972 (R2017), General Purpose Uniform Cross Section Spiral Retaining Rings
This standard is intended to cover complete general and dimensional data for two series of general purpose uniform cross section spiral retaining rings.

ASME B27.7-1977 (R2017), General Purpose Tapered and Reduced Cross Section Retaining Rings (Metric)
This standard is intended to cover complete general and dimensional data for three series of general purpose tapered and reduced cross section retaining rings.

ASME B29.1-2011 (R2016), Precision Power Transmission Roller Chains, Attachment and Sprockets
This Standard covers transmission roller chains, attachments, and sprockets. It is intended to facilitate fulfillment of the needs of users, distributors, and manufacturers of chain sprocket drives on a sound economic basis and in a manner consistent with sound engineering and manufacturing practices.

ASME B29.100-2011 (R2016), Double-Pitch Roller Chains, Attachments, and Sprockets
This Standard covers double-pitch roller chains (and their attachments and sprockets) which consist of series of alternately assembled roller links and pin links in which the pins articulate inside the bushings and the rollers are free to turn on the bushings.

ASME B29.10M-1997 (R2009), Heavy Duty Offset Sidebar Power Transmission Roller Chains and Sprocket Teeth
This Standard covers chains with series of identical offset links in which the pins articulate inside the bushings and the rollers are free to turn on the bushings. Pins and bushings are fixed in their respective sidebar holes. In addition to press fits, other types of locks such as flats are sometimes used to prevent rotation of pins and bushings in their respective sidebar holes.
ASME B29.12M-1997 (R2013), Steel Bushed Rollerless Chains, Attachments and Sprockets

This Standard provides the following information for Steel Bushed Rollerless Chains, Attachments, and Sprocket Teeth: A series of block links having steel bushings to contact the sprocket teeth, alternating with links composed of sidebars and pins which articulate in the steel bushings of the block link. The main topics are: (a) General Chain Proportions and Designations; (b) Chain and Attachment Dimensions; and (c) Sprocket Tooth Form. There are also Tables for: (a) General Chain Dimensions, Minimum Ultimate Tensile Strength, Strand Length and Measuring Load; (b) Maximum and Minimum Controlling Dimensions for Interchangeable Chain Links; (c) Chain Clearance Dimensions; (d) A-1, A-2, A-22, X-1, K-2, K-3, K-35, K-44, & K-443 Attachments; (e) Sprockets - Maximum Eccentricity and Face Runout Tolerances; and (f) Sprocket Tooth Form Factors.

ASME B29.15M-1997 (R2017), Steel Roller Type Conveyor Chains, Attachments, and Sprocket Teeth

This Standard covers steel roller type conveyor chains which is a series of roller links having steel bushings with rollers to contact the sprocket teeth, alternating with links comprised of sidebars and pins, which articulate in the steel bushings of the roller link.

ASME B29.17M-1998 (R2013), Hinge Type Flat Top Conveyor Chains and Sprocket Teeth

This Standard contains information for Hinge-type Flat-top Conveyor Chains and Sprocket Teeth: A series of steel (carbon or stainless) flat surfaces of various widths as specified herein made integral with hinge-like barrels on each side. These barrels are designed to interlace so that links inserted through the holes formed by the barrels connect adjacent links, thus forming a continuous length of flat top conveyor chain free to flex in one direction. Pins are retained by press fit and/or heading with respect to the barrels of one link while being a free or slip fit with respect to the interlaced barrels of the adjacent link. The chain so formed is driven by meshing the curl outside diameter with sprocket teeth. Plastic hinge-type flat-top conveyor chains are similar to steel type flat top chains except that the chain links are molded of plastic material. Pins are usually made of stainless steel and may be retained by press fit or knurls. The main topics are: (a) General chain proportions and designations; (b) General chain dimensions, Minimum Ultimate Tensile Strength and Measuring load for checking chain length; (c) Chain and Attachment Dimensions; and (d) Sprocket tooth form – general. There are also Tables for: (a) General chain dimensions, Minimum Ultimate Tensile Strength and Measuring load for checking chain length; (b) Maximum and minimum controlling dimensions for interchangeable links; (c) Chain clearance dimensions; (d) Standard pitch diameter, maximum outside and bottom diameter, and pressure angle limits for normal range of sprocket teeth available with Type B tooth form sprockets; and (e) Maximum eccentricity and face runout tolerances of sprocket teeth.

ASME B29.200-2001 (R2017), Welded-Steel-Type Mill Chains, Welded-Steel-Type Drag Chains, Attachments, and Sprocket Teeth

This Standard covers both the Welded-Steel-Type Mill Chains and Welded-Steel-Type Drag Chains. Both types are a series of identical offset links having barrels to contact the sprocket teeth, and pins which articulate in the barrels of the links. However, the Drag Chains are especially designed to operate closed-end of link forward for maximum push or scraping action against the material to be conveyed.

ASME B29.21-2013, 700 Class Chains, Attachments and Sprocket Teeth for Water and Sewage Treatment Plants

This Standard covers the various types of 700 Class welded steel and cast chains, attachments and sprockets, namely Straight Sidebar Type; Curved Sidebar Type; and associated Sprockets.

ASME B29.22-2001 (R2016), Drop Forged Rivetless Chains, Sprockets Teeth Drive Chain/Drive Dogs

This Standard covers chains made from drop-forged steel parts that are heat-treated and are proportioned for high strength and comparative light weight. These chains’ simple design permits assembly or dismantling by hand; these chains are available in three general types – Regular drop-forged rivetless chain, X-type chain, and Modified X-type rivetless chain – as illustrated and described in this Standard. Numerous attachments are available to suit a wide variety of applications.

ASME B29.24-2002 (R2016), Roller Load Chains for Overhead Hoists

This Standard covers specialized roller chains that are designed specifically as load chains for use in overhead hoists.

ASME B29.26-2013, Fatigue Testing Power Transmission Roller Chain

This Standard covers fatigue testing, in axial tension, of power transmission roller chains in B29.1M and ASME B29.3M, and nonstandard variants of those chains.

ASME B29.27-2002 (R2016), Single-Pitch and Double-Pitch Hollow Pin Conveyor Chains and Attachments

This standard covers the dimensional limits required for chain interchangeability on sprockets. It does not provide for interconnectability of chains or individual links from different manufacturers.

ASME B29.28-2015, High Strength Chains for Power Transmission and Tension Linkages

This Standard covers roller chains that are specifically designed to withstand occasional high shock loads or high starting loads that are encountered in certain construction equipment and other severe-duty applications.

ASME B29.2M-2007 (R2017), Inverted Tooth (Silent) Chains and Sprockets

This Standard covers the numbering and dimensions of chains and sprockets, the measurement of chain pitch, basic link dimensions, and sprocket tooth form details.

ASME B29.300-2015, Agricultural, Detachable and Pintle Chains, Attachments and Sprocket Teeth

This Standard includes the several types of chains as below. This Standard is not intended to be submitted for consideration as an ISO or ISO/IEC JTC1 Standard. AGRICULTURAL CHAINS: This Standard covers chains that are a series of alternately assembled roller links and pin links in which the pins articulate inside the bushings and the rollers are free to turn on the bushings. The pitch of the sidebars is derived from the pitch of B29.6 series chain contained in the B29.300 Standard. Pin link plates and roller link plates have identical contours. DETACHABLE CHAINS: This Standard covers chains that are a series of successively assembled steel links in which the end bars articulate inside the hook. The chain is detached by flexing it and driving the end bar out of the adjoining hook. Sprockets for use with steel detachable chains covered by this Standard are only those with dimensions controlling the surfaces that must properly engage or clear the chain. PINTLE CHAINS: This Standard covers chains that are a series of one-piece formed links, connected by pins, that articulate within the barrels of adjacent links. Each link has a barrel end and an open end. The pins are fixed against rotation by mechanical locks or interference fits at the open end of the link. The barrels are open, leaving the pins exposed on one side. Sprocket contact is made against the barrel or against the exposed pin.

ASME B29.400-2001 (R2013), Combination, “H” Type Mill Chains and Sprockets

This Standard is a consolidation of two ASME standards, ASME B29.11M-1994 (Combination Chains, Attachments, and Sprocket Teeth) and ASME B29.14M-1996 (“H” Type Mill Chains, Attachments, and Sprocket Teeth). These two Standards were combined into one because of the similarity of construction and the unusual applications for the two types of chains.

ASME B29.8-2010 (R2017), Leaf Chains, Clevises and Sheaves

This Standard covers the lacing, pin diameter, diameter of link plate holes, link plate contour and thickness, chain widths, and minimum ultimate tensile strengths.

ASME B30.1-2015, Jacks, Industrial Rollers, Air Casters and Hydraulic Gantry

Volume B30.1 includes provisions that apply to the construction, operation, inspection, testing, and maintenance of mechanical ratchet jacks, hand- or power-operated mechanical screw jacks, hand- or power-operated hydraulic jacks, air-lifting bags, industrial rollers, air casters, telescopic hydraulic-gantry systems, and strand jacks.

ASME B30.10-2014, Hooks

Volume B30.10 includes provisions that apply to the fabrication, attachment, use, inspection, and maintenance of hooks shown in Chapters 10-1 and 10-2 used for load handling purposes, in conjunction with equipment described in other volumes of the B30 Standard. Hooks supporting a load in the base (bowl/saddle or pinhole) of the hook are covered in Chapter 10-1. Hooks that may be loaded in other than the base (bowl/saddle or pinhole) are covered in Chapter 10-2.
ASME B30.12-2011, Handling Loads Suspended from Rotorcraft
B30.12 applies to the protection of flight crews, ground personnel, and property on the surface while working directly with or in the vicinity of rotorcraft conducting external load operations. Within the general scope as defined in Section I, B30.12 applies to the handling of loads suspended from rotorcraft using a cargo sling or powered hoist, or other attaching means, to lift, carry, pull, or tow a jettisonable load outside of rotorcraft airframe.

ASME B30.13-2017, Storage/Retrieval (S/R) Machines and Associated Equipment
ASME B30.13 applies to storage/retrieval (S/R) machines and associated equipment, such as aisle transfer cars and aisle equipment (as defined in para. 13-0.2.1), and interfaces with other material handling equipment covered under other standards. The provisions of this Volume apply to S/R machines that are part of or attached to S/R machines or aisle transfer cars.

ASME B30.14-2015, Side Boom Tractors
Volume B30.14 includes provisions that apply to the construction, installation, operation, inspection, testing, and maintenance of side boom tractors powered by an internal combustion engine used for pipe laying or lifting operations, utilizing a lifting boom, drum, wire rope, and/or hydraulic cylinders.

ASME B30.16-2012, Overhead Hoists (Underhung)
Volume B30.16 includes provisions that apply to the construction, installation, operation, inspection, testing, and maintenance of hand chain-operated chain hoists and electric and air-powered chain and wire rope hoists used for, but not limited to, vertical lifting and lowering of freely suspended, unguided loads which consist of equipment and materials.

ASME B30.17-2015, Cranes and Monorails (With Underhung Trolley or Bridge)
B30.17 includes provisions that apply to the construction, installation, operation, inspection, testing and maintenance of hand-operated and power-operated overhead cranes and monorail systems with either an underhung trolley or bridge, or both. These cranes and monorail systems shall support one or more hoists used for vertical lifting and lowering of freely suspended, unguided loads, and include top running and underhung bridge cranes, gantry cranes, traveling wall cranes, jib cranes, polar gantry cranes, portal gantries, other cranes having the same fundamental characteristics, and monorail systems including trolleys (carriers) and end trucks. Track sections and their support systems for monorail systems, runways and their support systems for underhung cranes, and runway rails for top-running cranes, are also within the scope of this Volume. Provisions for similar equipment used for a special purpose, such as, but not limited to, non-vertical lifting service, lifting a guided load, or lifting personnel are not included in this Volume.

ASME B30.18-2016, Stackner Cranes (Top or Under Running Bridge, Multiple Girder with Top or Under Running Trolley Hoist)
Volume B30.18 includes provisions that apply to the construction, installation, operation, inspection, and maintenance of hand-powered and power-driven overhead and gantry cranes that have a top or under running multiple girder bridge with a vertically guided carriage, with or without a top or under running trolley. The requirements included in this Volume also apply to stacker cranes having the same fundamental characteristics, such as cantilever gantry and semi-gantry stacker cranes.

ASME B30.19-2016, Cableways
B30.19 applies to all load transfer, hoisting, and lowering cable-supported systems operating on and supported from track cable(s). This Standard does not apply to skyl ine systems, as used in the logging industry, or slackline systems used for evacuating.

ASME B30.2-2016, Overhead and Gantry Cranes (Top Running Bridge, Single or Multiple Girder, Top Running Trolley Hoist)
B30.2 includes provisions that apply to the construction, installation, operation, inspection, and maintenance of hand-operated and power-operated overhead and gantry cranes that have a top-running single girder or multiple-girder bridge, with one or more top-running trolley hoists used for vertical lifting and lowering of freely suspended, unguided loads consisting of equipment and materials. The requirements included in this Volume also apply to cranes having the same fundamental characteristics such as cantilever gantry cranes, semi-gantry cranes, and wall cranes. Requirements for a crane used for a special purpose such as, but not limited to, non-vertical lifting service, lifting a guided load, or lifting personnel are not included in this Volume.

ASME B30.20-2013, Below the Hook Lifting Devices
Volume B30.20 includes provisions that apply to the marking, construction, installation, inspection, testing, maintenance, and operation of below-the-hook lifting devices, other than components addressed by other ASME B30 volumes or other standards, used for attaching loads to a hoist. The devices are arranged in five chapters as follows: Chapter 20-1: Structural and Mechanical Lifting Devices Chapter 20-2: Vacuum Lifting Devices Chapter 20-3: Close Proximity Operated Lifting Magnets Chapter 20-4: Remotely Operated Lifting Magnets Chapter 20-5: Scrap and Material Handling Grapples

ASME B30.21-2014, Lever Hoists (formerly Manually Lever Operated Hoists)
Volume B30.21 includes provisions that apply to the construction, installation, operation, inspection, and maintenance of ratchet and pawl and friction brake type lever chain, rope and web strap hoists used for lifting, pulling, and tensioning applications. The requirements for a lever hoist that is used for a special purpose, such as lifting personnel, or drawing both the load and the hoist up or down the load chain, rope or web strap when the lever hoist is attached to the load, and a specially insulated hoist used for handling energized electrical power lines are not included in this Volume.

ASME B30.22-2016, Articulating Boom Cranes
B30.22 includes cranes that are articulated by hydraulic cylinders and powered by internal combustion engines or electric motors and that are mounted on a vehicle or stationary installation. Articulating cranes equipped with a load hoist mechanism to broaden their versatility are covered by this Volume.

ASME B30.23-2016, Personnel Lifting Systems
ASME B30.23 may apply to hoisting and accessory equipment covered within certain Volumes of the ASME B30 Standard, which is used to lift, lower, hold, or transport personnel in a platform, by wire rope or chain, from hoist equipment, or by a platform that is mounted on a boom of the hoist equipment. The lifting of personnel is not allowed using some ASME B30 Standard equipment. The ASME B30 Standard addressing the hoisting equipment to be used shall be consulted for the applicability of the ASME B30.23 volume.

ASME B30.24-2013, Container Cranes
Volume B30.24 applies to the construction, installation, operation, inspection, testing, and maintenance of container cranes used for lifting purposes, in conjunction with equipment described in other volumes of the B30 Standard. This Volume includes power-operated cranes of the above type whose power source is either self-contained or provided externally; single, double, or box girder construction, utilizing a trolley and a container-handling spreader or other applicable lifting apparatus (cargo hook, cargo beam, magnet, etc.); and rail- or rubber tire-mounted with through-the-legs or between-the-legs operation. Use of the same hardware for purposes other than lifting is excluded from the provisions of this Volume. This Volume does not apply to small industrial truck-type cranes, container-handling toploaders and sideloaders, or mobile straddle-type industrial lifts.

ASME B30.25-2013, Scrap and Material Handlers
Volume B30.25 includes provisions that apply to the construction, installation, operation, inspection, and maintenance of scrap and material handlers consisting of a base, a revolving upper structure with operator’s station(s), and a front for lifting scrap or materials using attachments such as magnets and grapples, and any variations thereof in which the equipment retains the same fundamental characteristics. The provisions included in this Volume apply to scrap and material handlers that are crawler mounted, rail mounted, wheel mounted, or on pedestal bases. The scope includes hydraulically operated scrap and material handlers powered by internal combustion engines or electric motors to lift, lower, and swing scrap and material at various radii. Hydraulic excavators designed for digging and trenching, forestry machines, machines designed for demolition, lattice and telescopic boom cranes, rail mounted cranes for railway and automobile wreck clearance, and equipment covered by other volumes of this Standard are excluded.
ASME B30.26-2015, Rigging Hardware

Volume B30.26 includes provisions that apply to the construction, installation, operation, inspection, and maintenance of detachable rigging hardware used for load-handling activities in conjunction with equipment described in other volumes of the B30 Standard. This hardware includes shackles, links, rings, swivels, turnbuckles, eyebolts, hoist rings, wire rope clips, wedge sockets, rigging blocks, and load-indicating devices. Detachable hardware used in applications other than those detailed in this Volume shall only be used in accordance with the recommendations of the manufacturer or a qualified person.

ASME B30.27-2014, Material Placement Systems

Volume B30.27, Material Placement Systems, includes provisions that apply to the construction, installation, operation, inspection, and maintenance of trailer and truck-mounted material placement systems. Included in this are mechanical and hydraulic pea gravel systems, mobile telescoping boom conveyors, separate placing booms, and material placement accessories (see Figs. 1 through 4). Truck-mounted material placement systems can be either with or without an integral placing boom. This Volume does not apply to the conveyor parts of mobile telescoping boom conveyors, motor conveying and spraying machines, or dry mix shotcreting machines. The conveyor section of these machines is covered by ASME B20.1.

ASME B30.28-2015, Balance Lifting Units

B30.28 includes provisions that apply to the marking, construction, installation, inspection, testing, maintenance, and operation of balance lifting units (balancers). Balancers are distinguished by their ability to float the load. This Volume applies to balancers with fixed arm support (Fig. 28-0.1-1) and balancers with overhead flexible lifting medium (Fig. 28-0.1-2). This Volume does not apply to balancers with autonomous operation or balancers used for lifting personnel, as these units require additional considerations, provisions, and features that are not included in this Volume.

ASME B30.29-2012, Self-Erecting Tower Cranes

B30.29 includes provisions that apply to the construction, operation, inspection, testing and maintenance of powered, self-erect tower cranes, which adjust operating radius by means of a trolley traversing a jib. These may be horizontal, elevated, articulating, or telescoping, used for vertical lifting and lowering of freely suspended, unguided loads, which consist of equipment and materials. Self-erect tower cranes have vertical or nearly vertical masts that are bottom slewing and mounted on fixed, traveling, or mobile bases. The cranes are capable of moving or being moved from jobsite to jobsite fully assembled or nearly fully assembled. This volume does not apply to cranes used for non-vertical lifting service or lifting a guided load and truck-mounted material delivery cranes with a tabular boom and trolley traversing the boom. Tower cranes (refer to ASME B30.3) and mobile crane tower attachments (refer to ASME B30.5) are not within the scope of this volume.

ASME B30.3-2016, Tower Cranes

B30.3 Volume applies to “construction tower cranes” and “permanently mounted tower cranes” that are powered by electric motors or internal combustion engines and that adjust their operating radius by means of a luffing boom mechanism, a trolley traversing a horizontal jib, or a combination of the two. The cranes may be mounted on “fixed bases” or “traveling bases” and may have tower and supporting structure arrangements that permit the crane to climb in a structure being built or that permits increasing the crane’s tower height as the structure rises. Variations of the above physical characteristics that provide the same fundamental operating characteristics are included in the scope of this Volume; however, the requirements of this Volume are only applicable to the cranes within this scope when they are used in lifting operations.

ASME B30.4-2015, Portal and Pedestal Cranes

B30.4 includes provisions that apply to the construction, installation, operation, inspection, testing and maintenance of electric motor or internal combustion engine powered portal and pedestal cranes that adjust operating radius by means of a boom luffing mechanism or by means of a trolley traversing a horizontal boom, that may be mounted on a fixed or traveling base, and to any variation thereof that retain the same fundamental characteristics. This volume applies only to portal and pedestal cranes utilizing a drum and wire rope for hoisting and that are used for hoisting work.

ASME B30.5-2014, Mobile and Locomotive Cranes

B30.5 applies to crawler cranes, locomotive cranes, wheel-mounted cranes, and any variations thereof that retain the same fundamental characteristics. The scope includes only cranes of the above types that are basically powered by internal combustion engines or electric motors. Side boom tractors and cranes designed for railway and automobile wreck clearance, digger derricks, cranes manufactured specifically for, or when used for, energized electrical line service, knuckle boom, trolley boom cranes, and cranes having a maximum rated capacity of one ton or less are excluded. Special adoptions to the general types of machines covered by this Volume, where applicable, fall under this scope.

ASME B30.6-2015, Derricks

B30.6 includes provisions that apply to the construction, installation, operation, inspection, testing, and maintenance of guy, stumpl, basket, breast, gin pole, Chicago boom, sheareg, and A-frame derricks. These derricks, powered by winches through systems of wire rope reeving, are used for lifting, lowering, and horizontal movement of freely suspended unguided loads.

ASME B30.7-2016, Winches

The B30.7 Volume includes provisions that apply to the construction, installation, operation, inspection, testing, and maintenance of winches arranged for mounting on a foundation or other supporting structure for moving loads. Winches addressed in this Volume are those typically used in industrial, construction, and maritime applications. The requirements included in this Volume apply to winches that are powered by internal combustion engines, electric motors, compressed air, or hydraulics, and that utilize drums and rope. Also included are winches used with (a) all-terrain-type recreational vehicles, (b) drill rig relocation trucks (c) tow trucks (d) vehicle recovery units (e) boat trailers (i) amusement park rides (g) excavating equipment (h) equipment covered by ANSI A10, A17, A90, A92, A120, B20, B56, and B77 Standards (l) free-fall applications such as pile driving Provisions of this Volume do not apply to the movement of personnel.

ASME B30.8-2015, Floating Cranes and Floating Derricks

B30.8 applies to cranes and derricks mounted on barges or pontoons. Floating cranes are convertible for excavation service and other uses that are categorically not considered to be lifting service. The requirements of this Volume are applicable only to floating cranes and floating derricks used for vertical lifting and lowering of freely suspended unguided loads.

ASME B30.9-2014, Slings

Volume B30.9 includes provisions that apply to the fabrication, attachment, use, inspection, testing and maintenance of slings used for load handling purposes, used in conjunction with equipment described in other volumes of the B30 Standard, except as restricted in B30.12 and B30.23. Slings fabricated from alloy steel chain, wire rope, metal mesh, synthetic fiber rope, synthetic webbing, and polyester fiber yarns in a protective cover(s) are addressed. All slings, including those fabricated from materials or constructions other than those detailed in this Volume, shall be used only in accordance with the recommendations of the sling manufacturer or a qualified person.

ASME B31.1-2016, Power Piping

This code prescribes minimum requirements for the design, materials, fabrication, erection, test, and inspection of power and auxiliary service piping systems for electric generation station, industrial and institutional plants, central and district heating plants, and district heating systems.

ASME B31.12-2014, Hydrogen Piping and Pipelines

This Code is applicable to piping in gaseous and liquid hydrogen service and to pipelines in gaseous hydrogen service. This Code is applicable up to and including the joint connecting the piping to associated pressure vessels and equipment but not to the vessels and equipment themselves. It is applicable to the location and type of support elements but not to the structure to which the support elements are attached.

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ASME B31.3-2016, Process Piping
Rules for the Process Piping Code Section B31.3 have been developed considering piping typically found in petroleum refineries; chemical, pharmaceutical, textile, paper, semiconductor, and cryogenic plants; and related processing plants and terminals. (a) This Code prescribes requirements for materials and components, design, fabrication, assembly, erection, examination, inspection, and testing of piping. (b) This Code applies to piping for all fluids, including (1) raw, intermediate, and finished chemicals (2) petroleum products (3) gas, steam, air, and water (4) fluidized solids (5) refrigerants (6) cryogenic fluids.

ASME B31.4-2016, Pipeline Transportation Systems for Liquids and Slurries
This Code prescribes requirements for the design, materials, construction, assembly, inspection, testing, operation, and maintenance of piping transporting liquids liquid pipeline systems between production fields/facilities, tank farms, above/below ground storage facilities, natural gas processing plants, refineries, pump stations, ammonia plants, terminals (marine, rail, and truck), and other delivery and receiving points, as well as pipelines transporting liquids within pump stations, tank farms, and terminals associated with liquid pipeline systems. This Code also prescribes requirements for the design, materials, construction, assembly inspection, testing, operation, and maintenance of piping transporting aqueous slurries of nonhazardous materials such as coal, mineral ores, concentrates, and other solid materials, between a slurry processing plant or terminal and a receiving plant or terminal.

ASME B31.5-2016, Refrigeration Piping and Heat Transfer Components
Rules for this Code Section have been developed considering the needs for applications that include piping and heat transfer components for refrigerants and secondary coolants. This Code prescribes requirements for the materials, design, fabrication, assembly, erection, test, and inspection of refrigerant, heat transfer components, and secondary coolant piping for temperatures as low as 320°F (196°C), whether erected on the premises or factory assembled.

ASME B31.8-2016, Gas Transmission and Distribution Piping Systems
This Code covers the design, fabrication, installation, inspection, and testing of pipeline facilities used for the transportation of gas. This Code also covers safety aspects of the operation and maintenance of those facilities. (See Mandatory Appendix Q for scope diagrams.) This Code is concerned only with certain safety aspects of liquefied petroleum gases when they are vaporized and used as gaseous fuels. All of the requirements of NFPA 58 and NFPA 59 and of this Code concerning design, construction, and operation and maintenance of piping facilities shall apply to piping systems handling butane, propane, or mixtures of these gases.

ASME B31.8S-2016, Managing System Integrity of Gas Pipelines
This Code applies to onshore pipeline systems constructed with ferrous materials and that transport gas. The principles and processes embodied in integrity management are applicable to all pipeline systems. This Code is specifically designed to provide the operator (as defined in section 13) with the information necessary to develop and implement an effective integrity management program utilizing proven industry practices and processes. The processes and approaches described within this Code are applicable to the entire pipeline.

ASME B31.9-2014, Building Services Piping
This Code Section has rules for the piping in industrial, institutional, commercial, and public buildings, and multi-unit residences, which does not require the range of sizes, pressures, and temperatures covered in B31.1. This Code prescribes requirements for the design, materials, fabrication, installation, inspection, examination, and testing of piping systems for building services. It includes piping systems in the building or within the property limits.

ASME B31E-2008, Standard for the Seismic Design and Retrofit of Above Ground Piping Systems
This standard applies to above ground, metallic piping systems in the scope of the ASME B31 Code for Pressure Piping (sections B31.1, B31.3, B31.4, B31.5, B31.8, B31.9, B31.11). The requirements described in this standard are valid when the piping system complies with the materials, design, fabrication, examination, testing and inspection requirements of the applicable ASME B31 section.

ASME B31E-2010, Standard for the Seismic Design and Retrofit of Above-Ground Piping Systems
This standard applies to above ground, metallic piping systems in the scope of the ASME B31 Code for Pressure Piping (sections B31.1, B31.3, B31.4, B31.5, B31.8, B31.9, B31.11). The requirements described in this standard are valid when the piping system complies with the materials, design, fabrication, examination, testing and inspection requirements of the applicable ASME B31 section.

This document is intended solely for the purpose of providing guidance in the evaluation of metal loss in pressurized pipelines and piping systems. It is applicable to all pipelines and piping systems within the scope of the transportation pipeline codes that are part of ASME B31 Code for Pressure Piping, namely: ASME B31.4, Pipeline Transportation Systems for Liquid Hydrocarbons and Other Liquids; B31.8, Gas Transmission and Distribution Piping Systems; B31.11 Slurry Transportation Piping Systems, and B31.12 Hydrogen Piping and Pipelines, Part PL.

This standard provides a standardized method to develop the stress intensification factors (I-factors), flexibility factors (k-factors), and sustained stress factors used in B31 piping analysis of metallic piping components. Stress intensification and flexibility factor equations for common, metallic piping components are provided. The sustained load test procedure can be used to determine more applicable nominal stress multipliers for use in sustained and occasional B31 analyses. The procedures for conducting burst tests of metallic piping components are included in other ASME documents and are considered outside the scope of this standard.

ASME B31Q-2016, Pipeline Personnel Qualification
This Standard establishes the requirements for developing and implementing an effective Pipeline Personnel Qualification Program (qualification program) utilizing accepted industry practices. The standard also offers guidance and examples of acceptable practices to meet selected requirements. The standard specifies the requirements for identifying covered tasks that impact the safety or integrity of pipelines, for qualifying individuals to perform those tasks, and for managing the qualifications of pipeline personnel.

ASME B31T-2015, Standard Toughness Requirements for Piping
This standard provides requirements for evaluating the suitability of materials used in piping systems for piping that may be subject to brittle failure due to low temperature service conditions.

ASME B32.100-2016, Preferred Metric Sizes for Flat, Round, Square, Rectangle, and Hexagon Metal Products
This Standard established a preferred series of metric thicknesses, widths, and lengths for flat metal products of rectangular cross-section. The thicknesses and widths shown in this Standard are also applicable to base metals that may be coated in later operations. This Standard also establishes a preferred series of metric sizes for round, square, rectangular, and hexagonal metal products.

ASME B36.10M-2015, Welded and Seamless Wrought Steel Pipe
This Standard covers the standardization of dimensions of welded and seamless wrought steel pipe for high or low temperatures and pressures.
ASME B36.19M-2004 (R2015), Stainless Steel Pipe

This Standard covers the standardization of dimensions of welded and seamless wrought stainless steel pipe for high or low temperatures and pressures. The word pipe is used, as distinguished from tube, to apply to tubular products of dimensions commonly used for pipeline and piping systems. Pipes NPS 12 (DN 300) and smaller have outside diameters numerically larger than their corresponding sizes. In contrast, the outside diameters of tubes are numerically identical to the size number for all sizes. The wall thicknesses for NPS 14 through 22, inclusive (DN 350–550, inclusive), of Schedule 10S, NPS 12 (DN 300) of Schedule 40S, and NPS 10 and 12 (DN 250 and 300) of Schedule 80S are not the same as those of ASME B36.10M. The suffix “S” in the schedule number is used to differentiate B36.19M pipe from B36.10M pipe. ASME B36.10M includes other pipe thicknesses that are also commercially available with stainless steel material.

ASME B4.1-1967 (R2009), Preferred Limits And Fits For Cylindrical Parts

This standard presents definitions of terms applying to fits between plain (non-threaded) cylindrical parts and makes recommendations on preferred sizes, allowances, tolerances, and fits for use wherever they are applicable.

ASME B4.2-1978 (R2009), Preferred Metric Limits And Fits

This standard describes the ISO system of limits and fits for mating parts as it is approved for general engineering usage in the United States of America. It establishes: (1) the designation symbols used to define specific dimensional limits on drawings, material stock, related tools, gages, etc., (2) the preferred basic sizes (first and second choices), (3) the preferred tolerance zones (first, second and third choices), (4) the preferred limits and fits for sizes (first choice only) up to and including 500 millimeters, and (5) definitions of related terms.

ASME B40.100-2013, Pressure Gauges and Gauge Attachments

This Standard is confined to analog, dial-type gauges, which, utilizing elastic elements, mechanically sense pressure and indicate it by means of a pointer moving over a graduated scale. This Standard does not include gauges of special configuration designed for specific applications, edge reading, deadweight or piston gages, or any other gauges not using an elastic element to sense pressure.

ASME B40.200-2008 (R2013), Thermometers, Direct Reading and Remote Reading

This Standard is confined to analog, dial-type bimetallic actuated thermometers utilizing helical bimetallic elements that mechanically sense temperature and indicate it by means of a pointer moving over a scale. It also covers analog, dial-type filled system thermometers, utilizing elastic elements that enable the mechanically converted thermal energy to indicate temperature by means of a pointer moving over a scale. Thirdly, it also covers analog, liquid-in-glass industrial-type thermometers for industrial applications that sense process temperature by means of the expansion of the liquid within the glass thermometer bulb. And lastly, this Standard covers metallic thermowells for thermometers and electrical temperature sensors. Thermowells protect bulbs from excessive temperatures, excessive pressures, and corrosive attack by the process medium, and against structural damage caused by fluid velocity induced vibration.

ASME B46.1-2009, Surface Texture, Surface Roughness, Waviness and Lay

This Standard is concerned with the geometric irregularities of surfaces. It defines surface texture and its constituents: roughness, waviness, and lay. It also defines parameters for specifying surface texture. The terms and ratings in this Standard relate to surfaces produced by such means as abrading, casting, coating, cutting, etching, plastic deformation, sintering, wear, erosion, etc.

ASME B47.1-2007 (R2012), Gage Blanks

This Standard covers standard designs for the following: (a) plain and thread plug gage blanks to 12.010 in. maximum gaging diameter; (b) plain and thread ring gage blanks to 12.260 in. maximum gaging diameter; (c) involute and serrated spline plug and ring gage blanks to 8.000 in. major diameter; (d) straight-sided spline plug and ring gage blanks to major diameters of 8.000 in. for plugs and 6.000 in. for rings; (e) machine taper plug and ring gage blanks to 5.000 in. gaging diameter; (f) adjustable snap gages to 12 in.; (g) adjustable length gages to any desired length; (h) master disks up to 8.010 in. in diameter. Recommended general designs covering taper plug and ring gages for special applications, flush-pin gages, and flat plug gages are also included. This Standard is intended to deal only with the dimensions of blanks, frames, and fittings. However, it is expected that gages made from these blanks shall be finished in accordance with accepted good gage making practice with respect to accuracy and workmanship.

ASME B5.10-1994 (R2013), Machine Tapers

This Standard establishes (1) American standard practice for the slope of self-holding and steep machine tapers, (2) the detailed dimensions for this type of taper tool shank, (3) the corresponding dimensions for the taper socket in the spindle of the machine, including the dimensions of keyways. This, it is hoped, will serve as a guide for future designing of machines and related equipment utilizing tapers that come within the ranges specified in the various tables.

ASME B5.11-1964 (R2013), Spindle Noses and Adjustable Adapters for Multiple Spindle Drilling Heads

This Standard is to provide the means for individual axial adjustments of drilling, reaming, and tapping tools, etc. in the spindles of single or multiple spindle heads. Further, its purpose is to permit interchangeability of adapters into different manufacturers’ machines consistent with necessary accuracy. Its scope is primarily in the medium to large size of drill spindles, i.e., from No. 0 Morse Taper and .375 American Standard Taper through No. 4 American Standard Taper.

ASME B5.18-1972 (R2014), Spindle Noses and Tool Shanks for Milling Machines

This Standard provides dimensional requirements for spindle noses and tool shanks for milling machines.

ASME B5.1M-1985 (R2014), T-Slots – Their Bolts, Nuts, and Tongues

This Standard applies to T-slots as used on machine tools for the mounting of fixtures, attachments, and accessories; and to the bolts, nuts, and tongues used in such slots.

ASME B5.35-1983 (R2013), Machine Mounting Specifications for Abrasive Discs and Plate Mounted Wheels

This Standard covers ANSI Standard practice for location and size of bolt holes for mounting abrasive discs and plate mounted wheels.

ASME B5.40-1977 (R2013), Spindle Noses and Tool Shanks for Horizontal Boring Machines

This standard establishes (1) the American practice for the construction of spindle noses for horizontal boring machines by showing a number of types of such construction, (2) the important dimensions for self-holding and steep machine tapers as well as drive keys, draw bolts, drift and keeper keys, slot circles for face mounting of milling cutters, etc., (3) the corresponding dimensions for the taper shanks for construction of tools (boring bars, arbors, etc.) to fit the spindle nose tapers.

ASME B5.47-1972 (R2013), Milling Machine Arbor Assemblies

The standard is confined to milling machine arbors. The reason for confining this standard to this specified milling machine accessory is that through many years of development and general usage, there already exists good agreement on the structure and dimensions of milling machine arbors. The corresponding dimensions for such equipment here in the United States and abroad. This agreement is much better than for many other milling machine accessories and equipment. Already considerable interchangeability exists between the products of various suppliers of milling machine arbors.

ASME B5.48-1977 (R2013), Ball Screws

This standard covers definitions, classes of ball screws, recommended combinations of screw diameters and leads, recommended drawing format, and performance characteristics of ball screw and nut assemblies as applied to machine tools.
This Standard pertains to the standardization of basic toolholder shank, retention knob, and socket assemblies for numerically controlled machining centers with automatic tool changers. The requirements contained herein are intended to provide toolholder interchangeability between machining centers with automatic tool changers of various types.

**ASME B5.52-2003 (R2014), Power Presses - General Purpose Single Gap Type**

This Standard applies to hydraulic and mechanical power presses having a one-piece frame that guides the slide and supports the bolster, adjustable bed, or horn. The frame is configured to provide unrestricted access to the front and sides of the die space. By means of dies or tooling attached to the slide and bolster or horn, these machines are used to shear, punch, form, or assemble metal or other materials.

This Standard includes only the following types of presses: (a) bench; (b) open back inclinable (OBI); (c) open back stationary (OBS); (d) adjustable bed/horn.

**ASME B5.54-2010 (R2015), Methods for Performance Evaluation of Computer Numerically Controlled Machining Centers**

This Standard establishes methodology for specifying and testing the performance of Computer Numerically Controlled (CNC) machining centers. In addition to clarifying the performance evaluation, this Standard facilitates performance comparisons between machines by unifying terminology, general machine classification, and the treatment of environmental effects. It provides a series of tests that should be used to perform acceptance testing (runoff) of new and reconditioned machines and could be used to verify continued capability of production machines, already in operation, through periodic testing.

The set of acceptance tests and the specification limits for machine conformance shall be the subject of contractual agreement between the Supplier and the User. This Standard is rather comprehensive; therefore, for smaller and less expensive machines the conformance to specifications could be based on a recommended subset of tests to evaluate machine performance.


The requirements of this Standard apply to those power operated press brakes that are used to form metal by bending. This Standard specifically excludes machines referred to as hand brakes (leaf brake), folding brakes, tangent benders, apron brakes (box and pan), and swivel bending brakes.


The requirements of this standard apply to power shears used to cut metal by shearing, utilizing a fixed lower knife(s) and a non-rotary, moving upper knife(s). This standard applies to those shears commonly referred to as squaring, guillotine, gap, plate, pivot blade (swing beam), and slitting (non-rotary). This standard specifically excludes machines referred to as right angle, alligator, cut to length, crop, slitting (rotary), nibblers, portable hand tools, coil slitters, rotary blade slitters, iron workers, angle, bar, beam, channel, notching, rotary drum, flying, and billet shears.

**ASME B5.57-2012, Method for Performance Evaluation of Computer Numerically Controlled Lathes and Turning Machines**

This Standard establishes requirements and methods for specifying and testing the performance of Computer Numerically Controlled (CNC) lathes and turning centers. In addition to clarifying the performance evaluation of lathes and turning centers, this Standard seeks to facilitate performance comparisons between machines by unifying terminology, general machine classification, and the treatment of environmental effects. This Standard defines testing methods capable of yielding adequate performance results for the majority of turning centers and is not intended to replace more complete tests. It is not the intent of this Standard to place limits on, or to enforce 100 percent testing of, any individual machine tool in accordance with this Standard. This shall be the subject of contractual agreement between the supplier and the user. Sections 2 and 3 of this Standard reference documents that are used herein and provide a listing of symbolism. The first part of Section 4 is a glossary covering technical terms used throughout the Standard which might require explanation. The second part of Section 4 defines common machine classifications and provides guidance for developing other classifications.

**ASME B5.60-2014, Workholding Chucks: Jaw Type Chucks**

This revision incorporates “chuck-to-spindle interface” and “chuck assembly: sizes and designation” (chapters 2 and 6) into the standard.

**ASME B5.61-2003 (R2014), Power Presses - General Purpose Single Action Straight Side Type**

This Standard applies to hydraulic and mechanical power presses commonly referred to by the metalworking industry as General Purpose, Single Action, Straight Side Type Power Presses that, by means of dies or tooling attached to the slide and bolster, are used to shear, punch, form or assemble metal or other materials.

**ASME B5.62-2016, Hollow Taper Tooling with Flange-Face Contact**

This Standard covers basic toolholder shanks with a hollow 1:9.89 taper, and simultaneous contact face and taper mating surfaces that are applicable to a range of machine tool applications. Nominal flange diameters from 25 mm to 150 mm and Forms A, B, C, D, E, F and T are covered by this standard.

**ASME B5.8-2001 (R2016), Chucks and Chuck Jaws**

This Standard applies to chucks for use on engine lathes, tool room lathes, turret lathes, and automatic lathes and fit American Standard Spindle Noses of ANSI-B5.9-1967. They may be used on other applications for which they are suitable (see pages 4 and 5 of ANSI-B5.9-1967). It is within the scope of this Standard to establish: (a) duty classes (b) standard chuck diameters (c) top jaw interchangeability (d) mounting interchangeability (USA-Standard Spindle Noses) (e) draw-bar interchangeability for power chucks (f) identification code for body, master jaws, top jaws dimensions, where interchangeability of chucks may be involved (g) nomenclature

**ASME B5.9-1967 (R2014), Spindle Noses for Tool Room Lathes, Engine Lathes, Turret Lathes, and Automatic Lathes**

These spindle noses are for use on engine lathes, tool room lathes, turret lathes and automatic lathes and may be used advantageously on other machines wherever chucks or fixtures must be mounted accurately and rigidly on revolving spindles. Complete dimensions for each size and type of nose, as well as for mating backs of chucks, face plates and fixtures, are given in the tables. Also given are dimensions of gages for checking the important dimensions on these spindle noses and the backs of chucks, face plates and fixtures, to insure interchangeability between parts made by different manufacturers.

**ASME B73.1-2012, Specification for Horizontal End Suction Centrifugal Pumps for Chemical Process**

This Standard is a design and specification standard that covers metallic and solid polymer centrifugal pumps of horizontal, end suction single stage, centerline discharge design. This Standard includes dimensional interchangeability requirements and certain design features to facilitate installation and maintenance and enhance reliability and safety of B73.1 pumps. It is the intent of this Standard that pumps of the same standard dimension designation from all sources of supply shall be interchangeable with respect to mounting dimensions, size and location of suction and discharge nozzles, input shafts, baseplates, and foundation bolt holes (see Tables 1 and 2). Maintenance and operation requirements are not included in this standard. This Standard has been revised to include solid polymer pumps formerly covered under ASME B73.5. The design and construction features for metallic pumps are covered in Section 4. The design and construction features for solid polymer pumps are covered in Section 5. This Standard must be read in its entirety for proper application.

**ASME B73.2-2016, Specification for Vertical In-Line Centrifugal Pumps for Chemical Process**

This Standard covers motor-driven centrifugal pumps of vertical shaft, single stage design with suction and discharge nozzles in line. It includes dimensional interchangeability requirements and certain design features to facilitate installation and maintenance. It is the intent of this Standard that pumps of the same standard dimension designation, from all sources of supply, shall be interchangeable with respect to mounting dimensions and size location of suction and discharge nozzles.
ASME B73.3-2015, Specification for Sealless Horizontal End Suction Centrifugal Pumps for Chemical Process
This Standard is a design and specification standard that covers metallic and plastic lined sealless centrifugal pumps of horizontal, end suction single stage, centerline discharge design. This Standard includes dimensional interchangeability requirements and certain design features to facilitate installation and maintenance and enhance reliability and safety of B73.3 pumps.

ASME B89.1.10M-2001 (R2016), Dial Indicators (for Linear Measurement)
This Standard is intended to provide the essential requirements for dial indicators as a basis for mutual understanding between manufacturers and consumers.

ASME B89.1.13-2013, Micrometers
This Standard is intended to provide the essential requirements for micrometers as a basis for mutual understanding between manufacturers and consumers. Outside, inside, and depth micrometers are described in the Standard.

ASME B89.1.17-2001 (R2007), Measurement of Thread Measuring Wires
This Standard is intended to establish uniform practices for the measurement of thread measuring wires. The standard includes methods for the direct measurement of both master and working wires, and methods for the comparison measurement of working wires. The standard includes requirements for geometric qualities of thread measuring wires, the important characteristics of the comparison equipment, environmental conditions, and the means to ensure that measurements are made with an acceptable level of accuracy.

ASME B89.1.6-2002 (R2007), Measurement of Plain Internal Diameter for Use as Master Ring or Ring Gages
This Standard is intended to establish uniform practices for the measurement of master rings or ring gages using horizontal methods. The standard includes requirements for geometric qualities of master rings or ring gages, the important characteristics of the comparison equipment, environmental conditions, and the means to ensure that measurements are made with an acceptable level of accuracy. This Standard does not include measurement methods for rings below 1 mm (0.040 in.). The measurement method on these very small rings should be agreed upon prior to manufacture or calibration between the manufacturer/laboratory and customer.

ASME B89.1.7-2009 (R2014), Surveying Tapes
This Standard specifies the requirements for steel measuring tapes, with respect to units (SI and U.S. Customary), graduations, numbering, designations, and accuracy requirements.

ASME B89.1.8-2011 (R2016), Performance Evaluation of Displacement-Measuring Laser Interferometers
This Standard establishes requirements and methods for the specification, evaluation, setup, and use of laser interferometers.

ASME B89.1.9-2002 (R2012), Gage Blocks
This Standard specifies the most important design and metrological characteristics of gage blocks with a rectangular or square cross-section and a nominal length, l, ranging from 0.5 mm to 1 000 mm for metric sizes and 0.010 in. to 40 in. for inch sizes. It is not the intent of this Standard to preclude the use, by contractual agreement, of gage blocks of other shapes, grades or materials. Limit deviations and tolerances are stated for the calibration Grade K and for the Grades 00, 0, AS-1, and AS-2 for various measuring purposes.

ASME B89.3.4-2010 (R2015), Axes of Rotation: Methods for Specifying and Testing
This Standard is primarily intended for, but not limited to, the standardization of methods for specifying and testing axes of rotation of spindles used in machine tools and measuring machines.
ASME B89.6.2-1973 (R2012), Temperature and Humidity Environment for Dimensional Measurement
This standard is intended to fill industry’s need for standardized methods of: a. Describing and testing temperature-controlled environments for dimensional measurements, and b. Assuring itself that temperature control is adequate for the calibration of measuring equipment, as well as the manufacture and acceptance of workpieces.

ASME B89.7.2-2014, Dimensional Measurement Planning
The objective of this Standard is to ensure correctness and acceptability of dimensional measurements. This Standard specifies requirements for preparation and approval of dimensional measurement plans and for the use of approved plans in making dimensional measurements.

ASME B89.7.3.1-2001 (R2011), Guidelines for Decision Rules: Considering Measurement Uncertainty in Determining Conformance to Specifications
These guidelines provide terminology and specify the content that must be addressed when stating a decision rule used for deciding the acceptance or rejection of a product according to specification.

ASME B89.7.3.3-2002 (R2017), Guidelines for Assessing the Reliability of Dimensional Measurement Uncertainty Statements
This Standard provides guidance in assessing the reliability of a statement of measurement uncertainty in question.

ASME B94.19-1997 (R2014), Milling Cutters and End Mills
This Standard covers high speed steel milling cutters and end mills of one piece construction as listed in Tables 1 through 62. It also includes general definitions, sizes, and tolerances.

ASME B94.2-1995 (R2015), Reamers
This Standard covers Reamers including nomenclature, definitions, types, sizes, and tolerances.

ASME B94.33-1996 (S2016), Jig Bushings
This Standard covers the nomenclature, definitions, sizes, and tolerances of Jig Bushings and locking devices used for securing the bushings in the jig or bushing plate. The purpose of this standard is to provide the necessary information for the design, procurement, and installation of Jig Bushings.

ASME B94.33.1-1997 (S2016), Jig Bushings (Metric)
This Standard covers the standard practice for sizes, types, tolerances, and identification of metric Jig bushings and locking devices used for securing the bushing in the jig or bushing plate.

ASME B94.33.1-1997 (S2016), Jig Bushings, Metric
This Standard covers the nomenclature, definitions, types, sizes, tolerances and identification of Metric Jig Bushing and locking devices used for securing the bushing in the jig or bushing plate.

ASME B94.35-1972 (R2015), Drill Drivers, Split-Sleeve, Collet Type

ASME B94.49-1975 (R2010), Spade Drill Blades and Spade Drill Holders
This standard covers nomenclature, definitions, sizes and tolerances for spade drill blades and spade drill holders as defined in the holder locates and holds the spade drill blade. All dimensions are in inches. Conversion tables from inch to millimetre are given in Appendix A.

ASME B94.51M-2010 (S2016), Specifications for Band Saw Blades (Metal Cutting)
This Standard provides a useful criterion of practice in production, distribution, and use of metal cutting band saw blades. It was developed to provide blades that will meet all normal requirements of consumers. Section 3, definitions, indicates the specific types in common usage and also defines the various elements. This Standard covers tooth shape, sizes, and tolerances for regular, skip tooth, and hook tooth band saw blades; and it also sets out the determination of: (a) band saw blade dimensions; (b) tooth form and set; (c) blade flatness and minimum hardness characteristics. Metric dimensions shown are based on the Renard R-40 system for conversion and are for guidance. This Standard applies to carbon hard edge flexible and tempered back band saw blades and intermediate and high speed steel and composite steel band saw blades. Information on friction cutting band saw blades is set forth in Appendix I.

ASME B94.52M-1999 (S2016), Specifications for Hacksaw Blades
This Standard provides a useful criterion of practice in production, distribution and use of hacksaw products. It was developed to provide blades that will meet all normal requirements of consumers. Section 3 defines the specific types in common usage and also defines the various elements. This Standard covers tooth shape, sizes, and tolerances for hand and power hacksaw blades in all types of materials; and it also sets out the determination of: (A) Hacksaw blade dimensions in all types of steel (B) Tooth form and set and, (C) Blade straightness and minimum hardness characteristics.

ASME B94.54-1999 (R2015), Specifications for Hole Saws, Hole Saw Arbors, and Hole Saw Accessories
This Standard provides a useful criterion of practice in the production, distribution, and of high-speed steel, grit edge, and carbide-tipped nonadjustable hole saws and their accessories. This Standard covers definitions, standard sizes, dimensions, tolerances, tooth configuration, and quality requirements for the hole saws and their accessories covered by this Standard.

ASME B94.55M-1985 (R2014), Tool Life Testing with Single-Point Turning Tools
This Standard establishes specifications for the following factors of tool life testing with single-point turning tools: workpiece, tool, cutting fluid, cutting conditions, tool wear and tool life, equipment, test procedures, recording and reporting and presentation of results.

ASME B94.6-1984 (S2016), Knurling
This Standard covers knurling tools with standardized diametral pitches and includes dimensional relations with stock in the production of straight, diagonal, and diamond knurling on cylindrical surfaces having teeth of uniform pitch parallel to the axis of the cylinder or at a helix angle not exceeding 45 deg. with axis of work. Such knurling is made by displacement of the material on the surface when rotated under pressure against a knurling tool. These tools and recommendations are equally applicable to general purpose and precision knurling.

ASME B94.7-1980 (S2016), Hobs
This Standard covers types, sizes, tolerances, marking and nomenclature for hobs of one-piece construction used for generating involute gears, involute splines, parallel side splines, involute serrations and roller chain sprockets. The purpose of this standard is to provide information on standard types, sizes, tolerances, marking and nomenclature of hobs to encourage uniformity in specifications. The inclusion of dimensional data in this Standard is not intended to imply that all of the products described are stock production sizes. Consumers are requested to consult with manufacturers concerning availability of products.

ASME B94.9-2008 (R2013), Taps: Ground and Cut Threads with Cut Thread Appendix ( Inch and Metric Sizes)
This Standard covers various designs of standard taps, nomenclature, and definitions; the standard system of marking; and dimensions and tolerance tables for the types and styles of taps listed below. For thread series designations, refer to Table 1.

ASME BPE-2014, Bioprocessing Equipment
The ASME BPE Standard provides requirements for systems and components that are subject to cleaning and sanitization and/or sterilization including systems that are cleaned in place (CIP’d) and/or steamed in place (SIP’d) and/or other suitable processes used in the manufacturing of biopharmaceuticals. This Standard also provides requirements for single use systems and components used in the above listed systems and components. The ASME Bioprocessing Equipment Standard was developed to aid in the design and construction of new fluid processing equipment used in the manufacture of biopharmaceuticals, where a defined level of purity and bioburden control is required.
ASME BPE-2016, Bioprocessing Equipment
The ASME BPE Standard provides requirements for systems and components that are subject to cleaning and sanitization and/or sterilization including systems that are cleaned in place (CIP’d) and/or steam in place (SIP’d) and/or other suitable processes used in the manufacturing of biopharmaceuticals. This Standard also provides requirements for single use systems and components used in the above listed systems and components. The ASME Bioprocessing Equipment Standard was developed to aid in the design and construction of new fluid processing equipment used in the manufacture of biopharmaceuticals, where a defined level of purity and bioburden control is required.

ASME BPVC Revision-2008, ASME Boiler and Pressure Vessel Code (11/16/07 Meeting)
This Standard establishes rules relating to pressure integrity governing the construction of boilers, pressure vessels, transport tanks and nuclear components, as well as in-service inspection of nuclear components and transport tanks.

ASME BPVC Revision-2008, ASME Boiler and Pressure Vessel Code (2/8/08 Meeting)
This Standard establishes rules relating to pressure integrity governing the construction of boilers, pressure vessels, transport tanks and nuclear components, as well as in-service inspection of nuclear components and transport tanks.

ASME BPVC Revision-2009, ASME Boiler and Pressure Vessel Code (04/25/08, 08/08/08, 11/14/08 and 02/06/09 Meetings)
This standard establishes rules of safety, relating only to pressure integrity, governing the construction of boilers, pressure vessels, transport tanks and nuclear components, and in-service inspection for pressure integrity of nuclear components and transport tanks.

ASME BPVC Section I-2017 , Rules for Construction of Power Boilers
This Code covers rules for construction of power boilers, electric boilers, miniature boilers, high-temperature water boilers, heat recovery steam generators, and certain fired pressure vessels to be used in stationary service and include those power boilers used in locomotive, portable, and traction service. The rules are applicable to boilers in which steam or other vapor is generated at a pressures of more than 15 psig (100 kPa) for use external to itself, and high temperature water boilers intended for operation at pressures exceeding 160 psig (1.1 MPa) and/or temperatures exceeding 250 degree F (120 degree C).

ASME BPVC Section II-2017, Part A - Ferrous Material Specifications
Part B - Nonferrous Material Specifications
Part D - Materials Properties
Section II of the Boiler and Pressure Vessel Code provides material specifications for base metallic materials and material design values and limits and cautions on the use of materials.

ASME BPVC Section II-2017 , Part C - Specifications for Welding Rods, Electrodes, and Filler Metals
Section II, Part C, contains material specifications, most of which are identical to corresponding specifications published by AWS and other recognized national or international organizations. All adopted specifications are either reproduced in the Code, where permission to do so has been obtained from the originating organization, or so referenced, and information about how to obtain them from the originating organization is provided.

ASME BPVC Section III-2017 , Rules for Construction of Nuclear Facility Components
The rules of this Section constitute requirements for the design, construction, stamping, and overpressure protection of items used in nuclear power plants and other nuclear facilities. This Section consists of the following divisions: (a) Division 1. Metallic vessels, heat exchangers, storage tanks, piping systems, pumps, valves, core support structures, supports, and similar items. (b) Division 2. Concrete containment vessels. (c) Division 3. Containment Systems for Transportation and Storage of Spent Nuclear Fuel and High-Level Radioactive Material (d) Division 4. Components for fusion devices; and (e) Division 5. High temperature reactors, vessels, storage tanks, piping, pumps, valves, metallic and nonmetallic core supports, and supports for use in nuclear power plants and other nuclear facilities.

ASME BPVC Section IV-2011, Rules for Construction of Heating Boilers
The rules of this Section of the Code cover minimum construction requirements for the design, fabrication, installation, and inspection of steam heating, hot water heating, hot water supply boilers that are directly fired with oil, gas, electricity, coal, or other solid or liquid fuels, and for operation at or below the following pressure and temperature limits: 1) 15 psi for steam boilers and 2) 160 psi for water heating boilers and/or temperatures not exceeding 250 F.

ASME BPVC Section IV-2017, Rules for Construction of Heating Boilers
The rules of this Section of the Code cover minimum construction requirements for the design, fabrication, installation, and inspection of steam heating, hot water heating, hot water supply boilers that are directly fired with oil, gas, electricity, coal, or other solid or liquid fuels, and for operation at or below the pressure and temperature limits set forth in this document. Similar rules for portable water heaters are also included.

ASME BPVC Section IX-2017, Welding, Brazing and Fusing Qualifications
Section IX of the ASME Boiler and Pressure Vessel Code relates to the qualification of welders, welding operators, brazers, brazing operators, and fusing operators and the procedures that they employ in welding, brazing and fusing according to the ASME Boiler and Pressure Vessel Code and the ASME B31 Code for Pressure Piping.

ASME BPVC Section V-2017, Nondestructive Examination
Section V of the ASME Boiler & Pressure Vessel Code contains requirements and methods for nondestructive examination (NDE) which are referenced and required by other Sections of the Code. These NDE methods are intended to detect surface and internal imperfections in materials, welds, fabricated parts and components. The following NDE methods are addresed: radiography, ultrasonics, liquid penetrant, magnetic particle, eddy current, visual, leak testing, and acoustic emission.

ASME BPVC Section VI-2017, Recommended Rules for the Care and Operation of Heating Boilers
This Standard provides recommended rules for the care and operation of Heating Boilers covered under Section IV of the Boiler and Pressure Vessel Code.

ASME BPVC Section VII-2017 , Recommended Guidelines for the Care of Power Boilers
The purpose of Section VII, Recommended Guidelines for the Care of Power Boilers, is to promote safety in the use of power boilers. These guidelines are intended for use by those directly responsible for operating, maintaining, and examining power boilers. With respect to the application of these guidelines, a power boiler is a pressure vessel constructed in compliance with Section I in which, due to the application of heat, steam is generated at a pressure exceeding 15 psig (100 kPa) for use external to the boiler. The heat may be derived from the combustion of fuel (solids, liquids, or gases), from the hot waste gases of other chemical reactions, or from the application of electrical energy. The term power boiler in this Section includes stationary, portable, and traction types, but does not include locomotive and high-temperature water boilers or miniature boilers (Section I), nuclear power plant boilers (Section III), heating boilers (Section IV), pressure vessels (Section VIII), or marine boilers.

ASME BPVC Section VIII-2017 , Rules for Construction of Pressure Vessels
This Section contains mandatory requirements, specific prohibitions, and nonmandatory guidance for pressure vessel materials, design, fabrication, examination, inspection, testing, certification, and pressure relief. The Code does not address all aspects of these activities, and those aspects which are not specifically addressed should not be considered prohibited.
ASME BPVC Section X-2017, Fiber-Reinforced Plastic Pressure Vessels
Section X of the ASME Boiler and Pressure Vessel Code provides requirements for the fabrication of fiber-reinforced thermosetting plastic pressure vessels for general service, sets limitations on the permissible service conditions, and defines the types of vessels to which these rules are not applicable.

ASME BPVC Section XI-2017, Rules for Inservice Inspection of Nuclear Power Plant Components
Section XI, Rules for Inservice Inspection of Nuclear Power Plant Components, of the ASME Boiler and Pressure Vessel Code provides requirements for examination, testing, and inspection of components and systems, and repair/replacement activities in a nuclear power plant.

ASME BPVC Section XII-2017, Rules for Construction and Continued Service of Transport Tanks
The rules of this Section constitute requirements for construction and continued service of pressure vessels for the transportation of dangerous goods via highway, rail, air, or water.

ASME BTH-1-2017, Design of Below-the-Hook Lifting Devices
This Standard provides minimum structural and mechanical design and electrical component selection criteria for ASME B30.20, Below-the-Hook Lifting Devices. The provisions defined in this Standard address the most common and broadly applicable aspects of the design or modification of below-the-hook lifting devices. Compliance with requirements and criteria that may be unique to specialized industries and environments is outside the scope of this Standard. Lifting devices designed to this Standard shall comply with ASME B30.20, Below-the-Hook Lifting Devices. ASME B30.20 includes provisions that apply to the marking, construction, installation, inspection, testing, maintenance, and operation of below-the-hook lifting devices.

ASME CSD-1-2015, Controls and Safety Devices for Automatically Fired Boilers
The rules of this Standard cover requirements for the assembly, installation, maintenance, and operation of controls and safety devices on automatically operated boilers directly fired with gas, oil, gas-oil, or electricity within the service limitations and exclusions found in this Standard.

ASME EA-1-2009 (R2014), Energy Assessment for Process Heating Systems
This Standard covers process heating systems that are defined as a group (or a set, or combination) of heating equipment used for heating materials in the production of goods in an industrial plant. These systems, commonly referred to using terms such as furnaces, melters, ovens, and heaters, use heat sources such as fuels, electricity, steam or other fluids to supply the required heat. This Standard sets the requirements for conducting and reporting the results of a process heating energy assessment (hereafter referred to as an “assessment”) that considers the entire system, from energy inputs to the work performed as the result of these inputs. An assessment meeting this standard need not address each individual system component or specific system within an industrial facility with equal weight; however, it shall be sufficiently comprehensive to identify the major energy efficiency opportunities for improving the overall energy performance of the system. This Standard is designed to be applied primarily at industrial facilities, but many of the concepts can be used in other facilities such as those in the institutional and commercial sectors.

ASME EA-2-2009 (R2015), Energy Assessment for Pumping Systems
This Standard covers pumping systems, which are defined as one or more pumps and those interacting or interrelating elements that together accomplish the desired work of moving a fluid. A pumping system thus generally includes pump(s), driver, drives, distribution piping, valves, sealing systems, controls, instrumentation, and end use equipment such as heat exchangers, for example. This Standard addresses open and closed loop pumping systems typically used in industry, and is also applicable to other applications. This Standard sets the requirements for conducting and reporting the results of a pumping system assessment (hereafter referenced as an “assessment”) that considers the entire pumping system, from energy inputs to the work performed as the result of these inputs. An assessment complying with this standard need not address each individual system component or subsystem within an industrial facility with equal weight; however, it must be sufficiently comprehensive to identify the major efficiency improvement opportunities for improving the overall energy performance of the system. This Standard is designed to be applied primarily at industrial facilities, but many of the concepts can be used in other facilities such as those in the institutional, commercial, and water and wastewater facilities.

ASME EA-3-2009 (R2014), Energy Assessment of Industrial Steam Systems
This Standard covers steam systems that are defined as a system containing steam generator(s) or other steam source(s), a steam distribution network and end-use equipment. Cogeneration and power generation components may also be elements of the system (gas turbines, backpressure steam turbines, condensing steam turbines). If steam condensate is collected and returned, the condensate return subsystem is a part of the steam system. This Standard sets the requirements for conducting and reporting the results of a steam system energy assessment (hereafter referenced as an “assessment”) that considers the entire system, from energy inputs to the work performed as the result of these inputs. An assessment meeting this standard need not address each individual system component or specific system within an industrial facility with equal weight; however, it shall be sufficiently comprehensive to identify the major opportunities for improving the overall energy performance of the steam system. This Standard is designed to be applied primarily at industrial facilities, but most of the specified procedures can be used in other facilities such as those in the institutional and commercial sectors.

ASME EA-4-2010 (R2015), Energy Assessment for Compressed Air Systems
This Standard covers compressed air systems which are defined as a group of sub-systems comprised of integrated sets of components including air compressors, treatment equipment, controls, piping, pneumatic tools, pneumatically powered machinery, and process applications utilizing compressed air. The objective is consistent, reliable, and efficient delivery of energy to manufacturing equipment and processes. This Standard sets requirements for conducting and reporting the results of a compressed air system assessment (hereafter referenced as an “assessment”) that considers the entire system, from energy inputs to the work performed as the result of these inputs. An assessment complying with this Standard need not address each individual system component or subsystem within an industrial facility with equal weight; however, it must be sufficiently comprehensive to identify the major energy efficiency opportunities for improving the overall energy performance of the system. This Standard is designed to be applied primarily at industrial facilities, but many of the concepts can be used in other facilities such as those in the institutional and commercial sectors.
ASME HRT-1-2016, Rules for Hoisting, Rigging, and Transporting Equipment for Nuclear Facilities

This Standard provides requirements for the design and use of hoisting, rigging, and transporting equipment used from the time nuclear plant components are delivered at the point of receipt for the plant until the operating phase of the plant. Such equipment shall be designed in accordance with the guidelines of this Standard, or alternatively, in accordance with accepted industry or consensus standards applicable to the type of handling equipment use. This standard applies to the following types of load handling: (1) Those performed with single-load path handling systems; (2) Those performed with dual load path handling systems.

ASME HST-1-2012, Performance Standard for Electric Chain Hoists

(a) This Standard establishes performance requirements for electric chain hoists for vertical lifting service involving material handling of freely suspended (unguided) loads using load chain of the roller or welded link types with one of the following types of suspension: (1) hook; (2) trolley; (3) trolley. (b) This Standard is applicable to hoists manufactured after the date on which this Standard is issued. It is not applicable to: (1) damaged or malfunctioning hoists; (2) hoists that have been misused or abused; (3) hoists that have been altered without authorization of the manufacturer or a qualified person; (4) hoists used for lifting or supporting people; (5) hoists used for the purpose of drawing both the load and the hoist up or down the hoist’s own load chain(s); and (6) hoists used for marine and other applications as required by the Department of Defense (DOD). The requirements of this Standard shall be applied together with the requirements of ASME B30.16.

ASME HST-2-2014, Performance Standard for Hand Chain Manually Operated Chain Hoists

(a) This Standard establishes performance requirements for hand chain manually operated chain hoists for vertical lifting service involving material handling of freely suspended (unguided) loads, using welded link type load chain as a lifting medium, with one of the following types of suspension: (1) hook or clevis; (2) trolley. (b) This Standard is applicable to hoists manufactured after the date on which this Standard is issued. Differential pulley and self-locking worm drive type hoists are not covered in this Standard. (c) This Standard is not applicable to: (1) damaged or malfunctioning hoists; (2) hoists that have been misused or abused; (3) hoists that have been altered without authorization of the manufacturer or a qualified person; (4) hoists used for lifting or supporting people; (5) hoists used for the purpose of drawing both the load and the hoist up or down the hoist’s own wire rope; and (6) hoists used for marine and other applications as required by the Department of Defense (DOD).

ASME HST-3-2017, Performance Standard for Lever Hoists

This Standard establishes performance requirements for chain, wire rope and web strap lever hoists for lifting, pulling, and tensioning applications. The specifications and information contained in this Standard apply to lever hoists and is applicable to hoists manufactured after the date on which this Standard is issued. Requirements of this standard shall be applied together with the requirements of ASME B30.21.

ASME HST-4-2016, Performance Standard for Overhead Electric Wire Rope Hoists

(a) This Standard establishes performance requirements for electric wire rope hoists for vertical lifting service involving material handling of freely suspended (unguided) loads using wire rope with one of the following types of suspension: (1) lug; (2) hook; (3) trolley; (4) base or deck mounted (does not include base mounted winches of the type covered by ASME B30.7); (5) wall or ceiling mounted (does not include winches of the type covered by ASME B30.7). (b) This Standard is applicable to hoists manufactured after the date on which this Standard is issued. It is not applicable to: (1) damaged or malfunctioning hoists; (2) hoists that have been misused or abused; (3) hoists that have been altered without authorization of the manufacturer or a qualified person; (4) hoists used for lifting or supporting people; (5) hoists used for the purpose of drawing both the load and the hoist up or down the hoist’s own wire rope; or (6) hoists used for marine and other applications as required by the Department of Defense (DOD). The requirements of this Standard shall be applied together with the requirements of ASME B30.16.

ASME HST-5-2014, Performance Standard for Air Chain Hoists

(a) This Standard establishes performance requirements for air powered chain hoists for vertical lifting service involving material handling of freely suspended (unguided) loads using load chain of the roller or welded link types with one of the following types of suspension: (1) lug; (2) hook or clevis; (3) trolley. (b) This Standard is applicable to hoists manufactured after the date on which this Standard is issued. It is not applicable to: (1) damaged or malfunctioning hoists; (2) hoists that have been misused or abused; (3) hoists that have been altered without authorization of the manufacturer or a qualified person; (4) hoists used for lifting or supporting people; (5) hoists used for the purpose of drawing both the load and the hoist up or down the hoist’s own load chain(s); or (6) hoists used for marine and other applications as required by the Department of Defense (DOD). The requirements of this Standard shall be applied together with the requirements of ASME B30.16.

ASME HST-6-2015, Performance Standard for Air Wire Rope Hoists

(a) This Standard establishes performance requirements for air wire rope hoists for vertical lifting service involving material handling of freely suspended (unguided) loads using wire rope as the lifting medium with one of the following types of suspension: (1) lug; (2) hook or clevis; (3) trolley; (4) base or deck mounted (does not include winches of the type covered by ASME B30.7); (5) wall or ceiling mounted (does not include winches of the type covered by ASME B30.7). (b) This Standard is applicable to hoists manufactured after the date on which this Standard is issued. It is not applicable to: (1) damaged or malfunctioning hoists; (2) hoists that have been misused or abused; (3) hoists that have been altered without authorization of the manufacturer or a qualified person; (4) hoists used for lifting or supporting people; (5) hoists used for the purpose of drawing both the load and the hoist up or down the hoist’s own wire rope; or (6) hoists used for marine and other applications as required by the Department of Defense (DOD). The requirements of this Standard shall be applied together with the requirements of ASME B30.16. Please also refer to ASME B30.16 for requirements pertaining to marking, construction, and installation; inspection, testing and maintenance; and operations.


This Standard explains the principle of operation, establishes common terminology and gives guidelines for the selection, installation, calibration, and operation of capillary tube thermal flow meters and controllers for the measurement and control of fluid mass flow rate. The content of this standard applies to single phase laminar flows of gases or liquids of known composition, including single phase multicomponent mixtures of known proportions. This Standard applies only to fluid flow that is steady or varies only slowly with time.

ASME MFC-1-2014, Glossary of Terms Used in the Measurement of Fluid Flow in Pipes

This Standard consists of a collection of definitions of those terms that pertain to the measurement of fluid flow in pipes. The definitions provided also give guidance for recommended usage in the application of flow measurement devices.

ASME MFC-10M-2000 (R2011), Method for Establishing Installation Effects on Flowmeters

This Standard establishes methods for determining the influence of installation conditions or flow patterns on the performance of flowmeters in closed conduits (i.e., pipe, ducts, etc.).


This Standard establishes common terminology and gives guidelines for the selection, installation, calibration, and operation of Coriolis flowmeters for the determination of mass flow, density, volume flow, and other parameters.
ASME MFC-12M-2006 (R2014), Measurement of Fluid Flow in Closed Conduits Using Multiport Averaging Pitot Primary Elements
This Standard, provides information on the use of multiport averaging Pitot head-type devices used to measure liquids and gases.

ASME MFC-13M-2006 (R2014), Measurement of Fluid Flow in Closed Conduits-Tracer Methods
This Standard covers measurement of fluid flow in closed conduits using tracer methods.

ASME MFC-14M-2003 (R2008), Measurement of Fluid Flow Using Small Bore Precision Orifice Meters
This Standard specifies the geometry and method of use (installation and flowing conditions) for orifice meters of 6 mm to 40 mm (1/4 in. to 1 1/2 in.) line size when they are inserted in a conduit running full. It also gives necessary information for calculating flow rate and its associated uncertainty.

ASME MFC-16-2014, Measurement of Fluid Flow in Closed Conduit by Means of Electromagnetic Flowmeters
This Standard is applicable to industrial electromagnetic flowmeters and their application in the measurement of liquid flow. The electromagnetic flowmeters covered by this Standard utilize an alternating electrical current (AC) or pulsed direct current (pulsed-DC) to generate a magnetic field in electrically conductive and electrically-homogeneous liquids or slurries flowing in a completely filled, closed conduit.

ASME MFC-18M-2001 (R2016), Measurement of Fluid Flow Using Variable Area Meter
This Standard describes the common variable area flowmeter. This Standard does not attempt to standardize dimensions because the commercial products differ too widely. The variable area meter is manufactured in a variety of designs. This Standard addresses only those meters based on a vertical tapered tube of round or a modified round cross section. Specifically not addressed are the various vane type meters, meters with horizontal flow, or meters which use a spring deflection to oppose flow forces.

ASME MFC-21.2-2010, Thermal Mass Meters - Dispersion Flowmeters
This Standard establishes common terminology and gives guidelines for the description, principle of operation, selection, installation, and flow calibration of thermal dispersion flowmeters for the measurement of the mass flow rate, and to a lesser extent, the volumetric flow rate, of the flow of a fluid in a closed conduit. Multivariable versions additionally measure fluid temperature and static pressure. Thermal dispersion mass flowmeters are applicable to the flow of single-phase pure gases and gas mixtures of known composition and, less commonly, to single-phase liquids of known composition. This Standard applies only to fluid flow that is steady or varies only slowly with time.

ASME MFC-22-2007 (R2014), Measurement of Liquid by Turbine Flowmeters
This Standard describes the criteria for the application of a turbine flowmeter with a rotating blade for the measurement of liquid flows through closed conduit running full.

ASME MFC-26-2011, Measurement of Gas Flow by Bellmouth Inlet Flowmeters

This Standard presents a working outline detailing and illustrating the techniques for estimating measurement uncertainty for fluid flow in closed conduits. The statistical techniques and analytical concepts applied herein are applicable in most measurement processes.

ASME MFC-3M-2004 (R2017), Measurement of Fluid Flow in Pipes Using Orifice, Nozzle, and Venturi
This Standard specifies the geometry and method of use (installation and flowing conditions) for orifice devices (including, but not limited to, orifice plates, nozzles, and venturi tubes) when installed in a closed conduit running full and use to determine the flow-rate of the fluid flowing in the conduit.

ASME MFC-4M-1986 (R2016), Measurement of Gas Flow by Turbine Meters
This Standard applies to: (1) axial full-flow turbine meters with mechanical and/or electrical outputs whose rotating member is driven by a compressible fluid; (2) the measurement of gas by a turbine meter; the meter’s construction, installation, operation, performance characteristics, data computation and presentation, calibration, field checking, and other related considerations of the meter.

ASME MFC-5.1-2011, Measurement of Liquid Flow in Closed Conduits Using Transit Time Ultrasonic Flowmeters
This Standard applies only to ultrasonic flowmeters that base their operation on the measurement of transit time of acoustic signals. This Standard concerns the volume flowrate measurement of a single phase liquid with steady flow or flow varying only lowly with time in a completely filled closed conduit.

ASME MFC-5.3-2013, Measurement of Liquid Flow in Closed Conduits Using Doppler Ultrasonic Flowmeters
This Standard applies only to ultrasonic flowmeters that base their operation on the scattering (Doppler) of acoustic signals. This Standard concerns the volume flowrate measurement of two phase liquid with steady flow or flow varying only slowly with time in a completely filled closed conduit.

ASME MFC-6-2013, Measurement of Fluid Flow in Pipes Using Vortex Flow Meters
This standard gives guidelines for the construction, principle of operation, installation, performance, influence factors and calibration of vortex flowmeters in a closed conduit running full for the measurement of volumetric flowrate and volume flow total of single phase liquids or gases including vapors such as steam. This document also describes the use of vortex flowmeters in combination with one or more other process measurements for the inferential measurement of mass flowrate, mass flow total, base volumetric flowrate and base volume total. This document is limited to full bore flowmeters and does not include the special case of insertion type flowmeters.

This Standard applies only to the steady flow of single-phase gases through critical flow venturis, CFVs, of shapes specified herein (also sometimes referred to as critical flow nozzles or critical flow venturi nozzles). This document applies to critical flow venturis with diverging sections on the downstream side of the throat. When a critical flow nozzle, CFN, (no diverging section) is discussed, it will be explicitly noted. This Standard specifies the method of use (installation and operating conditions) of CFVs. This standard also gives information necessary for calculating the mass flow of the gas and its associated uncertainty. This Standard applies only to CFVs and CFNs in which the flow is critical. Critical flow exists when the mass flow through the CVF is the maximum possible for the existing upstream conditions. At critical flow or choked conditions, the average gas velocity at the CVF throat closely approximates the local sonic velocity. This Standard specifically applies to cases in which: (a) it can be assumed that there is a large volume upstream of the CFV or upstream of a set of CFVs mounted in a parallel flow arrangement (in a common plenum) thereby achieving higher flow; or (b) the pipeline upstream of the CFV is of circular cross section with throat to pipe diameter ratio equal to or less than 0.25.

ASME MFC-8M-2001 (R2016), Fluid Flow in Closed Conduits - Connections for Pressure Signal Transmission between Primary and Secondary Devices
This Standard describes the practices and means which allow the pressures at a head type primary device to be conveyed to the secondary device in a flow measurement system without introducing unnecessary measurement uncertainties.
ASME MFC-9M-1998 (R2011), Measurement of Liquid Flow in Closed Conduits by Weighting Method
This Standard specifies a method of liquid flow rate measurement in closed conduits by measuring the mass of liquid delivered into a weighing tank in a known time interval. It deals in particular with the measuring apparatus, procedure, and method for calculating the flow rate and the uncertainties associated with the measurement. The method described may be applied to any liquid, provided that its vapor pressure is such that any escape of liquid from the weighing tank by vaporization is not sufficient to affect the required measurement accuracy. Closed weighing tanks and their application to the flow measurement of liquids of high vapor pressure are not considered in this Standard.

ASME S11-2007 (R2013), Standard for In-Service Testing of Nuclear Air Treatment, Heating, Ventilating, and Air Conditioning Systems
This Standard covers the requirements for in-service testing of nuclear safety-related air treatment, heating, ventilating, and air-conditioning systems in nuclear facilities.

ASME NOG-1-2015, Rules for Construction of Overhead and Gantry Cranes (Top Running Bridge, Multiple Girder)
This Standard covers electric overhead and gantry multiple girder cranes with top running bridge and trolley used at nuclear facilities and components of cranes at nuclear facilities.

ASME NQA-1-2015, Quality Assurance Requirements for Nuclear Facility Applications
This Standard provides requirements and guidelines for the establishment and execution of quality assurance programs during siting, design, construction, operation and decommissioning of nuclear facilities. This Standard reflects industry experience and current understanding of the quality assurance requirements necessary to achieve safe, reliable, and efficient utilization of nuclear energy, and management and processing of radioactive materials. The Standard focuses on the achievement of results, emphasizes the role of the individual and line management in the achievement of quality, and fosters the application of these requirements in a manner consistent with the relative importance of the item or activity.

ASME NQA-1b-2011, Quality Assurance Requirements for Nuclear Facility Applications
To develop, manage, and/or coordinate quality assurance and quality assurance related codes and standards applicable to siting, design, construction, operation, and decommissioning of nuclear power plants and nuclear fuel cycle facilities.

ASME NUM-1-2016, Rules for Construction of Cranes, Monorails, and Hoists (Bridge or Trolley or Hoist of the Underhung Type)
This Standard covers underhung cranes, top-running bridge and gantry cranes with underhung trolleys, traveling wall cranes, jib cranes, monorail systems, overhead hoists, and hoists with integral trolleys used in nuclear facilities.

ASME OM Code-2004, Code for Operation and Maintenance of Nuclear Power Plants
Establishes the requirements for preservice and in-service testing and examination of certain components to assess their operational readiness in light water reactor power plants.

ASME OM-2017, Operation and Maintenance of Nuclear Power Plants
This Standard establishes the requirements for preservice and in-service testing and examination of certain components to assess their operational readiness in light water reactor power plants.

ASME OM-S/G-2007, Standards and Guides for Operation and Maintenance of Nuclear Power Plants
This document contains standards and guidelines applicable to the safe and reliable operation and maintenance of nuclear power plants.

This Code establishes the requirements for preservice and in-service testing and examination of certain components to assess their operational readiness in light water reactor power plants.

ASME OM-A-2011, Operation and Maintenance of Nuclear Power Plants
Provides requirements for testing and examination of pumps, valves, pressure relief devices and dynamic restraints (snubbers) in light-water nuclear power plants.

Establishes the requirements for preservice and in-service testing and examination of certain components to assess their operational readiness in light-water reactor nuclear power plants.

ASME PASE-2014, Safety Standard for Portable Automotive Service Equipment
The standardization of safety and performance requirements for potable automotive service equipment including but not limited to: (a) attachments, adapters, and accessories (b) hydraulic hand jacks (c) transmission jacks (d) engine stands (e) vehicle support stands (f) emergency tire changing jacks (g) mobile lifts (h) service jacks (i) wheel dollies (j) shop cranes (k) auxiliary stands (l) automotive ramps (m) high reach supplementary stands (n) fork lift jacks (o) vehicle transport lifts (p) vehicle moving considerations: Lift 19201.1 Standard does not exclude any particular equipment or industry. This standard may not address all of the hazards that could be encountered during a load handling activity. It is the responsibility of the user of this standard to assess and address the hazards associated with a particular load handling activity.

ASME PASE-2014, Safety Standard for Portable Automotive Service Equipment
The establishment of safety standards and performance requirements for load handling equipment (LHE), other associated equipment and activities when moving loads vertically or horizontally. The planning guidance contained in this standard is divided into two categories dependent upon the nature of the load handling activity and the degree of exposure to the issues that impact safety. The categories are designated as Standard Lift Plan and Critical Lift Plan. This standard does not preclude the user of this standard from creating subcategories based on their specific load handling activity considerations. This standard is not a substitute for any particular load handling activity.

ASME PCC-1-2013, Guidelines for Pressure Boundary Bolted Flange Joint Assembly
The bolted flange joint assembly (BFJA) guidelines described in this document apply to pressure-boundary flanged joints with ring-type gaskets that are entirely within the circle enclosed by the bolt holes and with no contact outside this circle. By selection of those features suitable to the specific service or need, these guidelines may be used to develop effective joint assembly procedures for the broad range of sizes and service conditions normally encountered in industry.

ASME P30.1-2014, Planning for Load Handling Activities
This standard establishes planning considerations and practices that apply to Load Handling Equipment (LHE), other associated equipment and activities when moving loads vertically or horizontally. The planning guidance contained in this standard is divided into two categories dependent upon the nature of the load handling activity and the degree of exposure to the issues that impact safety. The categories are designated as Standard Lift Plan and Critical Lift Plan. This standard does not preclude the user of this standard from creating subcategories based on their specific load handling activity considerations. This standard is not a substitute for any particular load handling activity.
ASME PTC 19.1-2013, Test Uncertainty
This Standard specifies procedures for evaluation of uncertainties in test measurements, parameters and methods, and, for propagation of those uncertainties into the uncertainty of a test result. Depending on the application, uncertainty sources may be classified either by the presumed effect (systematic or random) on the measurement or test result, or by the process in which they may be quantified or their pedigree established (Type A or Type B). When an uncertainty analysis is completed, a numerical characterization of the quality of test results is available with an appropriate level of confidence, typically 95%. This Standard is not intended to be submitted for consideration as an ISO or ISO/IEC 17025 Standard.

ASME PTC 19.11-2008 (R2013), Steam and Water Sampling, Conditioning, and Analysis in the Power Cycle
The object of this Code is to specify and discuss the methods and instrumentation for testing boiler makeup and feedwater, steam, and condensate in relation to performance testing as may be required in Performance Test Codes in one-time acceptance testing and continuous performance monitoring. This Code also provides guidance to power-plant management, engineers, chemists, and operators in the design and operation of sampling systems for monitoring of cycle chemistry. The methods and equipment recommended herein may be useful for monitoring other influent and effluent streams of the power plant. Contamination of the steam and water cycle must be at or less than the maximum specified for the performance test before a turbine, condenser, or deaerator performance test is made.

ASME PTC 19.2-2010 (R2015), Pressure Measurement
The methods for pressure measurement and the protocols used for data transmission are provided in this Supplement. Guidance is given for setting up the instrumentation and determining the uncertainty of the measurement. Information regarding the instrument type, design, applicable pressure range, accuracy, output, and relative cost is provided.

ASME PTC 19.22-2007 (R2012), Data Acquisition Systems
The scope of this Code includes signal conditioning, signal multiplexing, analog-to-digital signal conversion, and data processing. This Code addresses stand-alone data acquisition systems, typified by a sensor with an integral digital display, data acquisition systems that link multiple sensors to a common digital processor tied to a computer or printer, and systems that link multiple digital processors to one or more stand-alone or networked computers. This Code incorporates instrumentation practices covered by other Instruments and Apparatus Supplements (PTC 19 Series) as well as by the equipment Performance Test Codes. It also provides a means to determine the uncertainty associated with the data acquisition system, and its impact on the overall uncertainty of the performance test. The Code does not directly address specific sensors or instruments used for ASME Performance Testing. These are addressed in other ASME Performance Test Codes.

ASME PTC 19.3TW-2016, Thermowells
This Standard applies to thermowells machined from bar stock and includes those welded to or threaded into a flange as well as those welded into a process vessel or pipe with or without a weld adaptor.

ASME PTC 19.5-2004 (R2013), Flow Measurement
This Supplement describes the techniques and methods of all flow measurements required or recommended by the Performance Test Codes. Newer flow measurement techniques of comparably high accuracy are included to provide alternative flow measurements for special situations in which deviations from the requirements of a code are agreed to be necessary. This is a supplementary document that does not supersede the mandatory requirements of any code unless such an agreement has been expressed in writing prior to testing.

ASME PTC 2-2001 (R2014), Definitions and Values
This Code contains standards for terms, units of measure, values of constants, symbols, and technical nomenclature that are to be used in all individual test codes.

ASME PTC 22-2014, Gas Turbines
This Code provides for the testing of gas turbines supplied with gaseous or liquid fuels (or solid fuels converted to liquid or gas prior to entrance to the gas turbine). Tests of gas turbines with emission control and/or power augmentation devices, such as injection fluids and inlet air treatment, are included. It may be applied to gas turbines in combined cycle plants or with other heat recovery systems.

ASME PTC 23-2003 (R2014), Atmospheric Water Cooling Equipment
This Code provides uniform test methods for conducting and reporting thermal performance characteristics of wet and dry-cooling towers, closed circuit evaporative (wet) coolers, and wet-surface air-cooled steam condensers. This Code also provides directions and rules for conducting and reporting plume abatement of wet-dry cooling towers and water consumption of any cooling tower.

ASME PTC 25-2014, Pressure Relief Devices
This Code provides standards for conducting and reporting tests on reclosing and nonreclosing pressure relief devices normally used to terminate an abnormal internal or external rise in pressure above a predetermined design value in boilers, pressure vessels, and related piping equipment. This Code covers the methods and procedures to determine relieving capacity and additional operating characteristics which may be required for certification or other purposes by other Codes.

ASME PTC 29-2005 (R2015), Speed Governing Systems for Hydraulic Turbine Generator Units
This Code applies to speed governors used on conventional, constant-speed hydraulic turbines. This Code is applicable to electronic-hydraulic and mechanical-hydraulic speed governors. These governors are commonly used to control reaction and impulse-type hydraulic turbines (fixed or variable geometry) and pump turbines operating in generation mode.

ASME PTC 30-1991 (R2016), Air Cooled Heat Exchangers
The object of this Code is to provide uniform methods and procedures for testing the thermodynamic and fluid mechanical performance of air cooled heat exchangers, and for calculating adjustments to the test results to design conditions.

ASME PTC 30.1-2007 (R2012), Air Cooled Steam Condensers
Provides uniform test methods for conducting and reporting thermal performance characteristics of mechanical draft air-cooled steam condensers (ACC) operating under vacuum conditions. It provides rules for conducting acceptance tests. It also provides guidelines for monitoring thermal performance and conducting routine tests. A test shall be considered an ASME Code Test only if the test procedures comply with those stipulated in this Code and the post-test uncertainty analysis results are in accordance with subsection 1.3.

ASME PTC 31-2011 (R2017), High-Purity Water Treatment System
This Code defines the procedures for the accurate field testing of high-purity water treatment systems for the purpose of determining level of performance. It is based on the use of accurate instrumentation and the best analytical and measurement procedures available.

ASME PTC 34-2017, Waste Combustors with Energy Recovery
This Code provides a test procedure for evaluating the performance of waste fuel combustors with energy recovery using the boiler as a calorimeter. These procedures apply when the variability and waste fuel composition results in a lack of confidence in obtaining representative samples for laboratory analysis. Instructions are given to determine the thermal capacity and thermal efficiency of waste combustor systems by applying the concept of using the boiler as a calorimeter. In addition, the HHV of the waste fuel can be determined by weighing the waste fuel that has been consumed during the test.
ASME PTC 36-2004 (R2013), Measurement of Industrial Sound
This Code includes measurement procedures in a variety of acoustical environments, including outdoor settings influenced by background noise. Generally, sound pressure levels and/or sound power levels in prescribed frequency bands are used to quantify ASME PTC 36-2004 the sound emission of industrial equipment and facilities. Sound pressure level measurements or sound intensity measurements obtained using the procedures of this Code may be used to calculate sound power level.

ASME PTC 39-2005 (R2010), Steam Traps
This Code covers steam traps which are devices used for removing condensate and noncondensables from steam systems.

ASME PTC 4-2013, Fired Steam Generators
The object of this Code is to establish procedures for conducting performance tests of fuel fired steam generators. This Code provides standard test procedures which can yield results giving the highest level of accuracy consistent with current engineering knowledge and practice. The accuracy of a particular test may be affected by the fuel fired during the test or other factors within the discretion of the operator. A test is considered an ASME Code test only if the following conditions are met: • test procedures comply with procedures and allowed variations defined by this Code. • uncertainties of test results, determined in accordance with Section 7.0 of this Code, do not exceed target test uncertainties defined by prior written agreement in accordance with Section 3.0 of this Code.

ASME PTC 4.2-1969 (R2016), Coal Pulverizers
The purpose of this code is to establish procedures for conducting performance tests to determine: Capacity, Fineness of product, Raw coal feed, Grindability, Moisture, Sizing, Power consumption and Effect of changes in raw coal Characteristics on product fineness, pulverizer capacity, and power consumption. Effect of changes in pulverizer component settings on product fineness, pulverizer capacity, and power consumption. This Code applies to the pulverizing system as a whole, including all the component parts necessary to take the raw coal, hot air and tempering air at the system inlet, and deliver pulverized coal in proper mixture with air and/or flue gas at the desired temperature at the outlet of the system.

ASME PTC 4.3-2017, Air Heaters
This Code applies to all air heaters used in industrial application, for example, air heaters servicing steam generators and industrial furnaces. This specifically includes: (a) Combustion gas-to-air heat exchanger including air heaters with multi-section air streams (b) Air preheater coils utilizing non condensing (single phase) steam, water, or other hot fluids. This code does not cover direct-fired air heaters or gas-to-gas heat exchangers. In the latter application, this Code may be used to determine both the thermal and pressure drop performance while alternate methods of leakage measurement should be agreed upon between the parties. This code also does not cover heat exchangers where the heating fluid is condensed while passing through the heater. Air heaters in parallel shall be tested individually (wherever possible) for purposes of checking standard of design performance.

ASME PTC 4.4-2008 (R2013), Gas Turbine Heat Recovery Steam Generators
This Code addresses steam generators whose primary function is to recover heat from gas turbine exhaust. Methods noted in this document may also be used for testing other heat recovery units, which may include the following: (1) units heating water only; (2) units using working fluids other than water; (3) units obtaining hot gas heat input from sources other than gas turbines; (4) HRSGs with fresh air firing capability.

ASME PTC 40-2017, Flue Gas Desulfurization Units Performance Test Code
The object of the Performance Test Code is to establish standard procedures for the conduct and reporting of performance tests of flue gas desulfurization (FGD) systems. The application of this Code is limited to the process and equipment employed to remove sulfur dioxide from flue gas or other sulfur dioxide-laden gas stream. The scope of this Code covers dry FGD, wet FGD, and regenerable FGD.

ASME PTC 46-2015, Overall Plant Performance
The purpose of this Code is to provide uniform test methods and procedures for the determination of the thermal performance and electrical output of heat cycle electric power plants and cogeneration facilities. It provides explicit procedures for the determination of the following performance results: (a) corrected net power; (b) corrected heat rate or efficiency; (c) corrected heat input

ASME PTC 47-2006 (R2011), Integrated Gasification Combined Cycle Power Generation Plants
This Code covers a defined range of primary fuel characteristics, but is limited to combined-cycle, power generation systems using gas and steam turbines. This Code defines the boundaries of the overall IGCC power plant to encompass three major plant sections — the air separation unit (ASU), for oxygen-blown gasifiers or plants that use nitrogen), the gasification process (including gas cleanup), and the power block. Tests conducted by this Code determine the quantity and quality of fuel gas by its flow rate, temperature, pressure, composition, heating value, and its content of contaminants. Contaminants are compounds that are potentially deleterious to the gas turbine and power block in general, or are precursors to stack emissions. Contaminants to be measured are sodium (Na), potassium (K), vanadium (V), lead (Pb), calcium (Ca), barium (Ba), manganese (Mn), phosphorus (P), sulfur compounds (H2S and COS), nitrogen compounds (HCN and NH3), chlorine compounds (HCl), and particulate matter. Recommendations are included for the following in pretest agreements: testing procedures, types of instruments, methods of measurement, methods of calculation, and contents of test reports. Regulatory compliance testing of IGCC power plants is not covered by this Code.

ASME PTC 47.4-2015, Performance Test Code for the Power Block of an Integrated Gasification Combined Cycle Power Plant
This Code applies to combined cycle power plants (Power Blocks) that operate in conjunction with a gasification plant, an integrated gasification combined cycle (IGCC) power plant or power IGCC cogeneration plant. This Code does not apply to power blocks other than those associated with IGCC plants. This code (PTC 47.4) is applicable to the combined cycle power block of integrated gasification combined cycle (IGCC) power plants, whereas PTC46 is applicable to conventional combined cycles. The thermal streams and corrections in PTC 46 for conventional combined cycles are normally limited to gas or liquid hydrocarbon fuel input and steam or water input. In PTC 47.4, test measurements and associated corrections are needed to address multiple thermal streams such as heated hydrocarbon syngas fuel input, water and steam inputs from gasification process units, nitrogen input from the air separation plant, and air extraction to the air separation plant. Emissions tests, operational demonstration tests, and reliability tests are outside the scope of this Code.

ASME PTC 50-2002 (R2014), Fuel Cell Power Systems Performance
This Code provides test procedures, methods, and definitions for the performance characterization of fuel cell power systems. Fuel cell power systems include all components required in the conversion of input fuel and oxidizer into output electrical and thermal energy.
ASME PTC 51-2011 (R2016), Gas Turbine Inlet Air Conditioning Equipment

This Code may be used for in situ testing of inlet air-conditioning systems (cooling/heating) as they apply to gas turbines in simple, cogeneration, and combined-cycle applications. Cooling systems covered by this Code include evaporative systems (foggers and media-based evaporative coolers) and mechanical/thermal refrigeration systems. Heating systems covered by this Code include compressor-bleed type systems and heating-coil systems.

ASME PTC 55-2013, Gas Turbine Aircraft Engines

This Code covers the testing of gas turbine aircraft engines in steady state. This Code applies to turbojet, turbofan, turboshift, and turboprop engines, applications. Additionally the Code will encompass ram and/or altitude test conditions, including sea level, static test conditions. This Code is only applicable to measuring performance when the engine is installed in a test facility. This Code is not applicable to measuring performance when the engine is installed in an aircraft, and it does not address engine-specific limits and margins. The Code does not cover ground-based mechanical or electrical power-generating gas turbines, which is the subject of PTC 22. This Code is not sufficient for certification or qualification of engines under development, nor is it intended for determination of research data. While this code does not cover the requirements for transient testing, it is recognized that transient testing may be required to meet some limited contractual requirements. Information on transient testing is provided herein to support a comprehensive test program.

ASME PTC 6-2004 (R2014), Steam Turbines

This Code may be used for testing of steam turbines operating either with a significant amount of superheat in the initial steam (typically fossil-fueled units) or predominantly within the moisture region (typically nuclear-fueled units). This Code contains rules and procedures for the conduct and reporting of steam turbine testing, including mandatory requirements for pretest arrangements, instrumentation to be employed, their application and methods of measurement, testing techniques, and methods of calculation of test results. It also contains procedures and techniques required to determine enthalpy values within the moisture region and modifications necessary to permit testing within the restrictions of radiological safety requirements in nuclear plants.

ASME PTC 6.2-2011 (R2016), Steam Turbines in Combined Cycles

ASME PTC 6.2 is a performance test code for testing steam turbines in combined cycles with or without supplementary firing and in cogeneration applications. It addresses the testing and calculating of turbine-generator output performance corrected to reference conditions as a measure of overall turbine performance. This Code contains rules and procedures for the conduct and reporting of steam turbine testing, including requirements for pretest arrangements, testing techniques, instrumentation, methods of measurement, and methods for calculating test results and uncertainty.

ASME PTC 6A-2000 (R2016), Appendix A to PTC 6, the Test Code for Steam Turbines

This appendix has been prepared to facilitate the calculation and correction of turbine test results by furnishing numerical examples of the procedures outlined in PTC 6, the Performance Test Code on Steam Turbines. The feedwater heating cycles and gland leak-off systems have been simplified by avoiding unnecessarily long or repetitive calculations while still demonstrating the basic principles involved. The general guidelines for making these calculations and comparisons to specified performance are given.

ASME PTC 6S-1988 (R2014), Procedures for Routine Performance Tests of Steam Turbines

This Report provides turbine-test procedures for the analysis and supervision of relative performance throughout the life of the turbine. These procedures will determine trends of operating efficiency, detect trouble, and furnish test data to evaluate efficiency changes in the turbine cycle. These procedures are designed to minimize test instrumentation and personnel. However, precision instrumentation at critical test locations is recommended for reliable results. A high degree of repeatability, rather than the acceptance test level of performance, is sought.

ASME PTC 70-2009 (R2014), Performance Test Code on Ramp Rates

This Code provides procedures, direction, and guidance for the accurate determination, via testing, of the maximum repeatable load change ramp rate, startup load change rate, or shutdown load change rate of a power plant. The load change rate is distinguished by starting from one operating point at steady state condition and transitioning to another. Startup commences at a shutdown condition, or intermediary startup condition, and proceeds to a defined running condition. Shutdown begins at a running condition and proceeds to a shutdown condition or intermediary shutdown condition.

ASME PVHO-1-2016, Safety Standard for Pressure Vessels for Human Occupancy

This Standard applies to all pressure vessels that enclose a human within its pressure boundary while under internal or external pressure exceeding a differential pressure of 2 psi. PVHOs include, but are not limited to, submersibles, diving bells, personnel transfer capsules; and decompression, recompression, hypobaric, and hyperbaric PVHOs.

ASME PVHO-2-2016, Safety Standard for Pressure Vessels for Human Occupancy: In-Service Guidelines

This Standard provides technical requirements and guidelines for the operation and maintenance of PVHOs and PVHO systems that were designed, constructed, tested and certified in accordance with ASME PVHO-1, Safety Standard for Pressure Vessels for Human Occupancy.

ASME QEI-1-2013, Standard for the Qualification of Elevator Inspectors

This Standard applies to the qualification and duties of inspectors and inspection supervisors engaged in the inspection and testing of equipment to determine compliance with the requirements of ASME A17.1/CSA B44; ASME A17.3; CSA B44.1/ASME A17.5; ASME A18.1 or CSA B355, CSA B311, and ANSI/ASSE A10.4 or CSA Z185. This Standard does not cover personnel engaged in engineering and type testing as covered in Section 8.3 of ASME A17.1/CSA B44; Section 8 of ASME A18.1 or Appendix A of CSA B355; and CSA B44.1/ASME 17.5, including inspection by laboratories in association with these tests.

ASME QFO-1-1998 (R2006), Qualification of High Capacity Fossil Fuel Fired Plant Operators

This Standard specifies the requirements leading to certification as a fossil combustion operator of a high capacity fossil fuel fired plant as appropriate to the Clean Air Act as amended in 1990, for a fossil fuel fired boiler with an input equal to or greater than 100 + 0 Btu/hr (10,550 E + 0 J/hr). It does not cover plants (boilers) exclusively firing: wood, wood residue, industrial waste, municipal waste, or combustion turbine exhaust. It provides a procedure for qualification, examination, and certification of the operator. Due to the diversity of size, operation, and process of the organizations and plants affected, this Standard does not identify which specific position(s) or which individual(s) will be certified.

ASME QME-1-2017, Qualification of Active Mechanical Equipment Used in Nuclear Power Plants

This Standard provides the requirements and guidelines for the qualification of active mechanical equipment whose function is required to ensure the safe operation or safe shutdown of a nuclear facility. The active mechanical equipment shall also comply with the requirements of the applicable design and construction codes and standards.

ASME QRO-1-2005 (R2015), Standard for the Qualification and Certification of Resource Recovery Facility Operators

This Standard covers the certification of persons who perform or direct operations of facilities that combust municipal solid waste (MSW).
This Standard sets forth the requirements for probabilistic risk assessments (PRAs) used to support risk-informed decisions for commercial light water reactor nuclear power plants and prescribes a method for applying these requirements for specific applications.

This Standard sets forth requirements for the incorporation of passive safety design concepts related to the performance of the carbodies of heavy rail transit vehicles in conditions such as collisions, so as to enhance occupant safety and control damage.

This Standard applies to commercial light rail vehicles and streetcars for transit passenger service. It defines requirements for the construction of passive safety design concepts related to the performance of heavy rail transit vehicles in conditions such as collisions, so as to enhance passenger safety and limit and control damage.

This Standard applies to stationary vessels used for the storage, accumulation, or processing of corrosive or other substances at pressures not exceeding 15 psig external and/or 15 psig internal above any hydrostatic head.

This Standard covers many facets of the design of steel stacks. It outlines the consideration that must be made for both the mechanical and structural design. It emphasizes what consideration must be taken for wind- and seismic-induced vibrations.

This Standard provides the requirements to establish a reliability, availability, and maintainability (RAM) program for any power generation facility. The program process includes: a) Establishment of RAM goals b) Requirements for design, construction and commissioning, and operations This Standard identifies the required RAM program elements and responsibilities.

This standard amplifies and clarifies the requirements of ASME RAM-1 to implement a RAM program for a power-generation facility. This standard assists in developing goals of a master equipment list to load the enterprise asset management system and populate scheduling systems with finished content ready to perform work. A RAM Program includes facility breakdown into a hierarchy, equipment (e.g., component) tagging, risk categorization of systems and equipment tags, standard development of components, and customization for similar context locations in the plant. This standard finalizes work organization as task lists in Work Orders, routes, and rounds. It provides a process to implement ASME RAM-1 based on terminology and methodology used in power plants.

This Standard applies to carbodies for newly constructed light rail vehicles and streetcars for transit passenger service. The Standard defines requirements for the incorporation of passive safety design concepts related to the performance of the carbodies of light rail vehicles in conditions such as collisions, so as to enhance occupant safety and control damage.

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This Standard applies to carbodies for newly constructed light rail vehicles and streetcars for transit passenger service. The Standard defines requirements for the incorporation of passive safety design concepts related to the performance of the carbodies of light rail vehicles in conditions such as collisions, so as to enhance occupant safety and control damage.
This Standard establishes the requirements for creating orthographic and pictorial views for engineering drawings. The topics covered include the multiview system of drawing, selection, and arrangement of orthographic views, auxiliary views, sectional views, details, and conventional drawing practices. It also addresses the kinds of pictorial views commonly used on engineering drawings. The methods for constructing pictorial drawings are beyond the scope of this Standard. Space geometry and space analysis and applications are included in the appendices for informational purposes.

This Standard establishes the requirements for undimensioned drawings that graphically define items with true geometry views(s) and predominantly without the use of dimensions.

This Standard establishes the minimum requirements for the preparation and revision of application lists, data lists, index lists, parts lists, and wire lists. In addition, this Standard presents certain options that may be incorporated into application lists, data lists, index lists, parts lists, and wire lists at the discretion of the design activity. It is essential that this Standard be used in close conjunction with ASME Y14.24, ASME Y14.35, ASME Y14.41, and ASME Y14.100.

The intent of this Standard is to allow the use of approved abbreviations in lieu of the use of complete words or terminology. Abbreviations defined by this Standard need not be additionally defined by the using drawing or related document. It is not the intent of this Standard to include abbreviations defined or established in other standards such as those for scientific terms and notations. However, an exception is made for those abbreviations that have widespread use and recognition, for example, AM for amplitude modulation, and FM for frequency modulation (radio).

This Standard establishes requirements and references documents applicable to the preparation and revision of digital product definition data, hereafter referred to as data sets. This Standard defines exceptions and additional requirements to existing ASME standards for using product definition digital data sets or drawings in digital format. Where no exception or additional requirements are stated, existing ASME standards shall apply.

This Standard defines metric sheet size and formats for engineering drawings. Decimal inch sheet sizes and format are defined in ASME Y14.1. For engineering drawing preparation and practices, see ASME Y14.100.

This Standard defines the types of engineering drawings most frequently used to establish engineering requirements. It describes typical applications and minimum content requirements. Drawings for specialized engineering disciplines, e.g., marine, civil, construction, optics, etc., are not included in this Standard.

This Standard defines the requirement for engineering drawings and associated documents and establishes methods for identification and recording revisions. The revision practices of this Standard apply to any form of original drawing and associated documents. It is essential that this Standard be used in close conjunction with ASME Y14.24, ASME Y14.34, ASME Y14.41, and ASME Y14.100.

This Standard establishes the method to designate controls for surface texture of solid materials. It includes methods for controlling roughness, waviness, and lay by providing a set of symbols for use on drawings, specifications, or other documents.

This Standard defines the definition of composite parts that are not covered within the existing ASME Y14 series standards. This standard defines exceptions and additional requirements to existing ASME standards for defining composite parts. Composite parts as addressed by this standard are inseparable assemblies of composite materials that may include non-composite material(s). When no exception or additional requirements are stated, existing ASME standards shall apply.

This Standard establishes the requirements for engineering drawings and related documents. This Standard presents certain options that may be incorporated into application lists, data lists, index lists, parts lists, and wire lists at the discretion of the design activity. It is essential that this Standard be used in close conjunction with ASME Y14.24, ASME Y14.35, ASME Y14.41, and ASME Y14.100.

This Standard establishes the minimum requirements for using product definition digital data sets or drawings in digital format. Where no exception or additional requirements are stated, existing ASME standards shall apply.

This Standard defines the types of engineering drawings most frequently used to establish engineering requirements. It describes typical applications and minimum content requirements. Drawings for specialized engineering disciplines, e.g., marine, civil, construction, optics, etc., are not included in this Standard.

This Standard establishes the method to designate controls for surface texture of solid materials. It includes methods for controlling roughness, waviness, and lay by providing a set of symbols for use on drawings, specifications, or other documents.
ASME Y14.5.1M-1994 (R2012), Mathematical Definition of Y14.5

Presents a mathematical definition of geometrical dimensioning and tolerancing consistent with the principles and practices of ASME Y14.5M-1994, enabling determination of actual values.

ASME Y14.6-2001 (R2013), Screw Thread Representation

This Standard establishes requirements for pictorial representation, specification, and dimensioning of screw threads on drawings; it is not concerned with standards for dimensional control of screw threads.

Information helpful in the design and selection of screw threads to meet specific requirements is included in the B1 series of the ASME Standards for Screw Threads (see para. 1.3).

ASME Y14.8-2009 (R2014), Castings, Forgings and Molded Parts

This Standard covers definitions of terms and features unique to casting and forging technologies with recommendations for their uniform description and inclusion on engineering drawings and related documents. Unless otherwise specified, any reference to features, parts, or processes shall be interpreted as applying to both castings and forgings. Castings and forgings are delineated as casting/forging throughout the Standard.

ASME Y32.18-1972 (R2013), Symbols for Mechanical and Acoustical Elements as Used in Schematic Diagrams

This standard presents symbols and definitions that may be used in constructing schematic diagrams for mechanical and acoustical systems whose performances are describable by finite sets of scalar variables. The choice of symbols described herein is based upon the following assumptions: a. A system can be divided conceptually into a finite set of elements each of whose dynamical properties are known. b. To each such conceptual element there can be assigned a set of terminals. c. Symbols for the elements shall be interconnected to form a schematic diagram for the whole system so that field equations shall be satisfied at every junction point and around every closed loop. The symbols which appear in this standard were evolved with the following principles in mind: a. It shall be possible to draw the symbols easily and quickly. b. The symbol shall be distinctive and where feasible shall suggest some well-known embodiment of the element in question. c. The symbols shall preferably have been used previously in the scientific literature.

NOTE 1: Questions concerning the specific form for a so-called equivalent circuit of an electro-mechanical or any other type of mixed system are not within the scope of this standard.

NOTE 2: An Appendix (not a part of this standard) provides background information on the use of the symbols in constructing schematic diagrams.

ASME Y32.7-1972 (R2014), Graphic Symbols for Railroad Maps and Profiles

This Standard includes symbols for railroad maps and profiles.

ASME/ANS RA-S-2008, Probabilistic Risk Assessment for Nuclear Power Plant Applications

This Standard sets forth the requirements for probabilistic risk assessments (PRAs) used to support risk-informed decisions for commercial light water reactor nuclear power plants, and prescribes a method for applying these requirements for specific applications.

ASNT (American Society for Nondestructive Testing)

ANSI/ASNT CP-105-2015, ASNT standard topical outlines for qualifications of nondestructive testing personnel

An essential element in the effectiveness of nondestructive testing (NDT) is the qualification of the personnel who are responsible for and who perform nondestructive testing. Formal training is an important and necessary element in acquiring the skills necessary to effectively perform nondestructive tests. The American Society for Nondestructive Testing, Inc. (ASNT) has, therefore, undertaken the preparation and publication of this standard which specifies the body of knowledge to be used as part of a training program qualifying and certifying NDT personnel.


Establishes a system for the qualification and certification, by a certification body, of personnel to perform industrial NDT.

ANSI/ASNT CP-189-2016, ASNT Standard for Qualification and Certification of Nondestructive Testing Personnel

This standard establishes the minimum requirements for the qualification and certification of nondestructive testing (NDT) and predictive maintenance (PdM) personnel. This standard details the minimum training, education, and experience requirements for NDT personnel and provides criteria for documenting qualifications and certification. This standard requires the employer to establish a procedure for the certification of NDT personnel. This standard requires that the employer incorporate any unique or additional requirements in the certification procedure.

ANSI/ASNT IILI-PQ-2005 (R2010), In-Line Inspection Personnel Qualification and Certification

Provides a standard means for employers to qualify and certify nondestructive testing personnel using in-line inspection technologies on oil and gas pipelines to include levels of qualification, education, training, experience requirements, examinations, certifications, recertification.

ASPE (American Society of Plumbing Engineers)

ANSI/ARCSA/ASPE 63-2013, Rainwater Catchment Systems

This Standard covers the design and installation requirements for rainwater catchment systems that utilize the principle of collecting and using precipitation from a rooftop and other impervious surfaces. This Standard does not apply to the collection of rainwater from vehicular parking or other similar surfaces.

ANSI/ARCSA/ASPE 78-2015, Stormwater Harvesting System Design for Direct End-Use Applications

This Standard covers onsite, single-property stormwater catchment systems that utilize the principle of collecting and using precipitation or rain from non-rooftop and other impervious surfaces at, below, and above grade. The objectives of this Standard are to provide guidance on how to provide and maintain a safe alternative to utility-provided water and to optimize stormwater utilization.

ANSI/ASPE 45-2013, Siphonic Roof Drainage

This Standard applies to engineered siphonic roof drainage systems intended to prime and operate full-bore through proper pipe dimensioning and the use of siphonic roof drains. This Standard does not apply to conventional roof drains covered under ANSI/ASTM A112.6.4 ‘Roof Drains,’ atmospheric roof drainage systems, or sanitary drainage systems. It establishes minimum performance specifications, provides guidelines for inspection and testing, and describes the basis for the design and manufacture of siphonic roof drain products as well as the procedures for performance tests and publication of performance data to be used by siphonic roof drainage system designers.

ANSI/WQA/ASPE S-801-2015, Sustainable Management

This standard includes attributes, criteria, and metrics that will be used to assess the sustainable management practices and performance of manufacturers, as well as component and material suppliers, that are seeking to obtain certification to applicable WQA sustainable product standards. Note that certification to this standard is not available for either products or facilities, as this standard was developed exclusively as a prerequisite to product certification standards developed for certification under ISO 17065. Policies, programs, objectives and targets should apply to the entire production facility subject to review under this standard.
ANSI/WQA/ASPE S-802-2014, Sustainable Activated Carbon Media for Drinking Water Treatment

The scope of this standard is limited to activated carbon used in the filtration of potable drinking water within the following applications: point of use (POU) systems/products, point of entry (POE) systems, commercial/industrial systems, and municipal supply. The following product types are excluded from the scope of this standard: activated carbon used in groundwater or wastewater remediation and carbon cartridge components such as carbon blocks. This standard will be applicable globally and may be applied to certification of applicable products by any qualified certification body.

ANSI/WQA/ASPE S-803-2015, Sustainable Drinking Water Treatment Systems

This standard applies to products that treat or otherwise produce water for human consumption (e.g., drinking and/or food/beverage preparation) or recreation, but excludes products that treat wastewater. It provides a points-based certification method to be used by third-party organizations to certify such products as sustainable.

ASQ (American Society for Quality)

ANSI/ASQ S1-2012, An attribute skip-lot sampling program

This standard defines a generic attribute skip-lot sampling program. The purpose of this publication is to provide procedures, for reducing the inspection effort on products submitted by those suppliers who have demonstrated their ability to control, in an effective manner, all facets of quality and who consistently produce lots which meet requirements. Inspection may take place at the supplier’s or purchaser’s locations or at an interface between operations of a production process. The skip-lot procedures are designed to be used with the attribute lot-by-lot plans described in ANSI/ASQ Z1.4.

ANSI/ASQ S3-2012, An attribute chain sampling program

This standard describes the process of chain sampling, the theory, applications, plans for use, operating (performance) characteristics, and the utility of chain sampling as compared to single sampling via the operating characteristics. The purpose of this standard is to provide the procedures for a collection of sample sizes as well as to present the static operating characteristics for the plans presented, for use of the chain sampling technique.

ANSI/ASQ Z1.11-2011 (R2016), Quality management system standards - Requirements for education organizations

 Specifies quality system requirements where an education organization a) needs to establish confidence in its ability to design, develop, deliver instruction, evaluate students, support research, provide public service, and maintain its support services to fulfill education requirements, satisfy customers, and meet expectations of interested parties, and b) needs to maintain conformity to applicable legal and regulatory requirements.

ANSI/ASQ ISO 26000-2010, Guidance on Social Responsibility

This International Standard provides guidance to all types of organizations, regardless of their size or location.


This International Standard specifies requirements for an environmental management system to enable an organization to develop and implement a policy and objectives which take into account legal requirements and other requirements to which the organization subscribes, and information about significant environmental aspects. It applies to those environmental aspects that the organization identifies as those which it can control and those which it can influence. It does not itself state specific environmental performance criteria.


This International Standard provides guidance on the establishment, implementation, maintenance and improvement of an environmental management system and its coordination with other management systems.

ASQ/ANSI E4:2014, Quality management systems for environmental information and technology programs - Requirements with guidance for use

This ANS specifies requirements for a Quality Management System (QMS) to enable an organization to formulate policies and procedures to plan and implement sufficient and adequate quality management practices for environmental programs. This Standard is applicable to any organization that wishes to: - implement, maintain, and improve a QMS for environmental programs; - specify quality requirements when contracting for work; - assure itself of conformity with its stated quality policy; and - demonstrate such conformity to others.

ASQ (ASC Z1) (American Society for Quality)

ANSI/ASQ S1.4-2003 (R2013), Sampling Procedures and Tables for Inspection by Attributes

This publication establishes sampling plans and procedures for inspection by attributes. When specified by the responsible authority, this publication shall be referenced in the specification, contract, inspection instructions, or other documents and the provisions set forth herein shall govern. The ‘responsible authority’ shall be designated in one of the above documents, as agreed to by the purchaser and seller or producer and user.

ANSI/ASQ Z1.9-2003 (R2013), Sampling procedures and tables for inspection by variables for percent nonconforming

Establishes sampling plans and procedures for inspection by variables for use in procurement, supply and storage, and maintenance inspection operations. When applicable this standard shall be referenced in the specification, contract, or inspection instructions, and the provisions set forth herein shall govern. These acceptance sampling plans for variables are given in terms of the percent or proportion of product in a lot or batch that depart from some requirement. The general terminology used within the document will be given in terms of percent of nonconforming units or number of nonconformities, since these terms are likely to constitute the most widely used criteria.

ANSI/ASQ ISO 10001:2007, Quality management - Customer satisfaction - Guidelines for codes of conduct for organizations

Provides guidance for planning, designing, developing, implementing, maintaining and improving customer satisfaction codes of conduct. It’s applicable to product related codes containing promises made to customers by an organization concerning its behaviour. Such promises and related provisions are aimed at enhanced customer satisfaction. Annex A provides simplified examples of components of codes for different organizations.

ANSI/ASQ ISO 10003:2007, Quality management - Customer satisfaction - Guidelines for dispute resolution external to organizations

Provides guidance for an organization to plan, design, develop, operate, maintain and improve an effective and efficient dispute-resolution process for complaints that have not been resolved by the organization. Intended for use by organizations regardless of type, size and product provided.


Provides guidance in defining and implementing processes to monitor and measure customer satisfaction. It’s intended for use by organizations regardless of type, size or product provided. The focus is on customers external to the organization.


Provides guidance for planning, designing, developing, implementing, maintaining and improving an effective and efficient business-to-consumer electronic commerce transaction system within an organization. It is applicable to any organization engaged in, or planning to be engaged in, a business-to-consumer electronic commerce transaction, regardless of size, type and activity. It’s not intended to form part of a consumer contract or to change any rights or obligations provided by applicable statutory and regulatory requirements. It aims to enable organizations to set up a fair, effective, efficient, transparent and secure B2C ECT system.

This International Standard provides guidelines for the development, review, acceptance, application and revision of quality plans. It is applicable whether or not the organization has a management system in conformity with ISO 9001. This International Standard is applicable to quality plans for a process, product, project or contract, any product category (hardware, software, processed materials and services) and any industry.

ANSI/ASQ/ISO Q10012-2003, Measurement management systems - Requirements for measurement processes and measuring equipment

This International Standard includes both requirements and guidance for implementation of measurement management systems, and can be useful in improving measurement activities and the quality of products.


Provides guidance on the intent of the requirements in ISO 9001:2015, with examples of possible steps an organization can take to meet the requirements. It does not add to, subtract from, or in any way modify those requirements. This document does not describe mandatory approaches to implementation, or provide any preferred method of interpretation.

ANSI/ISO 14065-2007, Greenhouse gases - Requirements for greenhouse gas validation and verification bodies for use in accreditation or other forms of recognition

This International Standard specifies principles and requirements for bodies that undertake validation or verification of greenhouse gas (GHG) assertions. It is GHG programme neutral. If a GHG programme is applicable, the requirements of that GHG programme are additional to the requirements of this International Standard.

ANSI/ISO 21247-2007, Combined accept-zero sampling systems and process control procedures for product acceptance

This International Standard provides a set of accept-zero sampling systems and procedures for planning and conducting inspections to assess quality and conformance to specified requirements.

ANSI/ISO 2859-1-1999, Sampling procedures for inspection by attributes - Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection

This part of ISO 2859 specifies an acceptance sampling system for inspection by attributes. It is indexed in terms of the acceptance quality limit (AQL). Its purpose is to induce a supplier through the economic and psychological pressure of lot non-acceptance to maintain a process average at least as good as the specified acceptance quality limit, while at the same time providing an upper limit for the risk to the consumer of accepting the occasional poor lot.


This part of ISO 2859 establishes sampling plans and procedures that can be used to assess whether the quality level of an entity (lot, process, etc) conforms to a declared value. The sampling plans have been devised so as to obtain a risk of less than of contradicting a correct declared quality level. The risk of failing to contradict an incorrect declared quality level which is related to the limiting quality ratio (see clause 4). Sampling plans are provided corresponding to three levels of discriminatory ability.

ANSI/ISO 3534-1-2006, Statistics - Vocabulary and symbols - Part 1: General statistical terms and terms used in probability

This part of ISO 3534 defines general statistical terms and terms used in probability which may be used in the drafting of other International Standards. In addition, it defines symbols for a limited number of these terms.


This part of ISO 3534 defines applied statistics terms, and expresses them in a conceptual framework in accordance with ISO normative terminology practice. Term entries are arranged thematically. An alphabetical index is provided. Standardized symbols and abbreviations are defined.

ANSI/ISO/ASQ E14025-2006, Environmental labels and declarations - Type III environmental declarations - Principles and procedures

This International Standard establishes the principles and specifies the procedures for developing Type III environmental declaration programmes and Type III environmental declarations. It specifically establishes the use of the ISO 14040 series of standards in the development of Type III environmental declaration programmes and Type III environmental declarations.


ISO 14064-1:2006 details principles and requirements for designing, developing, managing and reporting organization- or company-level GHG inventories. It includes requirements for determining GHG emission boundaries, quantifying an organization’s GHG emissions and removals, and identifying specific company actions or activities aimed at improving GHG management. It also includes requirements and guidance on inventory quality management, reporting, internal auditing and the organization’s responsibilities for verification activities.

ANSI/ISO/ASQ E14064-2-2006, Greenhouse gases - Part 2: Specification with guidance at the project level for quantification, monitoring and reporting of greenhouse gas emission reductions or removal enhancements

ISO 14064-2:2006 specifies principles and requirements and provides guidance at the project level for quantification, monitoring and reporting of activities intended to cause greenhouse gas (GHG) emission reductions or removal enhancements. It includes requirements for planning a GHG project, identifying and selecting GHG sources, sinks and reservoirs relevant to the project and baseline scenario, monitoring, quantifying, documenting and reporting GHG project performance and managing data quality.


ISO 14064-3:2006 details principles and requirements for verifying GHG inventories and validating or verifying GHG projects. It describes the process for GHG-related validation or verification and specifies components such as validation or verification planning, assessment procedures and the evaluation of organization or project GHG assertions. This part of ISO 14064 can be used by organizations or independent parties to validate or verify GHG assertions.


This International Standard provides guidance for the design and implementation of an effective and efficient complaints-handling process for all types of commercial or non-commercial activities, including those related to electronic commerce. It is intended to benefit an organization and its customers, complainants and other interested parties.


This International Standard provides guidance on quality management in projects. It outlines quality management principles and practices, the implementation of which are important to, and have an impact on, the achievement of quality objectives in projects.
ANSI/ISO/ASQ Q10014-2006, Quality management systems - Guidelines for realizing financial and economic benefits

This International Standard is addressed to top management. It provides guidelines for realizing financial and economic benefits through the effective application of quality management principles derived from ISO 9000:2005. These principles are subsequently referred to as "management principles" within the body of this standard. The intent of this document is to provide top management with information to facilitate effective application of principles and selection of tools that enable success and sustainability of an organization. A self-assessment is included as a gap analysis and prioritization tool (see Annex A).


Covers the development, implementation, maintenance, and improvement of strategies and systems for training that affect the quality of the products supplied by an organization. This International Standard applies to all types of organizations. It is not intended for use in contracts, regulations, or for certification. It does not add to, change, or otherwise modify requirements for the ISO 9000 series. This International Standard is not intended to be used by training providers delivering services to other organizations. NOTE The main source of reference for training providers should be ISO 9004:2:1991 Quality Management and quality system elements-Part 2: Guidelines for services, until superseded by ISO 9004:2000 Training providers may use this International Standard when addressing the training needs of their own personnel.


This International Standard describes fundamentals of quality management systems, which form the subject of the ISO 9000 family, and defines related terms.

ANSI/ISO/ASQ Q9004-2009, Quality Management Systems - Requirements

This International Standard provides guidance to organizations to support the achievement of sustained success by a quality management approach. It is applicable to any organization, regardless of size, type and activity.

ANSI/ISO/ASQ QE19011S-2008, Guidelines for management systems auditing - U.S. Version with supplemental guidance added

This International Standard provides guidance on the principles of auditing, managing audit programs, conducting quality management system audits and environmental management system audits as well as the competence of quality and environmental management system auditors. It is applicable to all organizations having a need to conduct internal or external quality and/or environmental management system audits, or manage an audit program.


The purpose of this International Standard is to enhance common understanding of the subject, to promote the use of configuration management, and to assist organizations applying configuration management to improve their performance. Configuration management can be used to meet the product identification and traceability requirements specified in ISO 9001.

ASQ/ANSI/ISO 14001:2015, Environmental management systems - Requirements with guidance for use

Specifies the requirements for an environmental management system that an organization can use to enhance its environmental performance. It is intended for use by an organization seeking to manage its environmental responsibilities in a systematic manner that contributes to the environmental pillar of sustainability.

ASQ/ANSI/ISO 14034-2016, Environmental management - Environmental technology verification (ETV)

This document specifies principles, procedures and requirements for environmental technology verification (ETV).


Provides detailed descriptions of sound statistical testing procedures and graphical data analysis methods for detecting outliers in data obtained from measurement processes. It recommends sound robust estimation and testing procedures to accommodate the presence of outliers. It is primarily designed for the detection and accommodation of outlier(s) from univariate data. Some guidance is provided for multivariate and regression data.


Describes procedures for establishing statistical tolerance intervals that include at least a specified proportion of the population with a specified confidence level. Both one-sided and two-sided statistical tolerance intervals are provided, a one-sided interval having either an upper or lower limit while a two-sided interval has both upper and lower limits. Two methods are provided, a parametric method for the case where the characteristic being studied has a normal distribution and a distribution-free method for the case where nothing is known about the distribution except that it is continuous.


Specifies the procedures for establishing a point estimate and confidence intervals for the median of any continuous probability distribution of a population, based on a random sample size from the population. These procedures are distribution-free, i. e. they do not require knowledge of the family of distributions to which the population distribution belongs. Similar procedures can be applied to estimate quartiles and percentiles. NOTE The median is the second quartile and the fiftieth percentile. Similar procedures for other quartiles or percentiles are not described in this part of ISO 16269.


 Specifies methods of determining prediction intervals for a single continuously distributed variable. These are ranges of values of the variable, derived from a random sample of size n, for which a prediction relating to a further randomly selected sample of size m from the same population may be made with a specified confidence. Three different types of population are considered, namely: a) normally distributed with unknown standard deviation; b) normally distributed with known standard deviation; c) continuous but of unknown form.


The objective of this International Standard is to provide local governments with guidelines for achieving reliable results through the application of ISO 9001:2008 on an integral basis. These guidelines do not, however, add, change or modify the requirements of ISO 9001:2008.


Describes the fundamental principles of capability and performance of manufacturing processes to provide guidance about circumstances where a capability study is demanded or necessary to determine if the output from a manufacturing process or the production equipment (a production machine) is acceptable according to appropriate criteria. Such circumstances are common in quality control when the purpose for the study is part of some kind of production acceptance. These studies can also be used when diagnosis is required concerning a production output or as part of a problem solving effort. The methods are very versatile and have been applied for many situations.
Describes a procedure for the determination of statistics for estimating the quality capability or performance of product and process characteristics. The process results of these quality characteristics are categorized into eight possible distribution types. Calculation formulae for the statistical measures are placed with every distribution. The statistical methods only relate to continuous quality characteristics. They are applicable to processes in any industrial or economical sector. NOTE This method is usually applied in case of a great number of serial process results, but can also be used for small series (a small number of process results).

Prescribes the steps to be taken in conducting short-term performance studies that are typically performed on machines where parts produced consecutively under repeatability conditions are considered. The number of observations to be analysed will vary according to the patterns the data produce, or if the runs (the rate at which items are produced) on the machine are low in quantity. The methods are not recommended where the sample size produced is less than 30 observations. Methods to be used for handling the data and carrying out the calculations are described. Machine performance indices and actions required at conclusion of a machine performance study are described.

Provides methods for calculating performance and capability statistics for process or product quantities where it is necessary or beneficial to consider a family of singular quantities in relation to each other. The methods provided here mostly are designed to describe quantities that follow a bivariate normal distribution. NOTE In principle, this part of ISO 22514 can be used for multivariate cases. It does not offer an evaluation of the different provided methods with respect to different situations of possible application of each method. For the current state, the selection of one preferable method might be done following the users preferences.
ASQ/ANSI/ISO/TS 16949-2009, Quality
management systems - Particular
requirements for the application of ISO
9001:2008 for automotive production and
relevant service part organizations

Specifies requirements for a quality management
system where an organization a) needs to
demonstrate its ability to consistently provide
product that meets customer and applicable
statutory and regulatory requirements, and b) aims
to enhance customer satisfaction through the
effective application of the system, including
processes for continual improvement of the system
and the assurance of conformity to customer and
applicable statutory and regulatory requirements.

ASSE (ASC A10) (American Society of
Safety Engineers)

ANSI ASSE A10.15-1995 (R2017), Safety
Requirements for Dredging
This standard applies to Construction Dredging
Operations.

ANSI ASSE A10.19-2017, Safety Requirements
for Pile Installation and Extraction Operations
This standard establishes safety requirements for the
installation and extraction of piles during
construction and demolition operations.

ANSI ASSE A10.27-1998 (R2017), Hot Mix
Asphalt Facilities
This standard provides recommendations concerning
the design, manufacture, operating processes and
equipment associated with the production of hot
asphalt (HMA) mixing facilities. Included are raw
material handling and storage, equipment operation
to produce asphalt mixtures and the delivery of mixes
into vehicles for transport to users. Routine
maintenance, housekeeping and allied functions are
included.

ANSI ASSE A10.28-2011, Work Platforms
Suspended from Cranes or Derricks
Applies to platforms suspended from the load lines of
cranes or derricks in order to: (1) perform work at
elevations that cannot normally be reached by other
types of scaffolds or aerial work platforms or (2)
transport personnel to elevations where other means
of access are unsafe or impractical because of design
or worksite conditions.

ANSI ASSE A10.42-2000 (R2010), Rigging
Qualifications and Responsibilities in the
Construction Industry
This standard establishes minimum criteria of
knowledge and performance requirements for a
qualified rigger in the construction industry. It is
designed to assist in achieving reasonable safety of
all persons and materials during the process of or as
the result of rigging, lifting, or movement of loads.
(Note: This standard was originally planned for
revision. A PINS Notice was announced for revision.
However, the committee has reviewed the standard
and decided that it should be reaffirmed instead.
Following approval as a reaffirmation the revision
process will start.)

ANSI ASSE A10.8-2011, Scaffolding Safety
Requirements
This standard establishes safety requirements for the
construction, operation, maintenance, and use of
scaffolds used in the construction, alteration,
demolition, and maintenance of buildings and
structures. This standard does not cover permanently
installed suspended scaffold systems or aerial
platforms. Please note that this standard is based on
the 2001 version of the A10.8 Standard, which was
administratively withdrawn by ANSI. Since the
standard was withdrawn it is viewed/processed as a
new standard, but the new document is based on the
2001 administratively withdrawn standard.

ANSI ASSE A10.9-2013, Concrete and Masonry
Work Safety Requirements
Establishes safety requirements pertaining to
cement and masonry work in construction.

ANSI ASSE A10.1-2011, Pre-Project & Pre-Task
Safety and Health Planning for Construction
and Demolition Operations
This standard establishes the elements and activities
for pre-project and pre-task safety and health
planning in construction.

ANSI ASSE A10.10-2015, Safety Requirements
for Temporary and Portable Space Heating
Devices and Equipment
This standard provides minimum safety requirements
for the selection, installation, operation and
maintenance of space heating devices and equipment
of temporary and portable design. It covers the
heater unit and its integral parts through to their
connection for fuel, but does not cover separate
supply tanks or valving.

ANSI/ASSE A10.11-2016, Safety Requirements
for Personnel Nets
Establishes safety requirements for the selection,
installation, and use of personnel nets during
construction, repair, and demolition operations.
Note: Title change to remove debris nets from this
standard since A10.37 is coming back.

ANSI/ASSE A10.12-1998 (R2016), Safety
Requirements for Excavation
This standard applies to all open excavations made in
the earth’s surface that require worker and/or
property protection. See Section 3, Requirements for
Protection Systems. Excavations are defined to
include trenches.

ANSI/ASSE A10.13-2011, Safety Requirements
for Steel Erection
This standard establishes safety requirements for the
erecting, handling, fitting, fastening, reinforcing and
dismantling of structural steel, plate steel, steel joist,
and metal deck at a final in-place field site during
construction, maintenance and dismantling
operations.

ANSI/ASSE A10.16-2009 (R2016), Safety
Requirements for Tunnels, Shafts, and
Caissons
This standard establishes safety requirements
pertaining to the construction of tunnels, shafts,
and caissons. The requirements set forth in this standard
cover environmental control; related facilities; fire
prevention; hoisting; haulage; and electrical, drilling
and blasting, and compressed air work. This standard
is not intended for application to mining or quarrying
operations.

ANSI/ASSE A10.17-2006 (R2011), Safe
Operating Practices for Hot Mix Asphalt
(HMA) Construction
This standard applies to those operations involving
hot mix asphalt (bituminous) mixtures and materials
for construction and resurfacing. Safe work practices
are included for the protection of workers and the
public and are to be considered the vital safety
requirements for designers, manufacturers and
installers of such equipment and materials.

ANSI/ASSE A10.18-2007 (R2012), Safety
Requirements for Temporary Floors, Holes,
Wall Openings, Stairways and Other
Unprotected Edges in Construction and
Demolition Operations
Prescribes rules and establishes minimum safety
requirements for the protection of employees and the
public from hazards arising out of or associated with
temporary roof and floor holes, wall openings. Please
note: The original PINS notice was that the standard
would be revised. However, the committee has
reviewed and decided upon a reaffirmation.
Following reaffirmation the committee then intends
to submit a PINS notice for revision of this standard.

ANSI/ASSE A10.20-2006 (R2016), Safe
Operating Practices for Tile, Terrazzo, and
Marble Work
This standard establishes safety requirements for
construction operations and equipment used in the
handling and installation of ceramic tile, terrazzo and
marble. The types of construction are not listed. The
standard is intended to apply to buildings of all kinds
and to heavy construction, such as work in tunnels.

ANSI/ASSE A10.22-2007 (R2012), Safety
Requirements for Rope-Guided and
Nonguided Workers’ Hoists for Construction
and Demolition Operations
This standard establishes minimum safety
requirements for temporary personnel hoisting
systems used for the transportation of persons to and
from working elevations during normal construction
and demolition operations, including maintenance,
and is restricted to use in special situations. Please
note: The original PINS notice was that the standard
would be revised. However, the committee has
reviewed and decided upon a reaffirmation.
Following reaffirmation the committee then intends
to submit a PINS notice for revision of this standard.

ANSI/ASSE A10.23-2014, Safety Requirements
for the Installation of Drilled Shafts
This standard establishes safety requirements for the
installation of drilled shafts during construction and
demolition operations.
ANSI/ASSE A10.24-2014, Roofing - Safety Requirements for Low-Sloped Roofs
This standard establishes safe operating practices for the installation, maintenance, and removal of membrane roofing that is seamed or seamless on low-sloped roofs, which means the roof has a slope that is less than or equal to 4 in 12 (18°). These types of roofs include but are necessarily limited to: hot and cold built-up roofing, single-ply roofing, spray polyurethane foam (SPF) roofing, liquid-type roofing (Hypalon® & Teflon®), polyurethane, etc., and modified bitumens.

ANSI/ASSE A10.25-2017, Sanitation in Construction
This standard applies to all construction jobsites and covers potable water, toilet and hand-washing facilities located on a jobsite. It assures that employees are provided with adequate potable water, hand-washing and sanitary waste-disposal facilities.

This standard applies to those emergency procedures involving: 1. Fires, collapses, hazardous spills and other emergencies that could endanger workers; 2. Emergency rescue of injured or ill workers or other persons, or of uninjured workers unable to rescue themselves; 3. Onsite provision of first aid and emergency medical care; 4. Evacuation and transportation of injured or ill workers to appropriate emergency medical facilities; 5. Pre-planning and coordination of emergency plan with emergency medical facilities; and 6. Training on emergency procedures/plans for workers and other groups.

ANSI/ASSE A10.3-2013, Safety Requirements for Powder-Actuated Fastening Systems
This standard provides safety requirements for powder-actuated fastening tools that propel studs, pins, fasteners, or other objects for the purpose of affixing it, by penetration, to hard structural material (such as concrete, masonry, or steel). This standard does not apply to devices designed for attaching object to soft construction materials (such as wood, plaster, tar, and dry wallboard) or very hard or brittle construction materials (such as cast iron, glazed tile, hardened steel, glass block, natural rock, hollow tile, and most brick).

ANSI/ASSE A10.31-2013, Safety Requirements, Definitions and Specifications for Digger Derricks
This standard applies to special multipurpose vehicle-mounted machines, commonly known as digger derricks. These machines are primarily designed to accommodate components that dig holes, set poles and position materials and apparatus.

ANSI/ASSE A10.32-2012, Fall Protection Systems for Construction and Demolition Operations
This standard establishes performance criteria for personal fall protection equipment and systems in construction and demolition and provides guidelines, recommendations for their use and inspection. It includes, but is not limited to: fall arrest, restraint, positioning, climbing, descending, rescue and training activities. Exceptions: This standard does not include line man’s body belts, pole straps, window washers belts, chest/waist harnesses, and sports equipment.

ANSI/ASSE A10.33-2011 (R2016), Safety and Health Program Requirements for Multi-Employer Projects
This standard sets forth the minimum elements and activities of a program that defines the duties and responsibilities of construction employers working on a construction project where multiple employers are or will be engaged in the common undertaking to complete a construction project.

ANSI/ASSE A10.34-2001 (R2012), Protection of the Public on or Adjacent to Construction Sites
This standard provides the recommended elements and activities on construction projects to provide protection for the public. Please note: The original PINS notice was that the standard would be revised. However, the committee has reviewed and decided upon a reaffirmation. Following reaffirmation the committee then intends to submit a PINS notice for revision of this standard.

ANSI/ASSE A10.37-2016, Debris Net Systems Used During Construction and Demolition Operations
This standard establishes safety requirements for the design, selection, installation, and use of debris net systems during construction, demolition operations and for the temporary containment of debris from deteriorating structures. (Note: This standard is a revision of the ANSI A10.37-1996 Standard. This standard was administratively withdrawn by ANSI during October of 2006, but was relaunched per consensus of the A10 ASC.)

ANSI/ASSE A10.38-2013, Basic Elements of an Employer’s Program to Provide a Safe and Healthful Work Environment
This Standard Establishes the Minimum Elements of a program for protecting the safety and health of employees involved in construction and demolition activities.

ANSI/ASSE A10.39-1996 (R2011), Construction Safety and Health Audit Program
This standard identifies the minimum performance elements that when properly utilized will allow for a competent evaluation of a construction safety and health program. Further, it will identify those areas where systems, records and performance elements are required in order to produce a quality audit. (Note: This standard was originally planned for revision. However, the A10 ASC reached consensus at its 7/2010 meeting to vote for reaffirmation of the standard at its 1/2011 meeting. Public review is taking place now to see if there are any public comments addressing the reaffirmation over the revision.)

ANSI/ASSE A10.4-2016, Personnel Hoists & Employee Elevators on Construction & Demolition Sites
This standard applies to the design, construction, installation, operation, inspection, testing, maintenance, alterations and repair of hoists and elevators that (1) are not an integral part of buildings, (2) are installed inside or outside buildings or structures during construction, alteration, demolition or operations and (3) are used to raise and lower workers and other personnel connected with or related to the structure. These personnel hoists and employee elevators may also be used for transporting materials under specific circumstances defined in this standard.

ANSI/ASSE A10.40-2007 (R2013), Reduction of Musculoskeletal Problems in Construction
This standard applies to construction work where there may be risk factors, which could lead to musculoskeletal problems for construction workers. This standard does not apply to office or administrative work performed by construction companies. Please note: The committee originally was considering submitting a PINS notice to revise the standard. However, the committee has reviewed and decided upon a reaffirmation. Following reaffirmation the committee then intends to submit a PINS notice for revision of this standard.

ANSI/ASSE A10.43-2016, Confined Space Entry for Construction and Demolition Operations
This standard sets forth the minimum elements and activities of a program that defines the duties and responsibilities of construction employers to be followed while entering, exiting and working in confined spaces at normal atmospheric pressure.

ANSI/ASSE A10.44-2014, Control of Energy Sources (Lockout/Tagout) for Construction and Demolitions Operations
This standard establishes the requirements for the control to prevent release of energy sources that could cause injury or illness to personnel performing construction and demolition work and protection of property.

ANSI/ASSE A10.46-2013, Hearing Loss Prevention in Construction and Demolition Workers
This standard is intended to help employers prevent occupational hearing loss among construction and demolition workers.
This standard covers workers engaged in construction, utility work, maintenance, or repair activities on any area of a highway.

This standard establishes minimum criteria for safe work practices and training for personnel performing work on communication structures including antenna and antenna supporting structures, broadcast and other similar structures supporting communication related equipment.

ANSI/ASSE A10.49-2015, Control of Health Hazards in Construction and Demolition Operations
This standard establishes the minimum requirements for controlling health risks from chemicals and toxic substances used or encountered in construction and demolition operations. The objective of this standard is to reduce the risk of adverse occupational health effects to construction workers.

ANSI/ASSE A10.5-2013, Safety Requirements for Material Hoists
This standard applies to material hoists used to raise or lower materials during construction, alteration or demolition. It is not applicable to the temporary use of permanently installed person-nel elevators as material hoists. This standard shall not apply to: (1) Elevators constructed and op-erated in conformance with ANSI/ASME A17.1, Safety Code for Elevators and Escalators. (2) Personnel hoists constructed and operated in conformance with ANSI/ASSE A10.4, American National Standard Safety Requirements for Personnel Hoists and Employee Elevators for Construction and Demolition Operations. (3) Manlifts constructed and op-erated in conformance with ANSI

ANSI/ASSE A10.6-2006 (R2016), Safety & Health Program Requirements for Demolition Operations
This standard applies to the demolition of buildings and other structures. This standard is intended to be complete in itself, except that any device, equipment and activity incidental to demolition operations shall be conducted, installed, inspected, maintained and operated in accordance with the requirements in American National Standards for Safety in Construction and Demolition Operations A10 Series, other American National Standards listed in Section 2 and other appropriate standards. Note: The original plan was to revise the standard, but the committee consensus is now to reafirm and then launch the revision process again.

ANSI/ASSE A10.7-2011, Safety Requirements for Transportation, Storage, Handling, and Use of Commercial Explosives and Blasting Agents
This standard is applicable to the transportation, storage, handling, and use of commercial explosives and blasting agents in the construction industry.

ASSE (Safety) (American Society of Safety Engineers)

ANSI ASSE Z117.1-2016, Safety Requirements for Entering Confined Spaces
This standard provides minimum safety requirements to be followed while entering, exiting and working in confined spaces at ambient atmospheric pressure.

ANSI ASSE Z359.15-2014, Safety Requirements for Single Anchor Vertical Lifelines & Fall Arrestors for Personal Fall Arrest Systems
This standard establishes requirements for the performance, design criteria, marking, qualification and verification testing, instructions, inspections, maintenance and removal from service of single anchor vertical lifelines and fall arrestors for users within the capacity range of 130 to 310 pounds (59 - 140 kg). Please note: The scope is more detailed than the original from the PINS statement.

ANSI ASSE Z359.16-2016, Safety Requirements for Climbing Ladder Fall Arrest Systems
This standard establishes requirements for the performance, design, marking, qualification testing, instructions for use, inspection, maintenance and storage, and removal from service of vertically oriented climbing ladder fall arrest systems consisting of flexible and rigid carriers with multiple attachment points and associated carrier sleeves for users within the capacity range of 130 to 310 pounds (59 to 141kg). See Figure 1 for examples of climbing ladder fall arrest systems equipment.

ANSI ASSE Z359.6-2016, Specifications and Design Requirements for Active Fall Protection Systems
This standard is intended for engineers who are trained as qualified persons and who have expertise in the design of active fall protection systems. It specifies requirements for the design and performance of complete active fall protection systems, including travel restraint and vertical and horizontal fall arrest systems. (Note: Change to the scope)

This standard establishes minimum control requirements and ventilation system design criteria for controlling and removing airborne contaminants to protect the health of personnel engaged in open-surface tank operations. It is not intended to cover firefighting.

This standard discusses fundamental good practices related to the commissioning, design, selection, installation, operation, maintenance, and testing of dilution ventilation (DV) or general exhaust ventilation (GEV) systems used for the control of employee exposure to airborne contaminants.

ANSI/AIHA Z88.10-2010, Respirator Fit Testing Methods
This standard provides guidance on how to conduct fit testing of tight-fitting respirators and appropriate methods to be used. Fit testing is only one element of a complete respiratory protection program.

ANSI/AIHA Z88.2-2010, Color Coding of Air-Purifying Respirator Canisters, Cartridges, and Filters
The purpose of this standard is to establish a system of marking air-purifying respirator canisters, cartridges and filter containers by means of colors in order to: 1. Facilitate rapid identification of the canisters, cartridges and filters by users. 2. Ensure color consistency among respirator manufacturers.

ANSI/AIHA Z9.2-2001 (R2011), Fundamentals Governing the Design and Operation of Local Exhaust Systems
Establishes minimum requirements for the commissioning, design, specification, construction, and installation of fixed industrial local exhaust ventilation (LEV) systems used for the reduction and prevention of employee exposure to harmful airborne substances in the industrial environment.

This standard is intended to help manufacturers and users protect the health of personnel from injurious effects of contact with gases, vapors, mists, dusts, powders, or solvents used in, or created, released or disseminated during or by spray finishing operations.

This standard shall apply to all operations in fixed location abrasive-blast enclosures in which an abrasive forcibly comes in contact with a surface by pneumatic or hydraulic pressure or by centrifugal force. It shall not apply to steam blasting, steam cleaning, or hydraulic cleaning methods in which work is done without the aid of abrasives. It also shall not apply to abrasive blasting conducted outdoors (e.g., bridges, water towers) even though temporary enclosures may be built at such locations.

ANSI/AIHA Z9.5-2010, Laboratory Ventilation Standard
This standard sets forth the requirements for the design and operation of laboratory ventilation systems. This standard does not apply to the following types of laboratories or hoods except as it may relate to general laboratory ventilation: Animal facilities; Biological safety cabinets; Explosives laboratories; High containment facilities (BL3 and BL4 facilities); Laminar flow hoods (e.g., a clean bench for product protection, not employee protection); Radioisotope laboratories;
ANSI/AIHA Z9.6-2008, Exhaust Systems for Grinding, Polishing, and Buffing
The rules and engineering principles described in this standard represent the minimum criteria intended 1) to protect the health of personnel engaged in and working in the vicinity of grinding, polishing, and buffing operations; and 2) to control contaminants generated by those operations.

ANSI/AIHA Z9.9-2010, Portable Ventilation Systems
This Standard discusses portable ventilation equipment and systems used for the reduction, control or prevention of exposure to hazardous atmospheres or airborne substances in the occupational environment, and for provision of comfort to employees.

ANSI/ASSE A1264.1-2017, Safety Requirements for Workplace Walking/Walking Surfaces & Their Access; Workplace Floor, Wall & Roof Openings; Stairs & Guardrails Systems
This standard sets forth safety requirements in industrial and workplace situations for protecting persons in areas/places where danger exists of persons or objects falling through floor, roof or wall openings, or from platforms, runways, ramps and fixed stairs, or roof edges in normal, temporary and emergency conditions.

ANSI/ASSE A1264.2-2012, Standard for the Provision of Slip Resistance on Walking/Walking Surfaces
This standard sets forth provisions for protecting persons where there is potential for slips and falls as a result of surface characteristics or conditions.

ANSI/ASSE Z10-2012 (R2017), Occupational Health and Safety Management Systems
This standard defines the minimum requirements for an occupational health and safety management system. This is a reaffirmation of the existing standard but the designation will change from AIHA to ASSE

This standard sets forth practices for the safe management and operation of motor vehicles owned or operated by organizations. These practices are designed for use by those having the responsibility for the administration and operation of motor vehicles for organizational business.

This standard establishes requirements for the control of hazardous energy associated with machines, equipment or processes that could cause injury to personnel.

ANSI/ASSE Z359.0-2012, Definitions and Nomenclature Used for Fall Protection and Fall Arrest
Establishes the definitions and nomenclature used for fall arrest and fall protection.

The Fall Protection Code is a set of standards that covers program management; system design; training; qualification and testing; equipment, component and system specifications for the processes used to protect workers at height in a managed fall protection program. This standard identifies those standards and establishes their role in the Code and their interdependence. Note: Changes to the title and scope different from the original/historic versions of Z359.1

ANSI/ASSE Z359.11-2014, Safety Requirements for Full Body Harness
This standard establishes requirements for the performance, design, marking, qualification, instruction, training, test methods, inspection, use, maintenance and removal from service of Fall Body Harnesses (FBH). FBH’s are used for fall arrest, positioning, travel restraint, suspension and/or rescue applications for users within the capacity range of 130 to 310 pounds (59 to 140 kg).

ANSI/ASSE Z359.12-2009, Connecting Components for Personal Fall Arrest Systems
This standard establishes requirements for the performance, design, marking, qualification, test methods and removal from service of connectors.

ANSI/ASSE Z359.13-2013, Personal Energy Absorbers and Energy Absorbing Lanyards
This standard establishes requirements for the performance, design, marking, qualification, instructions, inspection, maintenance and removal from service of energy absorbing lanyards and personal energy absorbers for users within the capacity range of 130 to 310 pounds (59 - 140 kg.).

ANSI/ASSE Z359.14-2014, Safety Requirements for Self-Retracting Devices for Personal Fall Arrest & Rescue Systems
This standard establishes requirements for the performance, design, qualification testing, markings and instructions, inspections, maintenance and storage, and removal from service of self-retracting devices (SRDs) including self-retracting lanyards (SRLs), self-retracting lanyards with integral rescue capability (SRL-Rs), and self-retracting lanyards with leading edge capability(SRL-LEs). This standard establishes requirements for SRDs intended for use in personal fall arrest or rescue systems for authorized persons within the capacity range of 130 to 310 pounds (59 to 141kg).

ANSI/ASSE Z359.18-2017, Safety Requirements for Anchorage Connectors for Active Fall Protection Systems
This Standard establishes requirements for the performance, design, testing, marking, and instructions for use of anchorage connectors in travel restraint, fall arrest, rescue, work position, rope access, and suspended component/tie-back line systems only.

ANSI/ASSE Z359.2-2017, Minimum Requirements for a Comprehensive Managed Fall Protection Program
This standard establishes guidelines and requirements for an employer’s managed fall protection program, including policies, duties and training; fall protection procedures; eliminating and controlling fall hazards; rescue procedures; incident investigations; and evaluating program effectiveness.

ANSI/ASSE Z359.3-2017, Safety Requirements for Lanyards and Positioning Lanyards
This standard establishes requirements for the performance, design, marking, qualification and verification testing and instructions for lanyards and positioning lanyards for users within the capacity range of 130 to 310 pounds (59 to 140kg).

ANSI/ASSE Z359.4-2013, Safety Requirements for Assisted-Rescue and Self-Rescue Systems, Subsystems and Components
This standard establishes requirements for the performance, design, marking, qualification, instruction, training, use, maintenance and removal from service of connectors, harnesses, lanyards, anchorage connectors, winches / hoists, descent control devices, rope tackle blocks, and self-retracting lanyards with integral rescue capability comprising rescue systems, utilized in pre-planned self-rescue and assisted-rescue applications for 1-2 persons.

ANSI/ASSE Z359.7-2011, Qualification and Verification Testing of Fall Protection Products
This standard specifies requirements for qualification and verification testing of ANSI/ASSE Z359 Fall Protection Code products. It includes requirements for third-party testing, witness testing and manufacturer testing of fall protection products to the requirements of the ANSI/ASSE Z359 standards. Please note the title was adjusted and the scope was revised to address comments during the ballot process.

ANSI/ASSE Z390.1-2017, Accepted Practices for Hydrogen Sulfide (H2S) Training Programs
This standard sets forth accepted practices for hydrogen sulfide (H2S) safety training and instruction of affected personnel to include, but not be limited to, the following: Minimum informational content of the course; Recommended exercises and drills; Properties and characteristics of H2S; Sources of H2S and areas of potential exposure; Typical site-specific safe work practices associated with H2S operations; Detection methods for H2S; Engineering/mitigation controls; Properties, characteristics and safe work practices of Sulfur Dioxide (SO2).

This standard establishes criteria for safety, health, and environmental training programs, including development, delivery, evaluation and program management.
The scope of this standard was narrowed to five elements: 1. Provides guidance for the decommissioning of all or parts of laboratory facilities. 2. Provides guidance to determine extent of acceptable risk given the future use of the facility. 3. Provides methodologies to document, monitor and verify the decommissioning process. 4. Identifies stakeholders, their roles, responsibilities and relationships. 5. Provides criteria for development of a decommissioning plan for laboratories that addresses human health, safety and environmental protection and meets the goals of the overall decommissioning process.
http://www.astm.org/ANSI_SA

http://www.astm.org/ANSI_SA

ASTM D4306-2012b, Practice for Aviation Fuel Sample Containers for Tests Affected by Trace Contamination
http://www.astm.org/ANSI_SA

ASTM D4306-2015, Practice for Aviation Fuel Sample Containers for Tests Affected by Trace Contamination
http://www.astm.org/ANSI_SA

ASTM D4308-2013, Test Method for Electrical Conductivity of Liquid Hydrocarbons by Precision Meter
http://www.astm.org/ANSI_SA

ASTM D4477-2016, Specification for Rigid (Unplasticized) Poly(Vinyl Chloride) (PVC) Soffit
http://www.astm.org/ANSI_SA

http://www.astm.org/ANSI_SA

http://www.astm.org/ANSI_SA

ASTM D4551-2012, Specification for Poly(Vinyl Chloride) (PVC) Plastic Flexible Concealed Water-Containment Membrane
http://www.astm.org/ANSI_SA

http://www.astm.org/ANSI_SA

ASTM D4756-2015, Practice for Installation of Rigid Poly(Vinyl Chloride) (PVC) Siding and Soffit
http://www.astm.org/ANSI_SA

ASTM D4803-2010, Test Method for Predicting Heat Buildup in PVC Building Products
http://www.astm.org/ANSI_SA

http://www.astm.org/ANSI_SA

ASTM D5001-2014 (R2014), Test Method for Measurement of Lubricity of Aviation Turbine Fuels by the Ball-on-Cylinder Lubricity Evaluator (BOCLE)
http://www.astm.org/ANSI_SA

ASTM D5006-2011 (R2016), Test Method for Measurement of Fuel System Icing Inhibitors (Ether Type) in Aviation Fuels
http://www.astm.org/ANSI_SA

http://www.astm.org/ANSI_SA

ASTM D5319-2012, Specification for Glass-Fiber Reinforced Polyester Wall and Ceiling Panels
http://www.astm.org/ANSI_SA

http://www.astm.org/ANSI_SA

ASTM D5365-2012, Test Method for Long-Term Ring-Bending Strain of "Fiberglass" (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe
http://www.astm.org/ANSI_SA

ASTM D5421-2015, Specification for Contact Molded Fiberglass (Glass-Fiber-Reinforced Thermosetting Resin) Flanges
http://www.astm.org/ANSI_SA

ASTM D5452-2012, Test Method for Particulate Contamination in Aviation Fuels by Laboratory Filtration
http://www.astm.org/ANSI_SA

ASTM D5677-2017, Specification for fiberglass (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe and Pipe Fittings, Adhesive Bonded Joint Type, for Aviation Jet Turbine Fuel Lines
http://www.astm.org/ANSI_SA

ASTM D5685-2011, Specification for "Fiberglass" Glass-Fiber-Reinforced Thermosetting-Resin Pressure Pipe Fittings
http://www.astm.org/ANSI_SA

ASTM D5813-2004 (R2012), Specification for Cured-In-Place Thermosetting Resin Sewer Piping Systems
http://www.astm.org/ANSI_SA

http://www.astm.org/ANSI_SA

ASTM D6041-2012, Specification for Contact-Molded Fiberglass (Glass-Fiber-Reinforced Thermosetting Resin) Corrosion Resistant Pipe and Fittings
http://www.astm.org/ANSI_SA

ASTM D6227-2017, Specification for Unleaded Aviation Gasoline Containing a Non-Hydrocarbon Component
http://www.astm.org/ANSI_SA

ASTM D6259-2015, Practice for Determination of a Pooled Limit of Quantitation
http://www.astm.org/ANSI_SA

ASTM D6299-2017, Practice for Applying Statistical Quality Assurance and Control Charting Techniques to Evaluate Analytical Measurement System Performance
http://www.astm.org/ANSI_SA

ASTM D6300-2016, Practice for Determination of Precision and Bias Data for Use in Test Methods for Petroleum Products and Lubricants
http://www.astm.org/ANSI_SA

ASTM D6300-2016a, Practice for Determination of Precision and Bias Data for Use in Test Methods for Petroleum Products and Lubricants
http://www.astm.org/ANSI_SA

ASTM D6424-2004A (R2014), Practice for Octane Rating Naturally Aspirated Spark Ignition Aircraft Engines
http://www.astm.org/ANSI_SA

http://www.astm.org/ANSI_SA

ASTM D6615-2015a, Specification for Jet B Wide-Cut Aviation Turbine Fuel
http://www.astm.org/ANSI_SA

ASTM D6617-2017, Practice for Laboratory Bias Detection Using Single Test Result from Standard Material
http://www.astm.org/ANSI_SA

ASTM D6708-2016, Practice for Statistical Assessment and Improvement of Expected Agreement Between Two Test Methods that Purport to Measure the Same Property of a Material
http://www.astm.org/ANSI_SA

ASTM D6708-2016a, Practice for Statistical Assessment and Improvement of Expected Agreement Between Two Test Methods that Purport to Measure the Same Property of a Material
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ASTM D6708-2016b, Practice for Statistical Assessment and Improvement of Expected Agreement Between Two Test Methods that Purport to Measure the Same Property of a Material
http://www.astm.org/ANSI_SA

ASTM D6777-2016, Test Method for Relative Rigidity of Poly(Vinyl Chloride)(PVC) Siding
http://www.astm.org/ANSI_SA

ASTM D6783-2005 (R2011), Specification for Polymer Concrete Pipe
http://www.astm.org/ANSI_SA

http://www.astm.org/ANSI_SA

ASTM D6812-2004b (R2014), Practice for Ground-Based Octane Rating Procedures for Turbocharged/ Supercharged Spark Ignition Aircraft Engines
http://www.astm.org/ANSI_SA

ASTM D6824-2013, Test Method For Determining Filterability of Aviation Turbine Fuel
http://www.astm.org/ANSI_SA

ASTM D6864-2011, Specification for Color and Appearance Retention of Solid Colored Plastic Siding Products
http://www.astm.org/ANSI_SA

ASTM D7082-2015, Specification for Polyethylene Stay In Place Form System for End Walls for Drainage Pipe
http://www.astm.org/ANSI_SA

ASTM D7219-2008 (R2014), Specification for Isotropic and Near-isotropic Nuclear Graphites
http://www.astm.org/ANSI_SA

ASTM D7223-2016, Specification for Aviation Certification Turbine Fuel
http://www.astm.org/ANSI_SA

ASTM D7223-2016a, Specification for Aviation Certification Turbine Fuel
http://www.astm.org/ANSI_SA

ASTM D7224-2014, Test Method for Determining Water Separation Characteristics of Kerosine-Type Aviation Turbine Fuels Containing Additives by Portable Separometer
http://www.astm.org/ANSI_SA

ASTM D7251-2011, Specification for Color and Appearance Retention of Variegated Color Plastic Siding Products
http://www.astm.org/ANSI_SA

ASTM D7254-2017, Specification for Polypropylene (PP) Siding
http://www.astm.org/ANSI_SA

ASTM D7301-2011 (R2015), Specification for Nuclear Graphite Suitable for Components Subjected to Low Neutron Irradiation Dose
http://www.astm.org/ANSI_SA

ASTM D7372-2012, Guide for Analysis and Interpretation of Proficiency Test Program Results
http://www.astm.org/ANSI_SA

http://www.astm.org/ANSI_SA

ASTM D7542-2015, Test Method for Air Oxidation of Carbon and Graphite in the Kinetic Regime
http://www.astm.org/ANSI_SA

ASTM D7547-2017, Specification for Hydrocarbon Unleaded Aviation Gasoline
http://www.astm.org/ANSI_SA

ASTM D7566-2016, Specification for Aviation Turbine Fuel Containing Synthesized Hydrocarbons
http://www.astm.org/ANSI_SA

ASTM D7566-2016a, Specification for Aviation Turbine Fuel Containing Synthesized Hydrocarbons
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ASTM D7618-2013, Specification for Ethyl Tertiary-Butyl Ether (ETBE) for Blending with Aviation Spark-Ignition Engine Fuel
http://www.astm.org/ANSI_SA

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ASTM D7846-2016, Practice for Reporting Uniaxial Strength Data and Estimating Weibull Distribution Parameters for Advanced Graphites
http://www.astm.org/ANSI_SA

ASTM D7856-2015, Specification for Color and Appearance Retention of Solid and Variegated Color Plastic Siding Products using CIE Lab Color Space
http://www.astm.org/ANSI_SA

ASTM D7856-2015a, Specification for Color and Appearance Retention of Solid and Variegated Color Plastic Siding Products using CIE Lab Color Space
http://www.astm.org/ANSI_SA

ASTM D7872-2013, Test Method for Determining the concentration of Pipeline Drag Reducer Additive in Aviation Turbine Fuels
http://www.astm.org/ANSI_SA

ASTM D7915-2014, Practice For Application of Generalized Extreme Studentized Deviation (GESD) technique for the simultaneous identification of multiple outliers in a Data set
http://www.astm.org/ANSI_SA

ASTM D7959-2016, Test Method for Chloride Content Determination
http://www.astm.org/ANSI_SA

ASTM D7960-2016, Specification for Unleaded Aviation Gasoline Test Fuel
http://www.astm.org/ANSI_SA

ASTM D7779-2011 (R2015), Test Method for Determination of Fracture Toughness of Graphite at Ambient Temperature
http://www.astm.org/ANSI_SA

ASTM D7793-2017, Specification for Insulated Vinyl Siding
http://www.astm.org/ANSI_SA

ASTM D7797-2016, Test Method for Determination of the Fatty Acid Methyl Esters Content of Aviation Turbine Fuel Using Flow Analysis by Fourier Transform Infrared Spectroscopy - Rapid Screening Method
http://www.astm.org/ANSI_SA
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ASTM F2855-2017, Specification for Chlorinated Poly(Vinyl Chloride)/Aluminum/Chlorinated Poly(Vinyl Chloride) (CPVC-AL-CPVC) Composite Pressure Tubing
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http://www.astm.org/ANSI_SA

ASTM F2879-2016, Specification for Eye Protective Devices for Airsoft Sports
http://www.astm.org/ANSI_SA

ASTM F2880-2017, Specification for Lap-Joint Type Flange Adapters for Polyethylene Pressure Pipe in Nominal Pipe Sizes 34 in. to 65 in.
http://www.astm.org

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http://www.astm.org/ANSI_SA

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http://www.astm.org/ANSI_SA

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http://www.astm.org/ANSI_SA

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http://www.astm.org/ANSI_SA

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http://www.astm.org/ANSI_SA

ASTM F2976-2013, Practice for Determining the Field Performance of Commercial Kitchen Demand Control Ventilation Systems
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http://www.astm.org/ANSI_SA

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http://www.astm.org/ANSI_SA

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http://www.astm.org/ANSI_SA

ASTM F3052-2014, Standard Guide for Conducting Small Boat Stability Test (Deadweight Survey and Air Inclining Experiment) to Determine Lightcraft Weight and Centers of Gravity of a Small Craft
http://www.astm.org/ANSI_SA

ASTM F3059-2015, Specification for Fiber-Reinforced Polymer (FRP) Gratings Used in Marine Construction and Shipbuilding
http://www.astm.org/ANSI_SA

ASTM F3077-2014, Specification for Eye Protectors for Women's Lacrosse
http://www.astm.org/ANSI_SA

ASTM F3085-2014, Specification ForAirsoft Gun Barrel Blocking Devices
http://www.astm.org/ANSI_SA

ASTM F3101-2015, Specification for Unsupervised Public Use Outdoor Fitness Equipment
http://www.astm.org/ANSI_SA

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ASTM F3103-2014, Specification for Testing Off-Road Motorcycle and ATV Helmets
http://www.astm.org/ANSI_SA

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ASTM F3105-2014, Specification for Externally Loaded Strength Training Equipment, Strength Training Benches and External Weight Storage Equipment
http://www.astm.org/ANSI_SA

ASTM F3123-2016, Specification for Metric Outside Diameter Polyethylene (PE) Plastic Pipe (DR-PN)
http://www.astm.org/ANSI_SA

ASTM F3124-2017, Practice for Data Recording the Procedure used to Produce Heat Butt Fusion Joints in Plastic Piping Systems or Fittings
http://www.astm.org

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ASTM F3137-2015, Headgear Used in Women's Lacrosse (excluding goalkeepers)
http://www.astm.org/ANSI_SA

ASTM F3150-2015, Specification ForHEPA Filtration System Performance of Residential & Commercial Vacuum Cleaners
http://www.astm.org/ANSI_SA

ASTM F3165-2016, Specification for Throat Protective Equipment for Hockey Goaltenders
http://www.astm.org/ANSI_SA

ASTM F3188-2016, Specification for Crumb Rubber Used as Synthetic Turf Infill
http://www.astm.org/ANSI_SA

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http://www.astm.org

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http://www.astm.org/ANSI_SA

ASTM F3216-2016, Test Method ForStandard Test Method for the Performance of Retherm Ovens
http://www.astm.org/ANSI_SA

ASTM F3226-2016, Specification ForMetallic Press-Connect Fittings for Piping and Tubing Systems
http://www.astm.org/ANSI_SA

ASTM F3249-2017, Specification for Treestands, Climbing Sticks and Tripod or Tower Stands
http://www.astm.org/ANSI_SA

ASTM F3256-2017, Guide for Reporting and Recording of Near Misses for Maritime Industry
http://www.astm.org/ANSI_SA

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http://www.astm.org/ANSI_SA

ASTM F765-2017, Specification for Wildcats, Ship Anchor Chain
http://www.astm.org/ANSI_SA

ASTM F782-2001 (R2012), Specification for Doors, Furniture, Marine
http://www.astm.org/ANSI_SA

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http://www.astm.org/ANSI_SA

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http://www.astm.org/ANSI_SA

ASTM F820-2016, Test Method for Measuring Air Performance Characteristics of Central Vacuum Cleaning Systems
http://www.astm.org/ANSI_SA

ASTM F821-2001 (R2012), Specification for Domestic Use Doors and Frames, Steel, Interior, Marine
http://www.astm.org/ANSI_SA

ASTM F822-1993 (R2017), Specification for Chest of Drawers (Chiffonier), Steel, Marine
http://www.astm.org/ANSI_SA

ASTM F823-1993 (R2017), Specification for Desk, Log, Marine, Steel, with Cabinet
http://www.astm.org/ANSI_SA

ASTM F824-1993 (R2017), Specification for Tables, Mess, Marine, Steel
http://www.astm.org/ANSI_SA

ASTM F825-1993 (R2017), Specification for Drawers, Furniture, Marine, Steel
http://www.astm.org/ANSI_SA

ASTM F826-1994 (R2017), Specification for Tops, Furniture, Marine, Steel
http://www.astm.org/ANSI_SA

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http://www.astm.org/ANSI_SA

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http://www.astm.org/ANSI_SA

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http://www.astm.org/ANSI_SA

ASTM F858-2007 (R2013), Specification for Hot Water Sanitizing Commercial Dishwashing Machines, Single Tank, Conveyor Rack Type
http://www.astm.org/ANSI_SA

ASTM F859-2015, Specification for Heat-Sanitizing Commercial Dishwashing Machines, Multiple Tank, Conveyor Rack Type
http://www.astm.org/ANSI_SA

ASTM F860-2007 (R2013), Specification for Hot Water Sanitizing Commercial Dishwashing Machines, Multiple Tank, Rackless Conveyor Type
http://www.astm.org/ANSI_SA

ASTM F861-2014a, Specification for Commercial Dishwashing Racks
http://www.astm.org/ANSI_SA

ASTM F876-2017, Specification for Crosslinked Polyethylene (PEX) Tubing
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ASTM F884-2011 (R2016), Test Method for Motor Life Evaluation of a Built-In (Central Vacuum) Vacuum Cleaner
http://www.astm.org/ANSI_SA

ASTM F885-2017, Specification for Envelope Dimensions for Bronze Globe Valves NPS 1/4 to 2
http://www.astm.org/ANSI_SA

ASTM F888-2011, Test Method for Measuring Maximum Function Volume of the Primary Dirt Receptacle in a Vacuum Cleaner
http://www.astm.org/ANSI_SA

ASTM F891-2016, Specification for Coextruded Poly(Vinyl Chloride) (PVC) Plastic Pipe With a Cellular Core
http://www.astm.org/ANSI_SA

ASTM F894-2017, Specification for Polyethylene (PE) Large Diameter Profile Wall Sewer and Drain Pipe
http://www.astm.org

ASTM F905-2017, Practice for Qualification of Polyethylene Saddle-Fused Joints
http://www.astm.org

ASTM F906-1985 (R2014), Specification for Letters and Numerals for Ships
http://www.astm.org/ANSI_SA

ASTM F910-2010 (R2015), Specification for Face Guards for Youth Baseball
http://www.astm.org/ANSI_SA

ASTM F913-2017, Specification for Thermoplastic Elastomeric Seals (Gaskets) for Joining Plastic Pipe
http://www.astm.org

ASTM F917-2014, Specification for Commercial Food Waste Disposers
http://www.astm.org/ANSI_SA

ASTM F918-2015, Specification for Noncarbonated Mechanically Refrigerated Beverage Dispenser (Visible Product)
http://www.astm.org/ANSI_SA

ASTM F919-2015, Specification for Slicing Machines, Food, Electric
http://www.astm.org/ANSI_SA

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ASTM F941-2000 (R2013), Practice for Inspection of Marine Surface Preparation and Coating Application
http://www.astm.org/ANSI_SA

ASTM F952-2012, Specification for Mixing Machines, Food, Electric
http://www.astm.org/ANSI_SA

ASTM F953-2014, Specification for Commercial Dishwashing Machines (Stationary Rack, Dump Type) Chemical Sanitizing
http://www.astm.org/ANSI_SA

ASTM F956-1991 (R2012), Specification for Bell, Cast, Sound Signalling
http://www.astm.org/ANSI_SA

ASTM F957-1991 (R2012), Specification for Gong, Sound Signaling
http://www.astm.org/ANSI_SA

http://www.astm.org/ANSI_SA

ASTM F985-2000 (R2012), Specification for Panama Canal Pilot Platform
http://www.astm.org/ANSI_SA

ASTM F986-1997 (R2014), Specification for Suction Strainer Boxes
http://www.astm.org/ANSI_SA

ASTM F987-2004 (R2017), Specification for Portable Intermediate Flush Deck Stanchion
http://www.astm.org/ANSI_SA
ATCC (American Type Culture Collection)

ANSI/ASN-0003-2015, Species-Level Identification of Animal Cells through Mitochondrial Cytochrome c Oxidase Subunit 1 (CO1) DNA Barcodes

DNA barcoding (CO1 analysis) can successfully identify a wide range of species from various animal taxa, even discriminating between species of the same genus. The technique is easily replicated among laboratories and, because the reference databases contain verified sequences derived from morphological voucher (reference) specimens, it provides a reliable means of validating a putative species identification of a sample.

ANSI/ATCC ASN-0001.1-2015, Standardization of in vitro Assays to Determine Anthrax Toxin Activities

This version represents the second version of ASN -0001, reflecting changes and updates in the five-year period since the first ASN was published. This standard provides a reference method for performing in vitro assays to determine anthrax toxin activities. The anthrax toxins to be assayed are lethal toxin [LT: protective antigen (PA) + lethal factor (LF)] and edema toxin [ET: PA + edema factor (EF)]. The assay for LT is based on cytotoxicity to cultured murine macrophages. The assay for ET is based on its adenylate cyclase activity and cyclic adenosine monophosphate (cAMP) production in host cells. These assays may be used to determine activities of various LT and ET preparations for experimental comparison between the same or different groups of investigators.

ANSI/ATCC ASN-0002-2011, Authentication of Human Cell Lines: Standardization of STR Profiling

The ASN-0002 document elaborates a standardized procedure for unambiguous authentication and identification of human cell lines using STR profiling.

ATIS (Alliance for Telecommunications Industry Solutions)

ANSI ATIS 0100012-2013, Standard Outage Classification

This Standard provides an outage classification methodology for use by the communications industry.

ANSI ATIS 0100024-2009 (R2014), User-Network Interface (UNI) Media Plane Security Standard for Evolving VoIP/Multimedia Networks

This Standard provides a set of security guidelines and requirements for Media (User) Plane Security in Next Generation Networks.
This standard provides performance monitoring (PM) functions and requirements applicable to Layer 1 transmission signals for the covered levels of the North American transmission hierarchy. This standard provides functional requirements to support maintenance and is not meant to be an equipment specification.

ANSI ATIS 0300231-03-2013, DS3 - Layer 1 In-Service Digital Transmission Performance Monitoring

This standard provides performance monitoring (PM) functions and requirements applicable to DS3 digital transmission. This standard provides functional requirements to support maintenance and is not meant to be an equipment specification.

ANSI ATIS 0300231.04-2013, SONET -- Layer 1 In-Service Digital Transmission Performance Monitoring

This standard provides performance monitoring (PM) functions and requirements applicable to SONET digital transmission. This standard provides functional requirements to support maintenance and is not meant to be an equipment specification.

ANSI ATIS 0300240-2014, Operations, Administration, Maintenance and Provisioning (OAM&P) - Generic Network Information Model for Interfaces between Operations Systems and Network Elements

This standard is part of a series of standards that specifies interface requirements for the interface between Operations Systems (OSs) and Network Elements (NEs). It describes a generic network model needed to develop Operations, Administration, Maintenance, and Provisioning (OAM&P) application message standards for modern telecommunication networks.

ANSI ATIS 0300245-2013, Directory Service for Telecommunications Management Network (TMN) and Synchronous Optical Network (SONET)

This standard specifies the usage of the X.500 Directory, protocols and services for communications between Directory Users and Directory Servers. These specifications are for use of the Directory in support of management communications within the Telecommunications Management Network (TMN), and for specific technologies, such as Synchronous Optical Network (SONET).

ANSI ATIS 0300247-2013, Operations, Administration, Maintenance, and Provisioning (OAM&P) - Performance Management Functional Area Services and Information Mode for Interfaces between Operations Systems and Network Elements

This American National Standard is part of a series of standards needed to specify the interfaces between Operations Systems (OSs) and Network Elements (NEs). It specifies a Performance Management Information Model needed to facilitate the exchange of performance management information between OSs and NEs when providing Operations, Administration, Maintenance, and Provisioning functions.

ANSI ATIS 0300255-2008 (R2013), In-Service, Non-Intrusive Measurement Device (INMD) - Methodology for Applying INMD Measurements to Customer Opinion Models

This document is intended for use as the North American standard for mapping measurements made with In-Service, Non intrusive Measurement Devices (INMDs) to the parameters used in customer opinion models for voice services. This standard includes mathematical algorithms which perform this mapping and allow customer opinion ratings to be determined from INMD measurements.

ANSI ATIS 0300260-1998 (R2013), Operations, Administration, Maintenance, and Provisioning (OAM&P) - Extension to Generic Network Information Model for Interfaces between a Service Provider Administrative System and Network Elements for Lawfully Authorized Electronic Surveillance

This standard specifies information models and functional requirements for the interface between Network Elements (NEs) and a Service Provider Administrative System for Lawfully Authorized Electronic Surveillance (LAES).

ANSI ATIS 0500002-2008 (R2013), Emergency Services Messaging Interface (ESMI)

This document contains standards for an Emergency Services Interface to the Emergency Services Network (ESNet). It specifies protocols and message sets for use in the Emergency Services Messaging Interface. The Emergency Services Messaging Interface (ESMI) is the evolution of the Emergency Service Network that provides sophisticated and robust services to the PSAP and other authorized agencies. The Emergency Services Messaging Interface supports a future direction toward a next generation emergency services network.
ANSI ATIS 0500006-2008 (R2013), Emergency Information Services Interfaces (EISI) ALI Service

This document contains standards for an Emergency Information Services Interface (EISI) in the Emergency Services Network (ESNet). It specifies protocols and message sets for use in the ESNet in order to communicate between Entities Consuming Emergency Services (ECES) and Entities Providing Emergency Services (EPES).

ANSI ATIS 0500007-2008 (R2013), Emergency Information Services Interface (EISI) Implemented with Web Services

This document contains standards for an Emergency Information Services Interface (EISI) in the Emergency Services Network (ESNet). It specifies protocols and message sets for use in the ESNet in order to communicate between Entities Consuming Emergency Services (ECES) and Entities Providing Emergency Services (EPES). The Emergency Information Services Interface is the evolution of the Emergency Service Network that provides sophisticated and robust services to the PSAP and other authorized agencies through the use of web services. The Emergency Information Services Interface supports a future direction toward a next generation emergency services network.

ANSI ATIS 0600009-2007 (R2012), RoHS-Compliant Plating Standard for Structural Metals, Bus Bars, and Fasteners

Prohibitions on the use of hexavalent chromium in sheet metal plating present an eco-design issue within a high impact on the US telecommunications industry. As the industry transitions to RoHS-compliant finishing, end-point specifications and quality standards are needed. This standard proposes text for specifying finishes, testing criteria and workmanship classifications.

ANSI ATIS 0600010-2014, Temperature, Humidity, & Altitude Standards

This standard covers the minimum temperature, humidity, and altitude criteria for telecommunications network equipment to be installed and utilized by service providers in controlled environmental spaces (e.g. Data Centers, Central Offices, NUs, CEVs, and on customer premises). It describes test methodologies and test report criteria necessary for proper evaluation by interested parties, and those intending to deploy equipment in such environments.


The standard provides the methodology by vendors and third party independent laboratories in the formation of a telecommunications energy efficiency ratio (TEER). The requirements and definitions in this document are for Wireline Access equipment that provides standards-based asymmetric broadband service and is deployed in the telecommunications industry. This supplemental standard represents one part of the larger ATIS suite of standards concerning Telecommunications Energy Efficiency (ATIS-0600015.2009). This supplemental standard (ATIS-0600015.07.201X) specifically addresses access equipment and is to be used in conjunction with ATIS-0600015.2009.

ANSI ATIS 0600016-2008 (R2013), Remote End POTS Splitter Requirements

This standard presents static POTS splitter requirements for remote end splitters operating in the xDSL band between 32 kHz and 30 MHz. This standard is not intended to provide specific details on physical attributes, industry standard safety considerations, or configuration of remote end splitters. This document describes the electrical characteristic of remote end splitters that reduce the xDSL signal impact on voice band communication and provide isolation between voice band equipment and xDSL equipment.

ANSI ATIS 0600017-2014, Non-Halogenated DC Power Wire and Cable for Telecommunications Power Systems

This standard establishes a minimum requirement for DC power cable used to connect telecommunications DC power systems to telecommunications load equipment. It will also be used to interconnect elements of the DC power system.

ANSI ATIS 0600019-2014, Test Requirements for Pb-Free Subassembly Modules

This document specifies test requirements for Pb-free Subassembly Modules. Examples of these include, but are not limited to, power supply modules and optics modules that are later added to a higher level assembly. This document exclusively focus on those Restrictions of Hazardous Substances (RoHS) items specific to the introduction of Pb-free components and does not address requirements for device specific qualifications.

ANSI ATIS 0600020-2014, Test Requirements for Pb-Free Circuit Packs

This document specifies acceptance and test requirements for Pb-free circuit packs. This document exclusively focuses on those Restriction of Hazardous Substances (RoHS) items specific to the introduction of Pb-free materials and components, does not address requirements for product-specific qualifications. The Addendum ATIS-0600020.a.2012 (attached to this document) has been created to address the specific conditions under which testing to this specification may be waived, expounding on Section 1.1 of this document.

ANSI ATIS 0600029-2013, Standard for Irreversible Compression Lugs, Inline Splices, and Taps

The purpose of this standard is to develop telecommunications industry-wide requirements for irreversible crimp compression lugs, inline splices and taps for use with 14 AWG and larger cable and bus bar; establish minimum quality requirements; establish recommended lug landing patterns including lug width; and establish barrel size requirements. The standard does not cover irreversible crimp compression terminals for smaller wire sizes.

ANSI ATIS 0600031-2014, (Pumped) Distributed Refrigerant Cooling - Standardized Infrastructure

Equipment cooling infrastructure solutions have expanded and adopted to meet increasing equipment heat loads and improved energy efficiencies. Infrastructure solutions now include energy efficient Close-coupled Cooling (C3) alternatives that bring the cooling (heat transfer) closer to the heat source. One C3 solution utilizes distributed refrigerant as a thermal transfer medium. As the industry adopts and integrates Distributed Refrigerant Cooling (DRC) systems, common infrastructure standards are needed to assure interoperability and connectivity between manufacturers. This standard outlines design requirements for a standard refrigerant distribution infrastructure.

ANSI ATIS 0600307-2014, Fire Resistance Criteria - Ignitability Requirements for Equipment Assemblies, Ancillary Non-Metallic Apparatus, and Fire Spread Requirements for Wire and Cable

This standard covers the fires resistance characteristics of equipment assemblies and selected products and materials used within telecommunications network equipment facilities and spaces of similar function. This standard – along with that latest published version of T1.319 (which is T1.319-2002 at the time of this publication) – shall be used as the means of appraising fire risk within a telecommunications network equipment facility or space with similar function.

ANSI ATIS 0600308-2008 (R2013), Central Office Equipment - Electrostatic Discharge Immunity Requirements

This standard specifies the Electrostatic Discharge (ESD) immunity requirements and test procedures as they apply to equipment assemblies intended for use in telecommunications central offices and similar type environments. This standard also specifies the manufacturer's notification requirements for ESD protection.
**ANSI ATIS 0600313-2013, Electrical Protection for Telecommunications Central Offices and Similar Type Facilities**

Telecommunications central offices, data centers, electronic equipment enclosures (EEE), and similar type facilities are often subjected to disturbances from lightning and ac power link faults, either directly or indirectly, through the communications cables and ac power facilities that serve them. This standard provides the minimum electrical protection, grounding, and bonding criteria necessary to mitigate the disruptive and damaging effects of lightning and ac power faults. It is intended to serve as a guide for designers of such facilities in the application of electrical protection, grounding, and bonding as a function of the electrical environment.

**ANSI ATIS 0600315-2013, Voltage Levels for DC-Powered Equipment Used in the Telecommunications Environment**

This standard establishes requirements and test procedures for voltage ranges and characteristics associated with the input voltage of telecommunications equipment powered from dc power systems in the telecommunications environment. It includes +12, + and -24, -48, + and -130, and 140 VDC.

**ANSI ATIS 0600316-2013, Electrical Protection of Telecommunications Outside Plant**

Telecommunications outside plant, by nature of its outdoor location, and frequent joint-use or joint right-of-way installations with power utility facilities, is often subject to disturbances from lightning and ac power line faults. This standard provides the minimum electrical protection, grounding and bonding criteria necessary to mitigate the disruptive and damaging effects of lightning and ac power faults. It is intended to serve as a guide for designers of such facilities in the application of electrical protection, grounding and bonding, as a function of the electrical environment.

**ANSI ATIS 0600317-1993 (R2013), Uniform Language for Accessing Power Plants - Human-Machine Language**

A standard for a command language that permits a uniform method of communicating with power systems in a telecommunications environment. This standard specifically addresses command language elements necessary for human-to-machine communication with systems that monitor and control power equipment. This standard is applicable to the design of power system monitoring and control systems.

**ANSI ATIS 0600319-2014, Equipment Assemblies - Fire Propagation Risk Assessment Criteria**

The purpose of this standard is to provide fire propagation hazard risk assessment criteria for equipment assemblies used in telecommunications network equipment environments.


This standard provides baseline measures describing the durability (survivability) of outside plant copper-conductor and optical fiber telecommunications distribution links to various levels of physical stress and radiation effects. The standard applies to optical fiber and metallic links for trunk, feeder, and local distribution.

**ANSI ATIS 0600329-2014, Network Equipment - Earthquake Resistance**

This standard, when used with established earthquake qualification practices, sets forth test methods, performance requirements, and acceptance criteria for determining the earthquake resistance of telecommunications equipment.

**ANSI ATIS 0600330-2013, Valve Regulated Lead-Acid Batteries Used in the Telecommunications Environment**

This standard covers valve-regulated lead-acid (immobilized electrolyte) batteries, hereinafter referred to as VRLA cells (or modules), used as a reserve energy source that supports dc-powered telecommunications load equipment.

**ANSI ATIS 0600333-2014, Grounding and Bonding of Telecommunications Equipment**

This standard defines and describes the grounding and bonding topologies commonly used for the installation of network telecommunications equipment in central offices and similar type facilities. It addresses the baseline grounding and bonding requirements for telecommunications equipment, the associated dc and ac power facilities, and the interfacing of co-located telecommunications systems installed in central offices and similar facilities.

**ANSI ATIS 0600334-2013, Electrical Protection of Communications Towers and Associated Structures**

Communications towers and the associated structures, by nature of their outdoor location, are often subject to disturbances from lightning. This standard provides the minimum electrical protection, grounding, and bonding criteria necessary to mitigate the disruptive and damaging effects of lightning. It is intended to serve as a guide for designers or users of such facilities in the application of electrical protection, grounding, and bonding.

**ANSI ATIS 0600413-2009 (R2014), Network to Customer Installation Interfaces - Asymmetric Digital Subscriber Line (ADSL) Metallic Interface**

This standard describes the interface between the telecommunications network and the customer installation in terms of their interaction and electrical characteristics. The requirements of this standard apply to a single asymmetric digital subscriber line (ADSL).

**ANSI ATIS 0700004-a-2008 (R2013), Supplement to ATIS High Capacity-Spatial Division Multiple Access (HC-SDMA) Radio Interface Standard**

This document contains necessary supplemental changes to ATIS-0700004.2007 to support transport of IP over PPP, IEEE802.2 LLC, IEEE802.3/Ethernet Payloads and Payload Header Suppression profiles over the HC-SDMA air interface.

**ANSI ATIS 0700706-1997 (R2013), Stage 1 Service Description for Personal Communications Service - Enhanced Priority Access and Channel Assignment (PACA-E) Supplementary Service**

This standard defines and describes the Enhanced Priority Access and Channel Assignment (PACA-E) service for PCS. This service is intended to provide preferential treatment to a special group of PCS users, e.g., National Security and Emergency Preparedness (NS/EP) users. PACA-E requires modifications to basic PCS call set-up procedures in order to provide prioritization, by queueing, of the assignment of radio channel resources involved in call origination from PACA-E subscriber (priority access) and, separately, call delivery to a PACA-E subscriber (priority egress).

**ANSI ATIS 0700708-1998 (R2013), PCS 1900 Service Provider Number Portability Number Portability (NP) allows subscribers to retain their Directory Number (DN) when they change their service provider (service provider portability), location (location portability), or service (service portability). The focus of this specification is to allow PCS1900 systems to support.**

**ANSI ATIS 0700711-1999 (R2014), Number Portability for PCS 1900 Short Message Service and Other Services**

This standard defines the PCS 1900 requirements needed to support Short Message Service and other Services in a Number Portability environment. This standard ensures that Short Message Service Point-to-Point (SMS-PP) works for all subscribers in a PCS 1900 Number Portability environment regardless of whether the subscriber has ported or not.

**ANSI ATIS 0700724-2014, UMTS Handover Interface for Lawful Interception**

This standard is based on 3GPP TS33.108[31], modified to become an American National Standard for Telecommunications. Laws of individual nations and regional institutions (e.g., European Union), and sometimes licensing and operating conditions, define a need to intercept telecommunications traffic and related information in modern telecommunications systems. It has to be noted that lawful interception shall always be done in accordance with the applicable national or regional laws and technical regulations. Nothing in this standard, including the definitions, is intended to supplant national law.
ANSI ATIS 0900002-2009 (R2014), Synchronization Standard - Physical Interconnection for Ethernet-Based Timing Distribution
This standard addresses the interconnection between the Timing Signal Generator (TSG) and Network Elements (NE) in an Intra-Central-Office environment. The principal focus of this standard is the physical layer connectivity for Ethernet signals including the connectorization, cabling, and shielding requirements for delivering a timing reference from the Office TSG to the NE.

ANSI ATIS 0900101-2013, Synchronization Interface Standard
The revised standard describes synchronization interfaces for the North American digital telecommunication hierarchy. Compliance with this standard is necessary to achieve satisfactory interworking of telecommunications networks.

ANSI ATIS 0900105.03-2013, Synchronous Optical Network - (SONET) - Jitter Network Interfaces
The standard describes the jitter specifications that are applicable to SONET network and equipment interfaces (OC-N and STS-N), and jitter and wander specifications that are applicable to certain SONET payload signals (e.g. DS1 and DS3).

ANSI ATIS 0900105.09-2013, Synchronous Optical Network (SONET) - Network Timing and Synchronization
This standard provides timing and synchronization specifications for SONET interfaces. Compliance with this standard is necessary to achieve satisfactory interworking of telecommunication networks.

ANSI ATIS 1000017-2008 (R2013), Interworking between the ISDN User - Network Interface Protocol and the Session Initiation Protocol (SIP) with ANSI Extensions to the Narrowband Signaling Syntax (NSS)
This standard defines the interworking relationship between the D-channel layer-3 functions and protocol employed across an ISDN User- Network Interface and an interface using the Session Initiation Protocol (SIP) augmented by the Narrowband Signaling Syntax (NSS) with ANSI Extensions.

ANSI ATIS 1000023-2013, ETS Network Element Requirements for a
This document defines network element requirements to ensure that Emergency Telecommunications Service (ETS) is implementable and interoperable in a multi-vendor environment for an NGN IMS-based network deployment. These requirements further refine the procedures defined in the ETS in IP Networks Phase 1 standard [Ref. 1]. In addition, OA&M requirements are specified.

This standard specifies Voice over Packet and Multimedia Signaling and control plane security requirements for evolving networks. This standard provides security requirements for VoIP and Multimedia signaling and control services that cross the User to Network interfaces (UNI).

ANSI ATIS 1000026-2008 (R2013), Session/Border Control Functions and Requirements
This document defines the Session Border Controller (SBC) functions and requirements that reside within a service provider’s network. Implementation realizations of SBCs are also described. An SBC comprises of Call Control Signaling Path (CCSP) functions and Media Path (MP) functions. The separation of an SBC into its component functions is described; and call/sessions control, bearer/media, and OAM&P requirements are provided.

ANSI ATIS 1000028-2008 (R2013), IP Device (SIP UA) to Network Interface Standard
This User to Network interface (UNI) standard supports SIP based interconnection for VoIP between a carrier (SCF) and the user (EUF). The SIP UNI interface specified in this document is applicable to individual SIP phones as well as to SUP PBXs.

ANSI ATIS 1000029-2008 (R2013), Security Requirements for NGN
This standard provides security requirements for the Next Generation Network (NGN) against security threats, and to mitigate the effects of security attacks.

ANSI ATIS 1000030-2008 (R2013), Authentication and Authorization Requirements for Next Generation Network (NGN)
This standard provides authentication and authorization requirements for Next Generation Networks (NGN). This includes requirements for authentication and authorization across the User-to-Network Interface (UNI), the Network-to-Network Interface (NNI) and the application to - - Network Interface (ANI) as well as any entities internally with a network that may require authentication and authorization.

ANSI ATIS 1000035-2009 (R2014), Next Generation Network (NGN) Identity Management (IdM) Framework
This standard provides a framework for Identity Management (IdM) in NGN. The primary purpose of this framework is to describe a structured approach for designing, defining, and implementing IdM solutions and facilitate interoperability in a heterogeneous environment.

ANSI ATIS 1000104-1991 (R2013), Exchange-Interexchange Carrier Interfaces - Individual Channel Signaling Protocols
The purpose of this standard is to enable a wireline exchange carrier (EC) entity and an interexchange carrier (IC), international carrier (INC), or consolidated carrier entity to provide interconnecting equipment that operates compatibly. This standard gives individual-channel signaling protocol requirements for the interface located between a public-switched EC network within an access area and an IC, INC, or consolidated carrier network.

ANSI ATIS 1000109-2014, Exchange - Interexchange Carrier Interfaces - 950+XXXX EC-to-IC Access Signaling Protocols
The purpose of this standard is to enable an exchange carrier (EC) entity and an interexchange carrier (IC), or consolidated carrier entity to provide interconnecting equipment that operates compatibly. This standard is one of a series of standards that gives individual-channel signaling protocol requirements for the interface located between a public switched EC network within an access area and an IC, INC, or consolidated carrier network.

ANSI ATIS 1000114-2004 (R2014), Signalling System Number 7 (SS7) - Transaction Capabilities Application Part (TCAP)
This document is based on T1.114-2000, and allows functions similar to those in ITU-T Recommendations Q.771 through Q.774 of the White Book specification of Signalling System No. 7 for internation use, issued by the ITU-T Study Group XI (Vol. VI Fascicle VI.9).

ANSI ATIS 1000602-1996 (R2014), Integrated Services Digital Network (ISDN) - Data-Link Layer Signaling Specification for Application at the User-Network Interface
This standard specifies the Link Access Procedure on the D-channel, LAPD. The purpose of LAPD is to convey information between layer-3 entities across the ISDN user-network interface using the D-channel. LAPD is a protocol operating at the data-link layer of the OSI architecture. The frame structure, elements of procedure, format of fields, and procedures for the proper operation of LAPD are specified.

ANSI ATIS 1000603-2014, Integrated Services Digital Network (ISDN) - Minimal Set of Bearer Services for the Primary Rate Interface
This standard defines the minimal set of bearer services for the ISDN primary rate interface, which conforms closely to CCITT architectural concepts and explicitly considers the service constraints in the telecommunications environment of the United States. The bearer services defined in this standard are the minimal set of bearer services that are to be supported by public networks for ISDN primary rate interfaces.
ANSI ATIS 1000604-2014, Integrated Services Digital Network (ISDN) - Minimal Set of Bearer Services for the Basic Rate Interface
This standard defines the minimal set of bearer services for the ISDN basic rate interface, which conforms closely to CCITT architectural concepts and explicitly considers the service constraints in the telecommunications environment of the United States.

ANSI ATIS 1000607-2014, Integrated Services Digital Network (ISDN) - Layer 3 Signaling Specification for Circuit Switched Bearer Service for Digital Subscriber Signaling System Number 1 (DSS1)
This standard specifies the procedures for the establishing, maintaining, and clearing of network connection at the Integrated Services Digital Network (ISDN) user-network interface for the support of circuit switched calls. These procedures are defined in terms of messages exchange over the D-channel.

ANSI ATIS 1000609-2014, Interworking between the ISDN User-Network Interface Protocol and the Signalling System Number 7 (SS7) ISDN User Part
This standard is aimed at defining the interworking relationship between the call control protocol of the ISDN User-Network Interface Protocol and the ISDN User Part of SS7. This standard defines in detail the relationship between signalling information conveyed via the User-Network Interface Protocol and similar signalling information conveyed via the ISDN User part of SS7. The above relationship is described within the context of supporting the establishment and clearing of call within an ISDN or mixed ISDN/non-ISDN environment.

ANSI ATIS 1000610-1998 (R2013), Generic Procedures for the Control of ISDN Supplementary Services
This standard specifies the generic procedures applicable for the control of Integrated Services Digital Network (ISDN) supplementary services at the user-network interface. This standard is identical to the 1993 Recommendation Q.392 issued by the International Telecommunications Union - Telecommunications Standardization Sector (ITU-T) with the charges described in clause 3.

ANSI ATIS 1000610.a-1998 (R2013), Generic Procedures for the Control of ISDN Supplementary Services, Modification to the Redirecting Number Information Element
This supplement to American National Standard for Telecommunications - Generic Procedures for the Control of ISDN Supplementary Services, ATIS -1000610.1998(R2008), revises the standard to improve and clarify the standard based on related advances in other standards bodies.

ANSI ATIS 1000611-1991 (R2013), Signalling System Number 7 (SS7) - Supplementary Services for Non-ISDN Subscribers
This standard describes thirteen services for non-integrated services digital network (non-ISDN) subscribers along with their supporting SS7 protocols. They provide enhanced functionality for users with non-ISDN interfaces who access SS7 capable networks.

ANSI ATIS 1000612-1992 (R2013), Integrated Services Digital Network (ISDN) - Terminal Adaptation Using Statistical Multiplexing
This standard describes a protocol for use in SS7 point to point 64 kbit/s, H0, H10, H11 or D (for Frame Relay) connections to accommodate lower speed devices conforming to other standards. It does not define the specific mapping between those standards and the protocol defined as this is viewed as an implementation matter and does not require standardization.

ANSI ATIS 1000615-2014, Digital Subscriber Signalling System No.1 (DSS1) - Layer 3 Overview
The Digital Subscriber Signalling System No.1 (DSS1) is a suite of protocols that provides the means for users to invoke the full range of services and capabilities available from the Integrated Services Digital Network (ISDN).

ANSI ATIS 1000616-2014, Integrated Services Digital Network (ISDN) - Call Hold Supplementary Service
This standard specifies the service capabilities of the Call Hold service within the context of an Integrated Services Digital Network (ISDN).

ANSI ATIS 1000618-1991 (R2013), Integrated Services Digital Network (ISDN) - Core Aspects of Frame Protocol for Use with Frame Relay Bearer Service
This standard provides a description of the protocol to support the data transfer phase of the Frame Relay bearer service as defined in ANSI T1.606, Frame relaying bearer service - Architectural framework and service description including Addendum 1.

ANSI ATIS 1000620a-2014, Multi-Rate Circuit-Mode Bearer Service for ISDN - Addendum to the Circuit-Mode Bearer Service Category Description
This document is a supplement to ATIS-1000620 and revises the standard to add the category of multi-rate circuit-mode bearer services.

ANSI ATIS 1000621-2014, Integrated Services Digital Network (ISDN) - User-to-User Signaling Supplementary Service
This standard is one of a series which defines and describes service capabilities within the context of an Integrated Service Digital Network (ISDN). It describes a single service capability which is a telecommunication transport capability. Such capability 5 be made available on a demand or a subscription arrangement.

ANSI ATIS 1000622-1999 (R2013), Message Waiting Indicator Control and Notification Supplementary Services and Associated Switching and Signaling Specifications
This standard specifies the service capabilities of Message Waiting Indicator Control and Notification (MWICN) services within the context of an Integrated Services Digital Network (ISDN). Message Waiting Indicator Control and Notification service allows a Message Storage and Retrieval (MSR) System to inform its client users about the status of messages recorded at the MSR System. The associated switching and signaling specifications are also provided. This service 5 be made available by subscription arrangements. The interaction of this service with other ANSI defined service capabilities are included.

ANSI ATIS 1000622.a-1998 (R2013), Supplement to ATIS-1000622.1999(R2008) - Message Waiting Indicator Control and Notification Supplementary Services and Associated Switching and Signaling Specifications
This supplement to American National Standard for Telecommunications - Message Waiting Indicator and Notification Supplementary Services and Associated Switching and Signaling Specifications, ATIS -1000622.1999(R2008), revises the standard to improve and expand the applicability of this standard, in particular, when interfacing to an NT2.

ANSI ATIS 1000623-2014, Digital Subscriber Signalling System Number 1 (DSS1) - Signalling Specification for the User Signalling Bearer Service
This standard presents the procedures at the S or T reference point for D-channel access connection on basic rate interfaces and primary rate interfaces within the Integrated Services Digital Network (ISDN) to support ISDN user signalling bearer service.

ANSI ATIS 1000625-1993 (R2013), Integrated Services Digital Network (ISDN) - Calling Line Identification Presentation and Restriction Supplementary Services
The ISDN supplementary service called Calling Line Identification Presentation and Calling Line Identification Restriction are defined in three parts: (1) a description from the user's point of view, (2) an abstract analysis of the functional capabilities needed in network and user equipment, and (3) a precise specification of access and interchange signaling capabilities that can be used to implement Calling Line Identification Presentation and Calling Line Identification Restriction.
This supplement to American National Standard for Telecommunications - Integrated Services Digital Network (ISDN) - Calling Line Identification Presentation and Restriction Supplementary Services, ATIS-1000625.1993(R2008), revises the standard to add a statement to the Scope and Purpose indicating that the standard can also be applied to wireless PCS applications.

ANSI ATIS 1000627-2014, Broadband ISDN - ATM Layer Functionality and Specification

This standard is one of a series of standards on Broadband Integrated Services Digital Network (B-ISDN). These standards describe the B-ISDN capabilities, architectural model, and network interfaces including protocol functionalities and specifications, and signaling characteristics. In particular, this standard describes the protocol of the ATM Layer.

ANSI ATIS 1000632-1993 (R2014), ISDN Supplementary Service Normal Call Transfer

This standard describes the ISDN Normal Call Transfer Service in terms of service definition and protocol and procedures needed for implementation.

ANSI ATIS 1000641-2014, Calling Name Identification Presentation

This standard is one of a series which defines and describes supplementary services. These services 5 be made available for users with non-ISDN interfaces who access S57 capable networks and also within the context of an Integrated Services Digital Network (ISDN). This standard describes Calling Name Identification Presentation which is a terminating service that provides either the name associated with the calling party number or an indication of privacy or service that provides either the name associated with the called party.

ANSI ATIS 1000642-2014, Integrated Services Digital Network (ISDN) - Call Deflection Supplementary Service

This standard is one of a series that defines and describes supplementary services within the context of an Integrated Services Digital Network (ISDN). The interaction of this service with other ISDN services is also included. The purpose of the standard is to allow maximum compatibility among network- and user-owned telecommunications equipment in order to increase the attractiveness and usefulness of ISDN-based capabilities.

ANSI ATIS 1000643-1998 (R2013), Integrated Services Digital Network (ISDN) - Explicit Call Transfer Supplementary Service

This standard is one of a series that defines and describes supplementary services within the context of an Integrated Services Digital Network (ISDN). This supplementary service 5 be made available on a demand or subscription arrangement. The interaction of this supplementary service with other ISDN services is also included. The purpose of the standard is to allow maximum compatibility among network- and user-owned telecommunications equipment in order to increase the attractiveness and usefulness of ISDN-based capabilities.

ANSI ATIS 1000645-1995 (R2013), B-ISDN Signaling ATM Adaptation Layer - Service Specific Coordination Function for Support of Signaling at the Network Node Interface (SSCF at the NNI)

This standard provides a function that is part of the ATM Adaptation Layer for the support of signaling (SAAL) at the Network Node Interface (NNI) of the B-ISDN. This function is used to map the service of the Service Specific Connection Oriented Protocol (SSCOP) of the AAL to the requirements of an SAAL user at the NNI as defined in ATIS-1000111. These requirements cover the needs for signaling between network nodes and networks. This function is called Service Specific Coordination Function (SSCF) for signaling at the NNI.

ANSI ATIS 1000654-1996 (R2013), Broadband Integrated Services Digital Network (B-ISDN) - Operations and Maintenance (OAM) Principles and Functions

This standard specifies the Operations and Maintenance (OAM) principles and functions for the Broadband aspects of the Integrated Services Digital Network (B-ISDN). Specifically, it defines the OAM flow mechanisms for B-ISDNs and specifies OAM functions for the Physical and Asynchronous Transfer Mode (ATM) layers of the B-ISDN protocol reference model. The categories of operations addressed are Fault Management and Performance Management.

ANSI ATIS 1000660-1998 (R2013), Signalling System Number 7 - Call Completion to a Portable Number - Integrated Text

This document describes the Signalling System Number 7 (SS7) network capabilities for completing calls to end users with portable numbers. The SS7 network capability, known as Call Completion to a Portable Number (CCPN), provides the core functionality. CCPN also includes optional network capabilities for obtaining the routing information outlined in 4.1 and described in Annexes A-C to supplement the CCPN capability. These optional network capabilities are: Number Portability (NP), Query - Response, NP Release to Pivot (NP RTP), and NP Query on Release (NP QoR).

ANSI ATIS 1000665-1997 (R2013), Broadband ISDN - Overview of ANSI B-ISDN NNI Signaling Capability Set 2, Step 1

This standard provides an overview of the capabilities of the ANSI Broadband ISDN Network Node Interface (B-ISDN NNI) for the Broadband ISDN Signaling Capability Set 2, Step 1 (B-ISDN NNI CS 2.1). This standard should thus be seen as an increment to ANSI T1.648, Section 1 which provides an overview of the B-ISUP for Signaling Capability Set 1. The B-ISUP for CS 1 provides common control for point-to-point signaling connection calls using ISDN bearer classes BCOB-A and BCOB-X.

ANSI ATIS 1000666-1999 (R2014), Signalling System Number 7 (SS7) - Operator Services Network Capabilities

This standard describes the operator services originating connection network capability, which permits the establishment and release of a network connection between a user and an operator service or services. This capability builds upon the existing basic call control procedures; define in ATIS-1000113, for establishing and releasing connections.

ANSI ATIS 1000666.a-2000 (R2014), Interactions Between the Operator Services Network Capability (OSNC) and Release to Pivot (RTP)

This document is a supplement to T1.666-1999 (R2009) and adds additional informative annexes.


This is a supplement to ATIS 1000678-2006, and provides clarifications, corrections and enhancements to ATIS 1000678-2006.

ANSI ATIS 1000678.b.v2-2010 (R2013), Supplement B to ATIS 1000678-2006, Lawfully Authorized Electronic Surveillance (LAES) for Voice Over Packet Technologies in Wireline Telecommunications Networks

This is a supplement to ATIS 1000678-2006, and provides clarifications, corrections and enhancements to ATIS 1000678-2006 and ATIS 1000678.a-2007.

ANSI ATIS 1000678.v2-2006 (R2013), Lawfully Authorized Electronic Surveillance (LAES) for Voice Over Packet Technologies in Wireline Telecommunications Networks, Version 2

This defines the interfaces between a Telecommunication Service Provider (TSP) and a Law Enforcement Agency (LEA) to assist the LEA in conducting lawfully authorized electronic surveillance for Voice over Packet (VoP) Technologies in Wireline Telecommunications Networks.
This document provides the mechanisms to perform lawfully authorized electronic surveillance of VoIP subject to the appropriate legal and regulatory environment. It is not the intent of this document to imply or impact any pending Communications Assistance for Law Enforcement Act (CALEA) regulatory decisions related to VoP.

This standard provides a set of user plane security guidelines and requirements for Emergency Telecommunications Services (ETS) over IP networks. The scope is intended to address security as it relates to user plane performance, reliability, and availability of ETS. ETS does not include E-911.

This standard describes a perceptual objective model for non-intrusive estimation of narrowband speech quality. This standard provides the description of the perceptual objective model, Auditory Non-Intrusive Quality Estimation Plus (ANIQUE+), which estimates the quality of speech without reference speech information.

This standard defines a metric that can gauge the ability of an IP network to deliver transaction services in an acceptable manner. Transactions such as Voice over IP (VoIP) calls are either successfully completed as required, or they are considered to be defects. The DPM metric is defined as the ratio of all defective transactions to the total number of transactions attempted over a pre-determined period, normalized by a factor of one million.

This standard describes four Reduced Reference (RR) video calibration algorithms of low computational complexity. RR Methods are useful for performing end-to-end in-service video quality measurements since these methods utilize a low bandwidth network connection between the original (source) and processed (destination) ends.

This standard describes a metric that quantifies the impact on IP service availability due to an underlying network element outage. Currently, Network Management System (NMS) tools offer limited capabilities to collect necessary data for estimating this impact. The purpose of this metric is to encourage development of outage measurement capabilities/techniques for metric estimation by equipment vendors.

This standard formalizes a set of priority classification levels for admission control and service restoration in Next Generation Networks. The highest priority classifications are reserved for Emergency Telecommunications Service.

This standard provides a set of Service Level Agreements (SLAs) between service providers and their customers as well as their vendors and suppliers. Metrics for estimating IP packet layer availability [Y.1540] and service level availability [ATIS-0100025] have received considerable attention in various standards bodies. In order for service providers, vendors or customers of the network to develop an SLA that includes the availability metric, the definition of availability must be agreed upon and a method for estimation developed. This Technical Report (TR) will describe the components of the definition of Availability rather than the definition.

This standard describes a set of priority classifications of ETS. ETS does not include E-911. This standard applies to Next Generation Networks, which are characterized by established transmission paths (i.e., no access or disengagement functions). Therefore, this standard defines performance parameters relevant to the information transfer phase only. This standard provides a list of the performance parameters and measurement methods needed by users, vendors, and providers of dedicated digital communications services, to characterize the user-observable performance of these services (i.e., it does not address the causes of errors).
ANSI/ATIS 0100504-1998 (S2016), Packet-Switched Data Communication Service - Performance Parameters, Measurements Methods, and Objectives

The purpose of this standard is to define a set of parameters that 5 be used in specifying and measuring the performance of packet switched data communication services provided in accordance with the ITU-T Recommendations X.25 and X.75. Formerly known as T1.504-1998(R2006).


This standard provides performance specifications for the two-way digital or digital equivalent transmission path between the exchange carrier's end office and an interexchange carrier's point of termination. This set of specifications will enable the provision of quality end-to-end performance for switched voice and voiceband data telephone services. This standard defines analog performance-related transmission parameters and specifies limits. Formerly known as T1.506-1997(R2006).

ANSI/ATIS 0100507-2002 (S2016), Network Performance Parameters for Circuit-Switched Digital Services - Definitions and Measurements

This standard applies to circuit-switched digital services, and provides and defines the performance parameters and measurements needed by users, vendors, and providers of circuit-switched digital services, to characterize the user-observable performance of these services (i.e., it does not address the causes of errors). It also includes parameters to be considered in determining whether or not a service is in the available or unavailable state. A given service will only reference those parameters or thresholds applicable to that service. The network-specific parameters are for performance allocation and network control.

ANSI/ATIS 0100508-2003 (R2013), Loss Plan for Digital Networks

This standard provides loss plan requirements for digital networks, including Digital End Offices, taking into account different network configurations and elements, and their associated transmission characteristics.

ANSI/ATIS 0100509-1995 (R2013), Packetized Circuit Multiplication Equipment - Interface Specification

The purpose of this standard is to standardize the interface to packetized circuit multiplication equipment (PCME). PCME converts speech, voiceband data, facsimile, channel-associated (i.e. in-band) signaling, common channel signaling, video, and digital data information from channelized DS1 of Synchronous Optical Network (SONET) formats to LAPD-like frame format.

ANSI/ATIS 0100510-1999 (R2013), Network Performance Parameters for Dedicated Digital Services for Rates Up to and Including DS3 - Specifications

This standard applies to Dedicated Digital Services operating at nominal rates of 56/64 kbit/s, 1.544 Mbit/s and 44.736 Mbit/s with objectives based on the largest and most complex circuits. Dedicated Digital Services are characterized by established connections.

ANSI/ATIS 0100511-2003 (R2013), B-ISDN ATM Layer Cell Transfer Performance

Through its normative reference to ITU-T Recommendation I.356, this standard defines speed, accuracy, and dependability performance parameters for cell transfer in the Asynchronous Transfer Mode (ATM) layer of a national public Broadband Integrated Services Digital Network (B-ISDN). It provisionally allocates performance values to define portions of an end-to-end national ATM connection.

ANSI/ATIS 0100512-1994 (R2013), Network Performance - Point-to-Point Voice-Grade Special Access Network Voiceband Data Transmission Objectives

This standard provides performance objectives for the two-way transmission path between the access provider's network interface to an end-user and an interexchange carrier's point of termination. This set of objectives will enable the provision of quality end-to-end performance for voiceband data voice-grade special services. This standard sets objectives for analog performance-related transmission parameters based on end-user needs and applications.

ANSI/ATIS 0100513-2003 (R2013), Frame Relay Data Communication Service - Access, User Information Transfer, Disengagement, and Availability Performance Parameters

This standard defines performance for Frame Relay permanent and switched virtual connections, including availability, using both parameters and objectives. Information transfer objectives are presented in quality of service classes.

ANSI/ATIS 0100517-1995 (S2016), Performance Parameters and Objectives for Integrated Services Digital Network

The purpose of this standard is to define a comprehensive basis for assessing the performance of Integrated Services Digital Networks (ISDNs) providing telecommunication service in accordance with the American National Standards and ITU-T Recommendations identified herein. This standard: (a) defines parameters that 5 be used to describe the performance of ISDN bearer services and (b) specifies worst-case objectives for the ISDN performance parameters. The parameters and objectives are applicable to circuit mode and packet mode ISDN bearer services.

ANSI/ATIS 0100518-1998 (R2013), Objective Measurement of Telephone Band Speech Quality Using Measuring Normalizing Blocks (MNBs)

This American National Standard (ANS) defines an algorithm that provides acceptably accurate predictions in the same areas as Recommendation P.861, as well as in additional important conditions, such as transmission channel errors and lower-rate speech coders.

ANSI/ATIS 0100519-1999 (R2013), Specifications for Transport of Generic Packets (including MPEG-2) Transport Packets Over the DS Hierarchy

This standard describes the methods and practices for the transmission of a type of generic packet data over the digital hierarchy.


This standard describes Packet Loss Concealment algorithms for use in packetized speech transmission systems that use ITU-T Recommendation G.711 to code speech signals. These concealment algorithms enable high-quality speech transmission in operating environments where packet losses occur by providing high-quality packet loss recovery methods.

ANSI/ATIS 0100523-2011, Telecom Glossary 2011

Aids interdisciplinary technical communications, and disseminates the advances in communications technologies benefiting users, vendors, researchers, and developers. Additionally, this standard provides an authoritative source of definitions for standards developers, teachers, technical writers, and all who are active in the telecommunications field.

ANSI/ATIS 0100524-2004 (R2013), Reliability-related Metrics and Terminology for Network Elements in Evolving Communications Networks

This standard defines reliability-related metrics, features, and terminology for communication networks to foster industry wide consistent nomenclature and methodology when specifying and measuring reliability-related attributes.

ANSI/ATIS 0100801.01-1995 (S2016), Digital Transport of Video Teleconferencing/Video Telephony Signals - Video Test Scenes for Subjective and Objective Performance Assessment

This standard specifies a collection of test scenes that have been used for subjective assessment and 5 be used in future objective assessment of Video Teleconferencing/Video Telephony (VTC/VT), Formerly known as T1.801.01-1995(R2006).
ANSI/ATIS 0100801.02-1996 (S2016), Digital Transport of Video Teleconferencing/Video Telephony Signals - Performance Terms, Definitions and Examples

This standard specifies terms useful for describing the performance of video teleconferencing/video telephony systems and gives their definitions. The standard also supplies examples of the terms where appropriate, as an aid to understanding the definitions. Formerly known as T1.801.02-1996 (R2006).

ANSI/ATIS 0100801.03-2003 (R2013), Digital Transport of One-Way Video Signals - Parameters for Objective Performance Assessment

This standard provides a video performance estimation method for one-way compressed video signal transported digitally on an error-free network or storage system. This video performance estimation method is for possible use with end-user systems, carriers, information and enhanced - service providers, and customer premise equipment.

ANSI/ATIS 0100801.04-2005 (R2015), Multimedia Communications Delay, Synchronization, and Frame Rate

This standard addresses delay and synchronization issues in Multimedia systems that may combine video, audio, and data channels.

ANSI/ATIS 0100802.01-1996 (S2016), North American Adaptation for Domestic-International Interfaces of ETSI 300 174 Digital Component Television Signals - Interface and Coding Specifications at DS-3

This standard is the North American adaptation for Domestic-International interfaces of the ETSI ETS 300 174 standard for the coding and transmission of digital component television signal at a bit rate of 45 Mbit/s. It provides a detailed description of the digital coding algorithm to be implemented in equipment designed to terminate digital transmission systems when those systems are employed to carry ITU-R 601-2 digital television video signals, AES/EBU digital audio signals and ancillary signals such as SMPTE time-code, and SMPTE machine control. Each television signal is formatted to be compatible with the North American DS-3 transport network.

ANSI/ATIS 0100803-1998 (R2013), Overview and Reference for GSTN Multimedia Terminals

This document is to be a general overview of the implementation of multimedia terminals targeting audio-visual conferencing applications on the GSTN. This document also provides elaboration of implementation details in areas which the ITU-T document have been found to be vague or unclear.

ANSI/ATIS 0300003-2017, XML Schema Interface for Fault Management (Trouble Administration)

This standard provides an XML schema information model for Trouble Administration and an XML schema interface for Trouble Administration functions and services. It is intended to be used in conjunction with ATIS-0300228.2011. Additional information from the original CMIP-based Trouble Administration standard ATIS-0300227.2008 is included in an informative annex to this document.

ANSI/ATIS 0300007-2007 (S2017), Identification of Physical Network Resources

This standard shows how ATIS interconnection standard map to ITU-T Recommendation M.1401, Formalization of interconnection designations among operator's networks, not only for network operator interconnection, but also for identification of Physical Network Resources (PNR).


This standard aligns with the relevant ITU-T recommendation M.3410, Guidelines and Requirements for Security Management Systems to Support Telecommunications Management, to replace the previously published ATIS-0300074.2006.

ANSI/ATIS 0300075-2012, Usage Data Management Architecture and Protocols Requirements for Packet-Based Application Services

This document describes a functional architecture and provides requirements intended for usage data management to be applied to various business applications for accounting and charging of packet-based telecommunications services.

ANSI/ATIS 0300094-2015, Trouble Type Codes in Support of ATIS Trouble Administration Standards

This document contains a canonical listing of Trouble Type Codes to be used in the Electronic Bonding process as specified in ATIS 0300003-2012 and ATIS 0300227-2008.

ANSI/ATIS 0300097-2017, Structure for the Identification of Communications Connections for Information Exchange

This standard provides the code and format structures necessary for identification of telecommunications connections and describes the code structure with various combinations of data units represented within those structures. This standard contains clauses that cover its purpose and scope, described format structures and data elements for message trunks and message trunks groups, special services circuits and facilities. It also contains definitions and references. Its intended use is to provide a standard that facilitates information exchange among human and machines.

ANSI/ATIS 0300202-2015, Internetwork Operations - Guidelines for Network Management of the Public Telecommunications Networks under Disaster Conditions

The purpose of this standard is to delineate network traffic management actions that should be performed prior to and during disaster conditions. This standard is applicable to all telecommunications network operators that are interconnected to the public telecommunications networks. A coordinated network traffic management response by all affected network operators should ensure the integrity of the public telecommunications networks.


This standard specifies a loopback test line capable of being used in the measurement of error performance of switched digital circuits. In order to carry out maintenance in the public switched telephone network of switched 64-kbit/s digital circuits, digital circuits at sub-rates of 64 kbit/s and N [infinity] DSO digital circuits (up to the maximum payload of a primary rate facility), a digital circuit test system is defined for digital exchanges and digital PBXs. Currently, only digital loopback testing is defined in this standard.

ANSI/ATIS 0300207-2000 (S2015), Operations, Administration, Maintenance, and Provisioning (OAM&P) - Terminating Test Line Access and Capabilities

This American National Standard describes types of terminating test lines and their optional functions, and provides numbering plan arrangements to access these capabilities for testing across interconnections in the public switched network. The capability outlined in this standards applies to both end user and network provides access to existing and proposed terminating test lines originating, intermediate and terminating points in the network.

ANSI/ATIS 0300210-2015, OAM&P - Principles of Functions, Architectures, and Protocol for Telecommunications Management Network (TMN) Interfaces and enhanced Telecom Operations Map (eTOM)

It is the intention of this standard to use and align with the relevant ITU-T Recommendations.

This standard provides the specifications, characteristics, and values of the National Security/Emergency Preparedness (NS/EP) - Telecommunications Service Priority (TSP) code. The TSP System is a Federal Communications Commission system which superseded the FCC National Communications System (NCS) Restoration Priority (RP) System. This standard contains sections covering its purpose and scope, code representation, allowable code values, and relative importance of activities associated with services having NS/EP TSP designations.

ANSI/ATIS 0300212-2015, Enhanced Telecommunications Charge Card Physical Characteristics and Numbering Structure

This standard applies to enhanced telecommunication charge cards issued within North America. The determination of eligibility to issue telecommunication charge cards is beyond the scope of this standard. This standard defines the major characteristics of enhanced telecommunication charge cards usable for international, domestic, inter-industry, and intra-industry applications in the interchange environment.

ANSI/ATIS 0300220-2016, Representation of the Communications Industry Manufacturers, Suppliers, and Related Service Companies for Information Exchange

This standard provides the coding specifications for representing the names of Communications Industry Manufacturers, Suppliers, and Related Service Companies for the purpose of efficient information exchange. This standard contains clauses covering its scope and purpose, definitions, coding specifications, and maintenance agent duties.

ANSI/ATIS 0300221.1995 (S2015), Operations, Administration, Maintenance, and Provisioning (OAM&P) - In-Service, Noninvasive Measurement Device (INMD) - Voice Service Measurements

This standard provides specifications for in-service noninvasive measurement devices (INMD) used to measure various parameters of importance to voice service transmission maintenance of telecommunications networks. These measurement devices are used primarily for the measurement of voice grade analog parameters such as speech level, noise level, echo path loss and echo path delay. This standard specifies interface, measurement range and accuracy requirements for measuring voice grade transmission parameters as well as descriptions of optional functions associated with these parameters.

ANSI/ATIS 0300223-2014, Structure and Representation of Network Channel (NC) and Network Channel Interface (NCI) Codes for Information Exchange

This standard provides the specifications and characteristics of Network Channel (NC) and Network Channel Interface (NCI) codes. This standard contains clauses that cover its purpose and scope, and describe data elements, code structures and applications. It also contains definitions and references.

ANSI/ATIS 0300226-2001 (S2016), Operations, Administration, Maintenance, and Provisioning (OAM&P) - Management of Functions for Signalling System No. 7 (SS7) Network Interconnections

This standard addresses Operations, Administration, Maintenance, and Provisioning (OAM&P) for internetwork connections employing Common Channel Signalling (CCS) based on Signalling system Number 7 (SS7) protocol used in North America. This standard presents principles, specifies requirements, describes architectures and protocol procedures, and identifies strategies for performance of OAM&P functions, including compatibility verification and gateway screening. It identifies procedures, actions, and responsibilities for performance of functions for management of network interconnections.

ANSI/ATIS 0300230-2015, Telecommunications Charge Card and Billed Number Screening Validation Message Components

This standard applies to telecommunications charge card (aka “calling card”) and billed number screening validation messages for use within the North American telecommunications interchange environment. The use of validation systems and networks also involves appropriate agreements between card issuers and service providers.

ANSI/ATIS 0300232-2012 (R2017), Human-to-Machine Interface Specification for Telecommunications Management

This standard provides general design information related to the Human Machine Interface (HMI). In the language of the Telecommunications Management Network (TMN), this interface was called the G Interface. The ITU-T standardized three important aspects of the HMI. This document provides a pointer to these standards and other information.

ANSI/ATIS 0300234-2000 (S2015), Signalling System Number 7 (SS7) - MTP Levels 2 and 3 Compatibility Testing

This standard addresses the testing requirements for internetwork connections employing Common Channel Signalling (CCS) based on Signalling System No. 7 (SS7) protocol used in North America. The internetwork connection may be either within or between North American countries. This standard provides a list of test scripts for testing compatibility between the interconnecting networks of the Message Transfer Part (MTP), level 2 and level 3, of the SS7 protocol. MTP level 1 tests are not included here because they are transmission tests in nature and not related to the SS7 protocol.

ANSI/ATIS 0300235-2000 (S2015), Signalling System 7 (SS7) - SCCP Class 0 Compatibility Testing

This standard addresses the testing required for internetwork connections employing Common Channel Signalling (CCS) based on Signalling System No. 7 (SS7) protocol used in North America. The internet work connection may be either within or between North American countries. This standard provides a list of test scripts for testing compatibility between the interconnecting networks of the Signalling Connection Control Part (SCCP) Class 0 of the SS7 protocol. This standard references material in SS7 protocol standards. (See clause 2.)

ANSI/ATIS 0300236-2005 (S2016), Signaling System 7 (SS7) - ISDN User Part Compatibility Testing

This standard addresses the testing required for internetwork connections employing Common Channel Signalling (CCS) based on Signaling System No. 7 (SS7) protocol used in North America. The internetwork connection may be either within or between North American countries. This standard provides a list of test scripts for testing compatibility between the interconnecting networks of the ISDN User Part (ISUP) of the SS7 protocol used for call control and circuit supervision.


This standard is one of a series of standards describing the model, protocol profile, and communications capabilities in support of management, protocol profile, and communications capabilities in support of management and maintenance functions to be provided at the ISDN user-network interface. This standard describes the protocol profile employed in providing management information transfer capabilities at the ISDN user-network interface.

ANSI/ATIS 0300241-1994 (S2015), Integrated Services Digital Network (ISDN) Management - Service Profile Verification and Service Profile Management - ISDN Interface Management Services

This standard is one of a series describing the model, protocol profile, and the communications capabilities in support of management and maintenance functions to be provided at the ISDN user-network interface. This standard provides requirements for the reading and writing of ISDN service profile information in an ISDN switch directly from ISDN terminal Equipment. These capabilities provide for some real-time customer network management capabilities.

ANSI/ATIS 0300251-2017, Codes for Identification of Service Providers for Information Exchange

This standard provides the specifications and characteristics of codes used to represent service providers. Its intended use is to provide a standard that facilitates information exchange among humans and machines.
ANSI/ATIS 0300253-2016, Structure for the Representation of Location Entities for Information Exchange

This standard defines the format and structure of data elements and the overall code necessary to provide a form of identification of location entities for the purpose of efficient information exchange. It also provides for instances of codes to represent geographical locations (e.g. cities, towns, and communities) within the states and territories of the United States and the provinces and territories of Canada, as well as in other countries and unique designations. This standard also provides information for the assignment of these codes. The provision of instances of the remaining data elements in the overall location code is also described.

ANSI/ATIS 0300264-2010 (R2015), Alarm Surveillance in a Telecommunications Management Network (TMN)

Alarm Surveillance is the set of functions that enables the monitoring or interrogation (or both) of the telecommunications network concerning alarm-related events or conditions. This standard provides a description of the functions, management information, services, functional units, and protocols related to Alarm Surveillance.

ANSI/ATIS 0300259-2006 (S2016), Structure and Representation of Trace Message Formats for Information Exchange

This Standard provides the specifications for trace message formats. Standard contains sections that cover its purpose and scope, and describe data elements, code structures, and applications. Also contains definitions and references.


This standard contains a set of baseline security requirements for the management plane. The requirements outlined in this standard allow equipment/system suppliers, government departments and agencies, and service providers to implement a secure telecommunications management infrastructure. Contains information formerly included in ATIS-0300233.004, OAM&P - Security Framework for Telecommunications Management Network (TMN) Interfaces which has been withdrawn.

ANSI/ATIS 0500019-2010 (R2015), Request for Assistance Interface (RFAI) Specification

This ATIS Standard defines the Request For Assistance Interface (RFAI) between the Emergency Services Next Generation Network (ES-NGN) and a Public Safety Answering Point (PSAP). Initially, Requests for Assistance are emergency voice calls and RFAI defines the foundation for supporting future types of Requests for Assistance. The RFAI specification may be used by PSAP CPE vendors and Network Equipment Providers that are implementing IP-based solutions as part of the transition and evolution to the Next Generation 9-1-1 emergency services (NG9-1-1).

ANSI/ATIS 0600003-2007 (R2012), Battery Enclosure and Rooms/Areas

The purpose of this standard is to develop industry-wide requirements including methods and procedures for the control of battery room and enclosure environments. This includes adequate ventilation of battery-generated gases, the dissipation of battery-generated heat, the control of room and enclosure temperature, the management of battery electrolyte spills, and in general the control of any contaminates within the battery room or enclosure.

ANSI/ATIS 0600004-2006 (R2011), Equipment Surface Temperature

This standard sets forth the test methods and temperature limits for verifying surface temperatures of network telecommunications equipment. High exterior temperatures of exposed surfaces on equipment may cause injury or accidents to personnel working with or around the equipment.

ANSI/ATIS 0600005-2006 (R2011), Acoustic Measurement

Acoustic noise from telecom equipment adds to regulated environmental noise. This standard provides measurement methods for acoustic noise that are accurate and repeatable. Emission limits are set in units of sound power for equipment installed in temperature-controlled environments.

ANSI/ATIS 0600010.01-2017, Temperature, Humidity, Altitude, and Salt Fog

Requirements for Network Telecommunications Equipment Utilized in Outside Plant Environments

This standard covers the minimum temperature, humidity, and altitude criteria for telecommunications network equipment to be installed and utilized by service providers in outside plant (OSP) environments. These environments include those in OSP cabinets enclosure, pedestals, etc.

ANSI/ATIS 0600010.02-2012 (R2017), Equipment Handling, Transportation Vibration, and Rail Car Shock Requirements for Network Communications Equipment

This standard specifies covers the minimum equipment handling, transportation vibration, and rail car shock criteria for communications equipment. It is the intent of this standard to utilize the latest versions of ATIS standards that are referenced. It is also the intent to utilize (where appropriate) newer versions of other standards or documents that are referenced provided they do not conflict with the intent of this standard.

ANSI/ATIS 0600010.03-2011 (R2016), Heat Dissipation Requirements for Network Telecommunications Equipment

The purpose of this Standard is to provide the methods for the measurement of the heat release and to quantify/define airflow characteristics of telecommunications equipment. This Standard may assist in the efficient design and deployment of a telecommunications facility.

ANSI/ATIS 0600010.04-2017, Operational Vibration Requirements for Communications Equipment

This standard specifies covers the minimum operational vibration criteria for communications equipment. It is the intent of this standard to utilize the latest versions of ATIS standards that are referenced. It is also the intent to utilize (where appropriate) newer versions of other standards or documents that are referenced provided they do not conflict with the intent of this standard.

ANSI/ATIS 0600015.01-2014, Energy Efficiency for Telecommunication Equipment: Methodology for Measurement and Reporting -- Server Requirements

This document defines how to measure the Telecommunications Energy Efficiency Ratio (TEER) of a server or server blade. The standard will also provide requirements for how equipment vendors shall respond to a TEER request based on a specific application description by making use of relevant data from internal and independent test reports.


This document specifies the definition of Transport and optical access products and systems as well as a methodology to calculate the Telecommunication Energy Efficiency Ratio (TEER) of a transport or optical access system or network configuration. The standard will also provide requirements for how equipment vendors shall respond to a TEER request based on a specific application description by making use of relevant data from internal and independent test reports.

ANSI/ATIS 0600015.03-2016, Energy Efficiency for Telecommunication Equipment: Methodology for Measurement and Reporting for Router and Ethernet Switch Products

This document defines the definition of router and Ethernet switch products based on their position in a network, as well as a methodology to calculate the Telecommunication Energy Efficiency Ratio (TEER). The standard will also provide requirements for how equipment vendors shall respond to a TEER request based on a specific application description by making use of relevant data from internal and independent test reports.


This document defines how to measure the Telecommunication Energy Efficiency Ratio (TEER) of DC Power Plant Rectifiers. The standard also provides requirements for how equipment vendors shall respond to a TEER request based on a specific application description by making use of relevant data from internal and independent test reports.
ANSI/ATIS 0600015.08-2014, Small Networking Devices Efficiency Standard
This document specifies the definition of router and Ethernet switch products based on their position in a network, as well as a methodology to calculate the Telecommunication Energy Efficiency Ratio (TEER). The standard will also provide requirements for how equipment vendors shall respond to a TEER request based on a specific application description by making use of relevant data from internal and independent test reports.

ANSI/ATIS 0600015.09-2015, Energy Efficiency for Telecommunication Equipment: Methodology for Measurement and Reporting of Base Station Metrics
The Base Station Input Power Metric is reported in Watts and is based on radio resource usage. The metric is obtained with the base station placed in a static operating state and does not take into account changing environmental conditions such as mobility, fading and traffic demands.

This document defines how to measure the Telecommunication Energy Efficiency Ratio (TEER) of Telecom Inverters for use in DC Power Plant configurations. The standard will also provide requirements for how equipment vendors shall respond to a TEER request based on a specific application description by making use of relevant data from internal and independent test reports.

This document defines how to measure the Telecommunication Energy Efficiency Ratio (TEER) of DC/DC Converters. The standard also provides requirements for how equipment vendors shall respond to a TEER request based on a specific application description by making use of relevant data from internal and independent test reports.

This document provides the methodology to be used by vendors and third party independent laboratories in the formation of telecommunications energy efficiency ratios for various typical operating modes of UPS systems. The requirements and definitions in this document are for UPS systems that are deployed in the information and communications technology industry.

Wi-Fi access points are widely used by enterprises and service providers to give local wireless access to employees and customers. Current tendencies will increase deployment of access points in the near future. Therefore, a well-defined and industry accepted energy efficiency evaluation for that group of networking products becomes an urgent task.

ANSI/ATIS 0600026-2010 (R2015), Network End POTS Splitter Requirements
This Standard is for Network Equipment Facility Splitters. These splitters are used by service providers to protect voice-grade services when high-speed digital services (e.g., ADSL, ADSL2plus, VDSL, and VDSL2) are deployed on the same copper pair. The Network End POTS Splitter is used on the network side of the local loop.

ANSI/ATIS 0600028-2016, DC Power Wire and Cable for Telecommunications Power Systems - for XHHW and DLO/Halogenated RHW-RHH Cable Types
This document describes standard dimensions and testing for XHHW and DLO type wires to be used for telecommunications power and grounding as an alternative to RHW-RHH cable described in ATIS-0600017.

ANSI/ATIS 0600030-2016, Line Powering of Telecommunications Equipment on Outside Plant (OSP) Twisted Copper Pair Loops
There are various standards that define telecommunications line-powering voltage limits, power limits, and safety-related precautions. This standard attempts to bring all those requirements into one document. This standard also addresses performance of line-powering systems in fault conditions and provides manufacturers, installers, and users of line power systems with a consistent fault condition testing and recording method. The fault current levels determined through this analysis can be compared to standards IEC 60479-1, Effects of Current on Human Beings and Livestock, Part 1 and IEC 60479-2, Effects of Current on Human Beings and Livestock, Part 2.

ANSI/ATIS 0600107-2002 (S2015), Digital Hierarchy - Formats Specifications
This standard specifies digital hierarchy format requirements. This standard is intended to be used in conjunction with the American National Standard for Telecommunications - Digital Hierarchy - Electrical Interfaces, T1.102-1993 (R1999). Compliance with this standard is necessary if the various networks that comprise the hierarchy are to be interconnected. Since this is an interconnect specification, no equipment design requirements are provided. Such requirements, and additional format specifications enabling end-to-end communication between terminals, will be found in the appropriate equipment specifications.

ANSI/ATIS 0600107.a-2005 (S2015), Digital Hierarchy - Formats Specification (Virtual Concatenation and LCAS) (Supplement to ATIS-0600107)
This supplement to ATIS-0600107.2002(R2006), Digital Hierarchy - Format Specifications, adds the virtual concatenation applications for DS1 and DS3 signals.

This Standard addresses the installation of dc power systems within controlled or limited access areas that convert commercial ac to dc voltages of 160 volts or less and those that convert from one dc level to another of 160 volts or less.

ANSI/ATIS 0600315-01-2015, Voltage Levels for 380V DC-Powered Equipment Used in the Telecommunications Environment
This standard establishes requirements and test procedures for voltage ranges and characteristics associated with the 380V DC input voltage of telecommunications equipment powered from dc power systems in the telecommunications environment.

ANSI/ATIS 0600318-2016, Electrical Protection Applied to Telecommunications Network Plant at Entrances to Customer Structures or Buildings
This standard establishes minimum electrical protection requirements intended to mitigate the disruptive and damaging effects of lightning and ac power faults at telecommunications network entrances to customer structures or buildings. Disturbances from lightning and ac power line faults may be disruptive to telecommunications service and may also result in damage to the telecommunications plant and equipment.

ANSI/ATIS 0600320-2015, Above-Baseline Electrical Protection for Designated Telecommunications Central Offices and Similar-Type Facilities Against High-Altitude Electromagnetic Pulse (HEMP)
This above-baseline standard applies to central offices and similar-type facilities in public telecommunications network in which a special measure of resistance to damage from high-altitude electromagnetic pulse (HEMP) is desired.

ANSI/ATIS 0600321-2015, Electrical Protection for Network Operator-Type Equipment Positions
This standard addresses electrical protection at new installations of network operator-type equipment positions, and at buildings housing such positions. Electrical disturbances may appear at network operator-type equipment positions arising either from Electrostatic Discharge (ESD), or from other sources that are internal or external to the building containing these positions, such as lightning or ac power disturbances.
ANSI/ATIS 0600331-2015, Description of Above-Baseline Physical Threats to Telecommunications Links
This standard describes and defines above-baseline physical threats to telecommunications links. It does not provide mitigating measures against stresses resulting from the threats. However, this standard does serve as a foundation to build specifications for concrete mitigating measures as needs arise. Such measures depend on specific stresses and are developed on a case-by-case basis. Because these are above-baseline threats, the stresses, application and methodology to mitigate them shall be negotiated by the service requester with each individual carrier.

ANSI/ATIS 0600332-2015, Electrical Protection of Network-Powered Broadband Facilities
This standard provides the minimum electrical protection requirements intended to mitigate the disruptive and damaging effects of lightning and ac power faults to broadband facilities. Disruptions from lightning and ac power line faults may be disruptive to broadband service and may also result in damage to the broadband plant and equipment.

ANSI/ATIS 0600336-2015, Design Requirements for Universal Cabinets and Framework
This standard, when used with established sheet metal manufacturing practices, sets forth-dimensional parameters, performance requirements, and acceptance criteria for the manufacture and availability of equipment frames for housing electronic equipment as used in the telecommunications networks.

ANSI/ATIS 0600337-2016, Requirements for Universal Cabinets and Framework
Network powering of transport systems requires higher levels of voltage and current to efficiently and effectively provide quality broadband services at increased distances over network telecommunications plant. However, network-power transport systems designers must also consider the electrical environment that is created by the introduction of these voltages and currents into network and customer premises telecommunications facilities.

ANSI/ATIS 0600338-2016, Electrical Coordination of Primary and Secondary Surge Protection for Use in Telecommunications Circuits
Many types of communications devices contain secondary surge protection devices either integral to their designs or placed near the protected equipment. External primary surge protection devices, typically placed where the outside plant enters a structure, are normally used to prevent excessive currents and voltages from entering the structure or equipment, where they could cause injury or damage. This standard addresses the proper electrical coordination of primary and secondary surge protection devices.

ANSI/ATIS 0600401.01-2000 (S2015), Network to Customer Installation Interfaces - Analog Voicegrade Switched Access Lines Using Loop-Start and Ground-Start Signaling
This standard provides requirements for loop-start and ground-start signaling for the analog voicegrade interface between carrier switched access lines and customer installations. These requirements are intended to assist carrier, manufacturers, and users of products to be used in the switched network to understand the characteristics of the existing networks. This standard is a revision and compilation of T.401-1990 and its supplements T.401a-2000 and T.401b-2002, which it replaces in its entirety.

ANSI/ATIS 0600401.02-2000 (S2015), Network to Customer Installation Interfaces - Analog Voicegrade Switched Access Lines with Distinctive Ringing Features
This standard provides the signaling requirements associated with Distinctive Alerting features on analog switched access lines when network started or ground-start signaling when the network provides this capability. Requirements are specified at the interface between telecommunications carriers and customer installation wiring and equipment. This standard is intended to be used in conjunction with American National Standard for Telecommunications - Network-to-Customer Installation Interfaces - Analog Voicegrade Switched Access Lines Using Loop-Start and Ground-Start Signaling, ATIS-0600401.2000 (R2005).

ANSI/ATIS 0600401.03-1998 (S2015), Network to Customer Installation Interfaces - Analog Voicegrade Switched Access Lines with Calling Number Delivery, Calling Name Delivery, or Visual Message-Waiting Indicator Features
This standard provides the signaling and data transmission requirements associated with the Calling Number Delivery (CND), Calling Name Delivery (CNAM), and Visual Message-Waiting Indicator (VMWI) features when one or more of these features are provided on an analog voicegrade switched access line. When the network provides the CND feature, the CNAM feature, or both the CND and CNAM features, an on-hook customer installation (CI) receives analog frequency-shift-keying (FSK) data messages that identify the caller’s number, the caller’s name, or both the caller’s number and name.

ANSI/ATIS 0600401.04-2000 (S2015), Network and Customer Installation Interfaces - Analog Voicegrade Switched Access Lines with the Call Waiting, Distinctive Call Waiting, or Calling Identity Delivery on Call Waiting Feature
This standard provides the signaling and data transmission requirements associated with Call Waiting (CW), Distinctive Call Waiting (DCW), and Calling Identity Delivery on Call Waiting (CIDCW) features on analog voicegrade switched access lines. When the network provides the CW or DCW feature, a customer installation (CI), while off-hook on an existing call, receives a CW alerting tone or a DCW alerting tone pattern when an incoming call is waiting to be answered.

ANSI/ATIS 0600403.01-1999 (S2015), Network and Customer Installation Interfaces - DS1 Electrical Interfaces
This standard specifies a DS1-rate electrical interface at the network interface (NI) between the network and a customer installation (CI). It establishes requirements at the NI necessary for compatible operation between a network and the CI. This standard specifies a basic DS1 interface, and provides criteria that is common to a set of standard, the ATIS-0600403 series, which define specific DS1 applications.

ANSI/ATIS 0600403.02-1999 (S2015), Network and Customer Installation Interfaces - DS1 Primary Rate Layer 1 Electrical Interfaces Specification
This standard provides the requirements for DS1 primary rate electrical interface specifications for a network to customer installation and between various customer premises equipment. Requirements include electrical characteristics, format parameters and physical characteristics. This standard provides interface compatibility information and is not meant to be an equipment specification.

ANSI/ATIS 0600403.03-1999 (S2015), Network and Customer Installation Interfaces - DS1 - Robbed-Bit Signaling State Definitions
This standard is a revision of the robbed-bit signaling information in ATIS-0600403.1999(R2007), and replaces annex C of that standard in its entirety. This standard provides NI compatibility information and is not meant to be an equipment specification.
ANSI/ATIS 0600403.02-a-2001 (S2015), Supplement to ATIS-0600403.02.1999(R2005) - Network and Customer Installation Interfaces - DS1 Robbed-bit Signaling State Definitions

This supplement renames Annex A, Bibliography, of ATIS-0600403.02.1999(R2005) as Annex B, adds several references to renamed Annex B, and adds a new Annex A (informative) on V.90 modem compatibility.

ANSI/ATIS 0600403.03-2002 (S2015), Network and Customer Installation Interfaces - DS1 Physical Layer Interface and Mapping Specifications for ATM Applications

This standard is a revision of the DS1 information relating to the transport of ATM payloads in T1.646 -1995 and replaces the relevant clauses of the standard in their entirety. This standard provides NI compatibility information and is not meant to be an equipment specification.

ANSI/ATIS 0600403.a-2001 (S2015), Supplement to ATIS-0600403.1999(R2007) - Network to Customer Installation Interfaces - DS1 Electrical Interfaces

This supplement adds a transverse balance requirement, an associated test figure, a related normative reference and an informative annex to ATIS-0600403.1999(R2007).

ANSI/ATIS 0600403.b-2002 (S2015), Supplement to ATIS-0600403.1999(R2007) - Network and Customer Installation Interfaces - DS1 Electrical Interface

This supplement replaces Annex E of ATIS-0600403.1999(R2007) in its entirety. The replacement clarifies, but does not change, the requirements of Annex E.

ANSI/ATIS 0600404-2002 (S2015), Network and Customer Installation Interfaces - DS3 and Metallic Interface Specification

This standard describes network and customer installation DS3 metallic interfaces. Requirements on DS3 electrical parameters, basic framing format, M23 multiplex and C-Bit Parity applications, and physical signal characteristics are included or referenced.

ANSI/ATIS 0600404.01-2002 (S2015), Network and Customer Installation Interfaces - DS3 Physical Layer Interface and Mapping Specifications for ATM Applications

This standard is a revision of the DS3 information relating to the transport of ATM payloads in T1.646 -1995 and replaces the relevant clauses of that standard in their entirety. This standard provides NI compatibility information and is not meant to be an equipment standard.

ANSI/ATIS 0600404.a-2005 (S2015), Supplement to T1.404-2004, Network and Customer Installation Interfaces - DS3 Metallic Interface Specification

This supplement adds an optional method for using inband signals to activate and deactivate a line loopback at a carrier provided NIU in M23 applications.

ANSI/ATIS 0600405-2002 (S2015), Network and Customer Installation Interfaces - Direct Inward Dialing Analog Voicemail Switched Access Using Loop Reverse-Battery Signaling

This standard provides requirements for the Network-to-Customer Installation interface for Direct Inward Dialing analog voicemail switched access using loop reverse-battery signaling with a customer-installation-provided battery source. These requirements are intended to assist carriers, manufacturers, and users of products to be used in or connected to a switched network to understand the parameters of the existing networks. This revision replaces T1.405-1996 in its entirety.

ANSI/ATIS 0600407-2002 (S2015), Network-to-Customer Installation Interfaces - Analog Voicemail Special Access Lines Using Customer-Installation-Provided Loop-Start Supervision

This standard provides signaling requirements for the interface between telecommunication networks and customer installations where the customer installation provides loop-start supervision. These requirements are intended to assist network operators, manufacturers, and users of products to be used with telecommunication networks to understand the parameters of the existing networks.

ANSI/ATIS 0600409-2002 (S2015), Network and Customer Installation Interfaces - Analog Voicemail Special Access Lines Using E&M Signaling

This standard provides signaling requirements for the analog voicemail interface between telecommunication carriers and customer installations where E&M signaling is used across the interface. These requirements are intended to assist carriers, manufacturers, and users of products to be used with telecommunication networks to understand the parameters of the existing networks.

ANSI/ATIS 0600410-2001 (S2015), Network-to-Customer Electrical Interface - Digital Data at 64 kbit/s and Subrates

This standard provides the requirements for a Network-to-Customer Installation (CI) synchronous digital data at 64 kbit/s and subrates electrical interface, referred to as the Network Interface (NI). Requirements include electrical characteristics, format parameters, and physical characteristics. This standard provides interface compatibility information and is not meant to be an equipment specification.

ANSI/ATIS 0600411-2001 (S2015), Network-to-Customer Installation Interfaces - Analog Voicemail Enhanced 911 Switched Access Using Network-Provided Reverse-Battery Signaling

This standard provides analog interface requirements for the interconnection of Customer Installations (CIs), such as Private Branch Exchanges, to Enhanced 911 systems. The analog interface allows the CI to transmit the caller’s emergency service identification information to an Enhanced 911 system in applications where multiple terminals share Enhanced 911 switched access.


This standard establishes common criteria for Synchronous Optical NETwork (SONET) interfaces at standard rates associated with the Network Interface (NI). Criteria covered in this standard include maintenance and operation functionality at the SONET Section, Line and Path layers, and other necessary criteria for compliance with the proper interfacing of the connecting customer installation equipment. Compliance with this standard is intended to ensure compatibility at the SONET NI and should not be construed as a constraint on the internal operations of the network or customer installation equipment.

ANSI/ATIS 0600416.01-1999 (S2015), Network to Customer Installation Interfaces - Synchronous Optical NETwork (SONET) Physical Media Dependent Specification: Multi-Mode Fiber

This standard establishes physical media dependent (PMD) specifications for Multi-Mode Fiber Synchronous Optical NETwork (SONET) network to customer installation interfaces. Criteria covered herein include SONET PMD criteria (such as optical parameters and connectors), and other necessary criteria for compliance with the optical specification at the NI and the proper interfacing of the connecting customer installation equipment. Compliance with this standard is intended to ensure compatibility at the SONET NI and should not be construed as a constraint on the internal operations of the network or customer installation equipment.


This standard provides Physical Media Dependent (PMD) specifications for Single Mode Fiber Synchronous Optical NETwork (SONET) network to customer installation interfaces. Criteria is given for standard rates associated with the Network Interface (NI). Criteria covered herein include SONET PMD criteria (such as optical parameters and connectors), and other necessary criteria for compliance with the optical specification at the NI and the proper interfacing of the connecting customer installation equipment.

ANSI/ATIS 0600416.02a-2001 (S2015), Supplement to ATIS-0600416.02.1999(R2005) - Network to Customer Installation Interfaces - Synchronous Optical NETwork (SONET) Physical Media Dependent Specification: Single Mode Fiber

This supplement corrects references to other members of the ATIS-0600416 family of standards that are listed in the Foreword and in the Scope.
ANSI/ATIS 0600416.03-1999 (S2015), Network to Customer Installation Interfaces - Synchronous Optical Network (SONET) Physical Media Dependent Specification: Electrical

This standard establishes physical characteristics and technical criteria for Synchronous Optical Network (SONET) interfaces, at standard rates, associated with the Network Interface (NI) for electrical interface applications. Criteria covered herein include SONET Physical Media Dependent (PMD) criteria (such as electrical parameters and connectors), and other necessary criteria for compliance with the electrical specification at the NI and the proper interfacing of the connecting customer installation equipment.

ANSI/ATIS 0600416.04-2005 (S2015), Network and Customer Installation Interfaces - SONET Physical Layer Interface and Mapping Specifications for ATM Applications

This standard is a revision of the SONET information relating to the transport of ATM payloads in T1.646-1995 and T1.646a-1997 and replaces the relevant clauses of those standards in their entirety. This standard provides NI compatibility information and is not meant to be an equipment specification.

ANSI/ATIS 0600417-2003 (S2015), Spectrum Management for Loop Transmission Systems

This standard provides spectrum management requirements and recommendations for the administration of services and technologies that use metallic subscriber loop cables. Spectrum management is the administration of the loop plant in a way that provides spectral compatibility for services and technologies that use pairs in the same cable.

ANSI/ATIS 0600418-2002 (S2015), High bit rate Digital Subscriber Line - 2nd Generation (HDSL2/HDSL4) Issue 2

This standard presents the electrical characteristics of the High bit rate Digital Subscriber Line - Second Generation (HDSL2) signals appearing at the network and remote ends of the twisted-wire pair line. The transport medium for the signals is a single twisted-wire pair or two twisted-wire pairs (HDSL4) that supports full-duplex transmission with a payload of 1.544 Mbps. This interface standard provides the minimum set of requirements for satisfactory transmission between the network and the remote installation. Equipment 5 be implemented with additional functions and procedures

ANSI/ATIS 0600418.a-2004 (S2015), High bit rate Digital Subscriber Line - 2nd Generation (HDSL2/HDSL4), Issue 2

This supplement provides an enhancement to ATIS 0600418.2002(R2006) to clarify the operation of the Embedded Operations Channel (EOC) for HDSL2 and HDSL4 equipment.

ANSI/ATIS 0600421-2001 (S2015), In-Line Filter for Use with Voiceband Terminal Equipment Operating on the Same Wire Pair with High Frequency (up to 12 MHz) Devices

This standard presents the electrical and physical characteristics of an In-Line filter (initially, and sometimes still, called a micro-filter), that is used to protect voiceband premises equipment from the high frequencies of digital data over voice services in the 25 kHz to 12 MHz range. It is also used to protect data over voice services from impedance changes and other detrimental impairments caused by voiceband equipment. Applications such as alarm systems and series stacking are beyond the scope of this standard.

ANSI/ATIS 0600422-2001 (S2015), Single-Pair High-Speed Digital Subscriber Line (SHDSL) Transceivers

This standard specifies ITU-T Recommendation G.991.2, Single-Pair High-Speed Digital Subscriber Line (SHDSL) Transceivers as a normative reference and identifies the requirements in ITU-T G.991.2 that are different in the United States.

ANSI/ATIS 0600423-2001 (S2015), Asymmetric Digital Subscriber Line (ADSL) Transceivers Based on ITU-T Recommendation G.992.1

This standard specifies ITU-T Recommendation G.991.2, Asymmetric Digital Subscriber Line (ADSL) Transceivers as a normative reference and identifies the requirements in ITU-T G.991.2 that are different in the United States. This standard does not replace T1.413-1998, Network and Customer Installation Interfaces - Asymmetric Digital Subscriber Line (ADSL) Metallic Interface, and will co-exist with it.

ANSI/ATIS 0600424-2004 (S2015), Interface Between Networks and Customer Installation Very-high-bit-rate Digital Subscriber Lines (VDSL) Metallic Interface (DMT based)

This American National Standard contains the technical requirements for Very-high-bit-rate Digital Subscriber Line (VDSL) transceiver systems. VDSL transceivers are intended for very high speed data transmission up to tens of Megabits per second over existing copper wires in the telephone access network. As specified in this Standard, VDSL 5 use wireline spectrum up to 12MHz to accommodate both symmetrical and asymmetrical data rates. It can be deployed to ser end-use customers from different points to access network, including Exchange and Cabinet.

ANSI/ATIS 0600426-2004 (S2015), Enhanced Single-Pair High-Speed Digital Subscriber Line (E-SHDSL) Transceivers

This standard specifies ITU-T Recommendation G.991.2, Single-Pair High-Speed Digital Subscriber Line (SHDSL) Transceivers as a normative reference and identifies the requirements in ITU-T G.991.2 that are different in North America. This standard specifies the requirements for a transmission system providing symmetric payload data rates up to 5696 kbit/s.

ANSI/ATIS 0600427.01-2004 (S2015), ATM - Based Multi-Pair Bonding

This document provides requirements for advanced bonding of multiple digital subscriber lines (DSL) to transport ATM streams. The specifications of this standard provide a complete description of startup, operation, and contingency modes of operation, which allows for interoperability between vendors.

ANSI/ATIS 0600427.02-2005 (S2015), Ethernet-based Multi-Pair Bonding

This standard specifies portions of Clause 61 of IEEE Standard 802.3ah-2004, Amendment to Carrier Sense Multiple Access with Collision Detection (CSMA/CD) access method and physical layer specification as a normative reference, and identifies the requirements for Ethernet multi-pair bonding in IEEE 802.3ah-2004 that are different in the United States. Further, this standard specifies the requirements for extending the multi-pair bonding methods of IEEE 802.3ah-2004 to xDSL technologies other than VDSL and SHDSL.

ANSI/ATIS 0600427.03-2004 (S2015), Multi-Pair Bonding Using Time Division Inverse Multiplexing

This document is a detailed specification of the TDIM protocol in sufficient detail to allow development and testing of interoperable implementations for both transmitter and receiver. It includes a Multi-pair synchronization frame format, Bonding Communication Channel (BCC), Byte oriented Dispatching, Hitless addition and removal of pairs, Fast removal of pair upon pair failure, using IEEE 802.3ah (EFM) handshake for pair discovery, parameter negotiation and setup, and an Optional FEC and Interleaver.

ANSI/ATIS 0600601-1999 (S2015), Integrated Services Digital Network (ISDN) - Basic Access Interface for Use on Metallic Loops for Application on the Network Side of the NT (Layer 1 Specification)

This interface standard was written to provide the minimal set of requirements to provide for satisfactory transmission between the network and the NT, while conforming, wherever possible with the International Telecommunication Union - Telecommunication Standardization Sector (ITU-T) Recommendations, and while not compromising the principles of evolution expressed therein.


This standard presents the electrical characteristics of the Integrated Services Digital Network (ISDN) Basic Access signals appearing at the S and T reference points. It also describes physical interface between a TE and an NT. This interface standard was written to provide the minimal set of requirements to provide for satisfactory transmission between a TE and an NT. Equipment 5 be implemented with additional functions and procedures.
ANSI/ATIS 0600605-1991 (S2015), Integrated Services Digital Network (ISDN) - Basic Access Interface for S and T Reference Points (Layer 1 Specification)

This standard presents the electrical characteristics of the Integrated Services Digital Network (ISDN) Basic Access signals appearing at the S and T reference points. It also describes physical interface between a TE and an NT. This interface standard was written to provide the minimal set of requirements to provide for satisfactory transmission between a TE and an NT. Equipment should be implemented with additional functions and procedures.

ANSI/ATIS 0700004-2007 (S2017), High Capacity - Spatial Division Multiple Access (HC-SDMA) Radio Interface Standard

The HC-SDMA interface provides wide-area broadband wireless data-connectivity for fixed, portable, and mobile computing devices and appliances. The protocol is designed to be implemented with smart antenna array techniques to substantially improve radio frequency (RF) coverage, capacity and performance for the system.

ANSI/ATIS 0700703-1995 (R2015), Allocation of Letters to the Keys of Numeric Keypads for Telecommunications

This standard provides a mapping of the 26 letters of the Latin alphabet to the keys of a numeric keypad for telecommunications.

ANSI/ATIS 0700714-2000 (R2015), Stage 2 Service Description for Personal Communications Service - Enhanced Priority Access and Channel Assignment (PACA-E) Supplementary Service

This standard defines and describes the stage 2 description for the Enhanced Priority Access and Channel Assignment (PACA-E) service to support call set-up requests invoked by authorized PACA-E subscribers (access) and call completion to a PACA-E subscriber (egress). PACA-E requires modifications to basic PCS call set-up procedures in order to provide priority, by queuing, of the assignment of radio channel resources involved in call origination from a PACA-E subscriber (priority access) and, separately, call delivery to a PACA-E subscriber (priority egress).

ANSI/ATIS 0900102-1993 (S2015), Digital Hierarchy - Electrical Interfaces

This revised standard describes the electrical interfaces for the DS1, DS1c, DS2, and DS3 levels of the North American digital telecommunications hierarchy. Compliance with this standard is necessary to achieve satisfactory interworking of the telecommunications network.

ANSI/ATIS 0900105-2015, Synchronous Optical Network (SONET) - Basic Description Including Multiplex Structure, Rates, and Formats

The purpose of this standard is to specify the multiplexing format and basic overhead definitions for the Synchronous Optical Network (SONET) signal. Other standards in the ATIS-0900105.2008 series build upon this base document by providing additional detailed information about other, specific aspects of SONET.

ANSI/ATIS 0900105.01-2000 (S2015), Synchronous Optical Network (SONET) - Automatic Protection Switching

The purpose of this standard is to establish specification for the automatic protection switching of optical facilities using the interface standard specified in ATIS-0900105. This standard defines the contents of the Automatic Protection Switching (APS) bytes within the SONET signal.

ANSI/ATIS 0900105.02-2007 (S2017), Synchronous Optical Network (SONET) - Payload Mappings

The purpose of this standard is to specify the mapping of payload signals into SONET signals, described in ATIS-0900105. These payload signals include time division multiplexed signals such as those from the asynchronous digital hierarchy described in ATIS-0600107, and packet-or cell-oriented payload data.

ANSI/ATIS 0900105.04-1995 (S2015), Synchronous Optical Network (SONET) - Data Communication Channel Protocol and Architectures

The purpose of this standard is to establish specifications for the data communications channels within facilities using the interface standard specified in ANSI T1.105-1995. This standard defines the protocols and architectures for data communications using the DCC bytes within the SONET signal. These DCC bytes carry the OAM&P information between network elements and can be used as an integral part of the overall Telecommunications Management Network (TMN).

ANSI/ATIS 0900105.05-2002 (S2015), Synchronous Optical Network (SONET): Tandem Connection Maintenance

The purpose of this standard is to establish specifications for Tandem Connection Monitoring using the optical interface standard specified in ATIS-0900105. This standard defines the contents and use of the Tandem Connection Monitoring bytes within the SONET signal. Tandem Connection Monitoring provides enhanced maintenance capabilities for certain SONET applications.

ANSI/ATIS 0900105.06-2002 (S2015), Synchronous Optical Network (SONET): Physical Layer Specifications

This standard provides the necessary parameters for SONET optical links in short reach, intermediate reach, and long reach applications. It also provides references for the necessary parameters in SONET electrical links.

ANSI/ATIS 0900414-2012 (R2017), Network to Customer Installation Interfaces - Enhanced 911 Analog Voicegrade PSAP Access Using Loop Reverse-Battery Signaling

This standard provides network-to-customer installation (CI) interface requirements for the connection of a Public Safety Answering Point (PSAP) CI to a network providing access to an Enhanced 911 switching system. The inter-face uses loop reverse-battery signaling with a CI-provided battery source. The inter-face allows users of the Enhanced 911 system to communicate with the PSAP CI and allows the Enhanced 911 system to transmit the caller’s emergency service identification (CESID) information to the PSAP CI.

ANSI/ATIS 1000006-2005 (R2015), Signalling Systems No. 7 (SS7) - Emergency Telecommunications Service (ETS)

This document builds upon the High Probability of Completion (HPC) Network Capability as described in T1.631-1993 (R1999). The ETS service is expanded to address bearer networks and the ITU-T Recommendation E.1610, International Emergency Preference Scheme for Disaster Relief Operations (IEPS).

ANSI/ATIS 1000007-2006 (S2016), Generic Signaling and Control Plane Security Requirements for Evolving Networks

Many security threats exist to the signaling and control plane of a telecommunications network. In addition, new security threats to the signaling and control plane are being introduced as the network evolves. The purpose of this document is to provide generic signaling and control plane security requirements and a general security framework to mitigate security risks in the evolving telecommunications networks.

ANSI/ATIS 1000008-2006 (S2016), Extensions to the Narrowband Signaling Syntax (NSS) - Syntax Definition

This Standard describes ANSI parameter, field, and field value extensions to the Q.1980, Narrowband Signaling Syntax (NSS) - Syntax Definition, to provide a normalized set of telephone parameters. NSS enables mapping from multiple telephony protocols in use today into a common parameter set.

ANSI/ATIS 1000009-2006 (S2016), IP Network - To Network Interface (NNI) Standard for VoIP

This document defines a standard approach to support IP-IP interconnection for VoIP between carriers.

ANSI/ATIS 1000010-2006 (S2016), Support of Emergency Telecommunications Service ETS in IP Network

This document defines the procedures and capabilities required to support Emergency Telecommunications Service (ETS) within and between Internet Protocol (IP) based service provider networks.
transport security for signalling and OAMP, and options for each selected mechanism. Specifically, packet networks) as defined in ATIS this standard are intended for NGN (i.e., managed identity functions and capabilities are used to increase Next Generation Network (NGN) and its interfaces. IdM This standard provides Identity Management (IdM) that can be used to fulfill the requirements described This standard describes some security mechanisms and procedures defined in the ETS Phase 1 Network Element Requirements for NGN IMS based Deployments standard [ATIS-1000023]. In addition, O&M requirements are specified.

This standard describes Next Generation Network (NGN) signaling support for Operator Regular Intercept Standard This standard describes Next Generation Network (NGN) signaling support for Operator Regular Intercept. The service may be invoked when an NGN caller attempts to set up a call/session to an ‘intercepted number’ where the address of the called party has changed. In the event that the old address has been replaced with multiple new addresses (‘split referral’), interaction with the calling party is required to determine the appropriate new address (‘referral number’).

ANSI/ATIS 100005S-2013, Emergency Telecommunications Service (ETS): Core Network Security Requirements

The integrity, confidentiality and availability of Emergency Telecommunication Service (ETS) in a multi-provider Next Generation Network (NGN) environment will depend on the security of each individual network involved in an end-to-end communication. To allow network provided security of end-to-end ETS communications in a multi-provider environment, intra-network domain and inter-network domain security requirements for ETS protection are needed. This ATIS standard provides a minimum set of common (i.e., independent of network type or technology) and core network security requirements for the protection of ETS in a multi-provider NGN environment.


The integrity, confidentiality and availability of Emergency Telecommunication Service (ETS) in a multi-provider Next Generation Network (NGN) environment will depend on the security of each individual network involved in an end-to-end communication. To allow network provided security of end-to-end ETS communications in a multi-provider environment, intra-network domain and inter-network domain security requirements for ETS protection are needed. This ATIS standard provides a minimum set of requirements for the security protection of NS/EP NGN-PS in LTE Access Networks.


The purpose of this document is to provide operational guidance regarding the assignment and use of the 3GPP LTE specifications for Access Class Barring to support National Security and Emergency Preparedness (NS/EP) Next Generation Network Priority-Services (NGN-PS).

ANSI/ATIS 1000065-2015, ETC EPC Network Element Requirements

To ensure that ETS is implementable and interoperable in a multi-vendor IP environment, there is a need to define the requirements for the Evolved Packet Core (EPC) Network Element Requirements.

ANSI/ATIS 1000066-2016, Emergency Telecommunications Service (ETS) Network Element Requirements for IMS-based Next Generation Network (NGN) Phase 2

This standard specifies Emergency Telecommunications Service (ETS) requirements for an Internet Protocol (IP) Multimedia Subsystem (IMS) Core Network for support of Next Generation Network (NGN) Government Emergency Telecommunications Service (GETS) Voice and NGN GETS Video. These requirements further refine the procedures defined in the ETS Phase 1 Network Element Requirements for NGN IMS based Deployments standard [ATIS-1000023]. In addition, O&M requirements are specified.

ANSI/ATIS 1000067-2015, IP NGN Enhanced Calling Name (eCNAM)

This ATIS standard defines the Calling Name Delivery service in the IMS-based Next Generation Network (NGN) and in the mixed NGN-PSTN environment. The enhanced CNAM service includes additional access protocols, an optional longer name field, and the capability for the network to verify the validity of the received name information.

ANSI/ATIS 1000110-1999 (R2015), Signalling System No.7, General Information

This standard is based on the 1988 Blue Book specification of Signalling System No. 1 (SS7#7) for international use issued by the CCITT Study Group XI (Vol. VI Fascicles VI.7 and VI.8) and is intended to be generally compatible with that standard. It has been appropriately modified for use within and between U. S. networks to meet the anticipated needs and applications of those entities.

ANSI/ATIS 1000111-2005 (R2015), Signalling System Number 7 (SS7) - Message Transfer Part (MTP)

Signalling System Number 7 (SS7) - Message Transfer Part (MTP) - This standard is made up of eight chapters. Chapter T1.111.1 provides the functional description of the Message Transfer Part of Signalling system Number 7 (SS7). Chapter T1.111.2 describes signalling data link to be used for SS7 networks in the United States. Chapter T1.111.3 describes the functions and procedures for, and relating to, the transfer of signalling messages over one signalling data link. In this section, "signal units" of variable lengths are transferred, including control information for proper operation.

ANSI/ATIS 1000112-2005 (R2015), Signalling System Number 7 (SS7) - Signalling Connection Control Part (SCCP)

This recommendation contains a general description for the services provided from the Message Transfer Part (MTP) of Signalling System Number 7 (SS7), the functions within the Signalling Connection Control Part (SCCP), and the resultant services provided for the users of the SCCP.
ANSI/ATIS 1000112.a-2006 (S2016), Subsystem Number Assignment Guidelines

This supplement to ATIS-1000112.2005 reassigns some of the subsystem number code points previously shown as spare to be ANSI Standard. These code points may be used to support applications which require internetwork messaging, but which do not qualify for international standardization. This addendum also provides the administrative procedures for requesting and assigning these subsystem number code points.

ANSI/ATIS 1000113-2015, Signaling System No. 7 (SS7) - Integrated Service Digital Network (ISDN) User Part

The Integrated Services Digital Network (ISDN) User Part defines the protocol which supports the signaling functions required to provide voice and non-voice services in an integrated Services Digital Network. This standard is based on the Specification of Signaling System No. 7 for international use issued by ITU-T Study Group 11 in the year 2000 and subsequent amendments. This standard is based on and uses, where applicable, the same signaling procedures, parameters, and message types as the internationally specified ISDN User Part of the ITU-T Signaling System No.7.

ANSI/ATIS 1000116-2000 (R2015), Signalling System Number 7 (SS7) - Operations, Maintenance, and Administration Part (OMAP)

This standard is based on the 1988 Blue Book Recommendations Q.791 and Q.795 of SS7 for international use issued by the CCITT Study Group XI (Vol. VI, Fascicles VI.7 and VI.8) and is intended to be compatible with that standard. It has been modified for use within and between U.S. Networks to meet the anticipated needs and applications of those entities. In general, the modifications fall into two categories: 1) The specification of options designated by the CCITT for national use. 2) Extensions to the 1988 protocol to provide for new applications of the SS7 protocol. This is in accordance with the current and projected ITU-T activity.

ANSI/ATIS 1000118-1992 (R2015), SS7 - Intermediate Signaling Network Identification (ISNI)

The Intermediate Signaling Network Identification (ISNI) capability allows an application process in the origination network to specify intermediate signaling network(s) for non- circuit-associated signaling messages, or to notify an application process in the destination network about such intermediate signaling network(s), or to do both. ISNI 5 be invoked by a variety of services.

ANSI/ATIS 1000607.a-2006 (S2016), Supplement to ATIS-1000607

Supplement aligns code point values T.607-2000 (R2004), with corresponding ITU-T Recommendation Q.931 code points for V.32 and V.34 modem types.

ANSI/ATIS 1000608-2000 (S2017), Integrated Services Digital Network (ISDN) - Signaling Specification for X.25 Packet-Switched Bearer Service for Digital Subscriber Signaling System Number 1 (DSS1)

The interface standard was written to provide a set of requirements for user-network signaling for ISDN support of packetized data transfer, while conforming, wherever possible, with the i-Series Recommendations of the International Telegraph and Telephone Consultative Committee (CCITT), and while not compromising the principles of evolution expressed therein. Formerly known as T.608-1991 (R2007).


ANSI/ATIS 1000613-1991 (S2017), Integrated Services Digital Network (ISDN) - Call Waiting Supplementary Service

This standard is one of a series that defines and describes supplementary services within the context of an Integrated Services Digital Network (ISDN). The international of this service with other ISDN services is also included. The purpose of the standard is to allow maximum compatibility among network- and user -owned telecommunication equipment in order to increase the attractiveness and usefulness of ISDN-based Capabilities. Formerly known as T.613-1991 (R2007).

ANSI/ATIS 1000614-1991 (S2017), Integrated Services Digital Network (ISDN) - Packet Mode Bearer Service Category Description

The International Telegraph and Telephone Consultative Committee (CCITT) Recommendation I.210 describes the principles for defining Integrated Services Digital Network (ISDN) - based telecommunication services including the concept of bearer services, teleservices and supplementary services. It also provides the means for the definition and description of such services. Formerly known as T.614-1991 (R2007).

ANSI/ATIS 1000619.a-1994 (S2017), Integrated Services Digital Network (ISDN) - Multi-Level Precedence and Preemption (MLPP) Service Capability

This supplement to American National Standard for Telecommunications - Integrated Services digital network (ISDN) - Multi-level precedence and preemption (MLPP) service capability, ANSI ATIS -1000619.1992(R2005), revises the standard so that the exchange-to-exchange signaling is consistent with ITU-T Recommendations Q.955.3 (1993) and Q.735.3 (1993), which were approved after the publication of ATIS-1000619.1992(R2015). Formerly known as T.619a-1994(R2007).

ANSI/ATIS 1000620-1991 (S2017), Integrated Services Digital Network (ISDN) - Circuit-Mode Bearer Service Category Description

This standard explains the ISDN Circuit-Mode bearer services from the user’s perspective. Formerly known as T.620-1991(R2007).

ANSI/ATIS 1000628-2000 (R2015), Emergency Calling Service

This standard specifies the capabilities required to provide the network routing and transfer features associated with emergency service calls. Routing, Bridging, and Transfer of Emergency Service Calls (RBTECS) allows emergency service calls to be completed through the network to an appropriate emergency service attendant, and to provide the emergency service attendant with the ability to bridge to any other attendant in the emergency serving area with full feature functionality.

ANSI/ATIS 1000628.a-2001 (R2015), ECS-Connection and Ring Back Addendum

This addendum to ATIS-1000628.2000(R2005) specifies the use of the Connection Hold network capability by the Emergency Calling Service (ECS) to support ECS call hold and ring back. This addendum also specifies the TCAP messages exchanged between a switching node routing ECS calls and a Selective Routing Database (SRDB) that contains information determining the PSAP that should receive the emergency calls originating from a given caller or calling location.

ANSI/ATIS 1000630-1999 (R2015), Broadband ISDN-ATM Adaptation Layer for Constant Bit Rate Services Functionality and Specification

This standard is one of a series of American National Standards on Broadband Integrated Services Digital Network (B-ISDN). These standards describe the B-ISDN capabilities, architectural model, and network interfaces including protocol functionalities and specifications, and signaling characteristics. This standard describes the protocol of the ATM Adaptation Layer for Constant Bit Rate Services (CBR AAL). The ATM Adaptation Layer (AAL) performs the necessary functions to match the services provided by the ATM Layer to the services required by the AAL service user. It provides to its users services that are not available from the ATM Layer.
ANSI/ATIS 1000630.a-2002 (R2015), Network-Broadband ISDN-ATM Adaptation Layer for Constant Bit Rate Services Functionality and Specification (Supplement to ATIS 1000630.1999 (R2010))

This standard defines a new AAL Type 1 format for interworking AAL Type 1 and AAL Type 2 networks.

ANSI/ATIS 1000631-2005 (R2015), Signaling Systems No. 7 (SS7) - High Probability of Completion (HPC) Network Capability

The Office of the Manager, National Communications Systems (OMNS), tasked by directives from the White House to ensure that a survivable and enduring National Security and Emergency Preparedness (NS/EP) telecommunications capability is available during national emergencies has endorsed the development and adoption of a standard to support increased call completion capabilities for critical users. The High Probability of Completion (HPC) network capability would be applied during the call setup of NS/EP calls by providing for an identifier for those calls on the SS7 network protocol.

ANSI/ATIS 1000634-1993 (S2016), Frame Relaying Service Specific Convergence Sublayer (FR-SSCS)

This standard specifies the Frame Relay Service Specific Convergence Sublayer (FR-SSCS). The FR-SSCS is located in the upper part of the ATM Adaptation Layer on top of the Common Part Convergence Sublayer (CPCS) of AAL type 5, as specified in ITU-T (formerly CCITT) Recommendation I.363, section 6. The FR-SSCS is used at the B-ISDN TE to emulate the Frame Relaying Bearer Service (FRBS) in B-ISDN. It is also used for interworking between a B-ISDN and a Frame Relaying Network. Formerly known as T1.634-1993 (R2006).

ANSI/ATIS 1000635-1999 (R2015), broadband ISDN-ATM Adaptation Layer Type 5 Common Part Functions and Specifications

This standard references the complete text of ITU-T (formerly CCITT) AAL Type 5, Recommendation I.363, text section 6 of I.363, 1993. This standard describes a protocol of the Common Part of the ATM Adaptation Layer type 5 to support Variable Bit Rate (VBR) services.

ANSI/ATIS 1000636-1999 (R2010), B-ISDN Signaling ATM Adaptation Layer (SAA)-Overview Description

This standard briefly describes the various components which make up the AAL functions necessary to support signaling (SAA). It is intended to serve as a guide to all other standards required by a user who intends to construct an AAL for the purpose of signaling.

ANSI/ATIS 1000637-1999 (R2015), B-ISDN ATM Adaptation Layer-Service Specific Connection Oriented Protocol (SSCOP)

The intent of this standard is to provide a new protocol specification that can be used in the B-ISDN ATM Adaptation Layer (AAL). This protocol, called the Service Specific Connection Oriented Protocol (SSCOP), promises assured data delivery between AAL connection endpoints.

ANSI/ATIS 1000638-1999 (R2015), B-ISDN ATM Adaptation Layer-Service Specific Coordination Function for Support of Signaling at the User-to-Network Interface (SSCF at the UNI)

The intent of this standard is to provide a function which is part of the ATM Adaptation Layer for the support of signaling (SAAL) at the UNI of the B-ISDN. This function is used to map the service of the Service Specific Connection Oriented Protocol (SSCOP) of the AAL to the needs of layer 3 protocols for access signaling across the UNI (e.g., Q.2931). This function is called Service Specific Coordination Function (SSCF) for signaling at the UNI.

ANSI/ATIS 1000639-1995 (S2016), Calling Name Identification Restriction

This standard is one of a series that defines and describes supplementary services. These services 5 be made available for users with non-ISDN interfaces who access SS7 capable networks and also within the context of an Integrated Services Digital Network (ISDN). This standard describes Calling Name Identification Restriction, which is an originating service that allows a user to alter the network stored or subscribed privacy status associated with the user’s Calling Name. The associated switching and signaling specification are also provided. This service 5 be made available on demand or in a subscription arrangement.

ANSI/ATIS 1000639.a-2001 (S2016), Supplement to Calling Name Identification Restriction

This supplement revises ATIS-1000639.1995 (R2006) to address certain regulations that 5 need to be considered by the service provider based on the FCC’s orders that were issued as a result of FCC Docket No. 91-281. Formerly known as T1.639a-2001 (R2006).

ANSI/ATIS 1000640-2001 (S2016), Broadband ISDN Network Node Interfaces and Inter-Network Interfaces - Rates and Formats Specifications

This standard provides specifications of the rates and formats of signals for use at Network Node Interfaces (NNIs) and Inter-Network Interfaces (INIs) in a Broadband Integrated Services Digital Network (B-ISDN).

ANSI/ATIS 1000641.a-2002 (S2017), Supplement to Calling Name Identification Presentation

This supplement revises ATIS-1000641.1995 (R2009) to address certain regulations that 5 need to be considered by the service provider based on the FCC’s orders that were issued as a result of FCC Docket No. 91-281, “Rules and Policies Regarding Calling Number Identification Service – Caller ID. Formerly known as T1.641a-2002 (R2007).

ANSI/ATIS 1000644-1995 (R2015), B-ISDN - Medium-Signalling Protocol

his standard defines the B-ISDN medium-signalling protocol (Version 1) that is used to establish and maintain user-network signalling connections that are applicable for multipoint configurations at the Sb or Tb reference points.

ANSI/ATIS 1000646-2003 (R2015), Network and Customer Installation Interfaces - Broadband ISDN: Common Criteria

This standard is a revision of the common criteria for broadband ISDN in T1.646-1995 and replaces the relevant clauses of the standard in their entirety. This standard provides NI compatibility information and is not meant to be an equipment specification. Information and requirements specific to particular transmission technologies has been removed to standard associated with those technologies.

ANSI/ATIS 1000647-1995 (R2015), Integrated Services Digital Network (ISDN) - Conference Calling Supplementary Service

This standard is one of a series, which defines and describes supplementary services within the context of an Integrated Services Digital Network (ISDN). The interaction of this service with other ISDN services is also included.

ANSI/ATIS 1000650-1995 (R2015), ISDN - Usage of the Cause Information Element in Digital Subscriber Signaling System Number 1 (DSS1)

This standard defines the usage, format, and encoding of the cause information element within the context of the Digital Subscriber Signaling System Number 1 (DSS1) of an Integrated Services Digital Network (ISDN). It also defines the meaning of specific causes, and the usage of the location and diagnostic fields.

ANSI/ATIS 1000651-1996 (S2016), Mobility Management Application Protocol (MMAP)

This standard provides an application layer protocol for the exchange of information between peer applications running in a radio system and other network elements (e.g., mobility management platforms, switching systems, and other radio systems). The basic provisions of the protocol provide the semantics and syntax for operations necessary to support the mobility aspects of telecommunication services and call control in a wireless environment. Formerly known as T1.651-1996 (R2006).

ANSI/ATIS 1000651.a-1996 (S2016), Mobility Management Application Protocol (MMAP) - Extensions

This supplement provides additions and modifications to ATIS-0000651.1996 (R2006). This standard provides an application layer protocol for the exchange of information between peer applications running in a radio system and other network elements (e.g., mobility management platforms, switching systems, and other radio systems). The basic provisions of the protocol provide the semantics and syntax for operations necessary to support the mobility aspects of telecommunication services and call control in a wireless environment.

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ANSI/ATIS 1000651-1996 (S2016), B-ISDN Signaling ATM Adaptation Layer - Layer Management for SAAL at the NNI

This standard specifies the Layer Management functions for the Signaling ATM Adaptation Layer (SAAL) at the Network Node Interface (NNI). These include the interfaces to the Service Specific Connection Oriented Protocol (SSCOP), (ANSI T1.637), to the Service Specific Coordination Function (SSCF) at the NNI (ANSI T1.645), and to systems management.

ANSI/ATIS 1000653-1996 (R2015), Integrated Services Digital Network (ISDN) - Call Park Supplementary Service

This standard specifies the service capabilities of the Call Park service within the context of an Integrated Services Digital Network (ISDN). Call Park is a Circuit-Switched service that allows a user to interrupt a voice or voice-band data communication on an existing call, and then re-establish communications from the same or different terminal equipment within the same Call Park subscriber group.

ANSI/ATIS 1000653-a-1998 (R2015), Integrated Services Digital Network (ISDN) - Call Park Supplementary Service - Generic Procedures for the Control of ISDN Supplementary Services, Clarification for Number Identification

This supplement to American National Standard for Telecommunications - Integrated Services Digital Network (ISDN) - Call Park Supplementary Service, ATIS-1000653, revised the standard to improve and clarify the standard based on related advances in other standards bodies.

ANSI/ATIS 1000655-2001 (S2016), Signaling System Number 7 (SS7) - Upper Layer Security Capability

This standard describes the Security network capability, which allow an end user service in an originating Signalling Point (SP) to invoke various security functions in the originating and/or destination SP. The Security capability can be used for identification and authentication of the communicating entities, it also provides information that supports resource access control, system access control, and encryption and decryption functions.

ANSI/ATIS 1000659-1996 (S2016), Mobility Management Application Protocol (MMAP) RCF-RACF Operations

This standard provides an application layer protocol for the exchange of information between peer applications running in a radio system and other network elements (e.g., mobility management platforms, switching systems, and other radio systems). The basic provisions of the protocol provide the semantics and syntax for operations necessary to support the mobility aspects of telecommunication services and call control in a wireless environment.

ANSI/ATIS 1000661-2000 (R2015), Signaling System Number 7 (SS7) - Release to Pivot (RTP)

The Release To Pivot (RTP) network capability permits an SS7 Signalling Point that has received a call from another Node, and has determined the call should be connected to a Destination Node other than itself, to have the connection established from a Node earlier in the call path. RTP functionality is shared between the Release Node and the Pivot Node. The RTP capability 5 be invoked by an end-user service or other network capability on a per-call basis.

ANSI/ATIS 1000667-2002 (S2017), Intelligent Network

This standard establishes an architectural framework in which the model of the Intelligent Network (IN) is defined. The architecture is intended to provide the flexibility to support a wide range of services and facilitates the evolution of future IN functional capabilities through its evolvable, modular structure to achieve service independence.

ANSI/ATIS 1000668-1999 (R2015), Signalling System Number 7 (SS7) - Facility Request to Pivot (FRP)

The Facility Request to Pivot (FRP) network capability permits an ISUP capable SS7 Signalling Point that has received a call from another ISUP capable node, and has determined that the call should be connected to a Destination Node other than itself, to have the connection established from a node earlier in the call path. FRP functionality is shared between the Request and Pivot nodes.

ANSI/ATIS 1000669-1999 (R2015), Signalling System Number 7 (SS7) - Intermediate Network Selection (INS)

This standard allows an application process in the origination network to specify a single intermediate signalling network for non-circuit-associated signalling messages. This network capability also includes functionality that 5 be used to route non-circuit-associated messages in a number portability environment.

ANSI/ATIS 1000671-2000 (R2015), Signaling System Number 7 (SS7) - Carrier Service Provider Identification (CSP)

Carrier Service Provider Identification (CSP) information is intended to identify to intermediate switches all presubscribed carriers associated with a calling party. Identifiable carrier service providers include the preferred intralATA toll carrier, the preferred interLATA carrier, and the international carrier. Other carrier types 5 be included as the need arises.

ANSI/ATIS 1000672-2000 (R2015), Bearer Independent Call Control (BICC)

This standard describes the adaptation of the narrowband ISDN User Part (ISUP) for the support of narrowband ISDN services independent of the bearer technology and signalling message transport technology used.

ANSI/ATIS 1000673-2002 (S2017), Bearer Independent Call Control (BICC) Capability Set 1+ (CS1+)

This standard describes the adaptation of the narrowband ISDN User Part (ISUP) for the support of narrowband ISDN services independent to the bearer technology and signalling message transport technology used. The protocol defined by this standard is the call control protocol to be used between “Serving Nodes.” This protocol is called the “Bearer Independent Call control” protocol (BICC). Between Serving Nodes, the control of bearers is provided by other protocols not specified by this standard. Formerly known as T1.673-2002(R2007).

ANSI/ATIS 1000674-2002 (S2017), BICC CS1+: Signaling Transport Converters (STCs)

This standard describes the Generic Signaling Transport that can be deployed by means of Signaling Transport Converters (STCs) over a range of signaling transport protocol stacks. It also specifies the STC for MTP3, and the STC for SSCOP and SSCOPMCE. Formerly known as T1.674-2002(R2007).

ANSI/ATIS 1000676-2001-2016, BICC IP Bearer Control Protocol (IPBCP)

This standard defines BICC IP Bearer Control Protocol. IPBCP is used for the exchange of media stream characteristics, port numbers, and IP addresses of the source and sink of a media stream to establish and allow the modification of IP bearers. The information exchanged with IPBCP is done during BICC call establishment. In addition, it 5 be exchanged after a call established. IPBCP uses the Session Description Protocol (SDP) defined in RFC 2327 to encode this information. This standard is used on the ITU-T Recommendation Q.1970, BICC IP Bearer Control Protocol.

ANSI/ATIS 1000677-2001 (S2016), BICC Bearer Control Tunneling Protocol

This standard defines the BICC Bearer Control Tunneling Protocol. The BICC Bearer Control Tunneling Protocol is a generic tunneling mechanism for the purpose of tunneling Bearer Control Protocols (BCP).

ANSI/ATIS 1000679-2015, Interworking between Session Initiation Protocol (SIP) and Bearer Independent Call Control or ISDN User Part

This standard defines the signaling interworking between the Bearer Independent Call Control (BICC) or ISDN User Part (ISUP) protocols and SIP in order to support services that can be commonly supported by BICC or ISUP and SIP based network domains.

AWC (American Wood Council)


Specification provides requirements for structural and fire design of wood products and their connections.
ANSI/AWC PWF-2015, Permanent Wood Foundation Design Specification
The basic design and construction requirements for the Permanent Wood Foundation (PWF) system are set forth in this publication. Included are criteria for materials, preservative treatment, soil characteristics, environmental control, design loads, and structural design.

ANSI/AWC SDPWS-2015, Special Design Provisions for Wind and Seismic
Provides special design and construction requirements for wind and seismic design of wood frame structures.

ANSI/AWC WFCM-2015, Wood Frame Construction Manual for One and Two-Family Dwellings
The WFCM provides engineered and prescriptive design requirements for wood frame construction used in one and two-family dwellings constructed in high wind, seismic and snow regions.

AWEA (American Wind Energy Association)

ANSI/AWEA 61400-12-1-2016, Power performance measurements of electricity producing wind turbines
This standard is the expedited national adoption of the IEC 61400-12-1(2005)

ANSI/AWEA SWT-1-2016, AWEA Small Wind Turbine Standard
The standard will provide standardized performance ratings and ensure that small wind turbines that meet the standard have been engineered to meet carefully considered requirements for safety and operation. The standard will reference and specify modifications to IEC 61400-2, IEC 61400-12-1 and IEC 61400-11. The standard will apply to electricity-producing wind turbine systems having a rotor swept area of 200 m2 or less.

AWPA (ASC O5) (American Wood Protection Association)

ANSI O5.1-2017, Wood Poles: Specifications and Dimensions
This standard provides minimum specifications for the quality and dimensions of wood poles that are to be used as single-pole utility structures. The poles described herein are considered as simple cantilever members subject to transverse loads only. Fiber strength values, provided as a basis for determining pole class sizes, apply only to poles that meet or exceed the minimum quality specifications. These revisions add modulus of elasticity (MOE) values to Table 1.

ANSI O5.2-2012, Structural Glued Laminated Timber for Utility Structures
Covers requirements for manufacturing and quality control of structural glued laminated timber of Southern Pine, Coast Region Douglas Fir, Hem Fir and other species of similar treatability for electric power and communication structures. The requirements are based on those in American National Standard for Structural Glued Laminated Timber, ANSI/AITC A190.1.

ANSI O5.3-2015, Solid Sawn Wood Crossarms & Braces - Specifications and Dimensions
This standard consists of specifications covering solid sawn-wood crossarms and braces manufactured from coastal Douglas-fir and from dense Southern pine. The specifications are intended to cover communications crossarms, power crossarms, heavy-duty crossarms, and heavy-duty braces. Crossarms are intended primarily for use as beams. Heavy-duty crossarms may also be used as struts or columns in braced H-frames. Braces are used for tension, compression-bracing, or both.

ANSI O5.4-2017, Naturally Durable Hardwood Poles - Specifications and Dimensions
This standard provides minimum specifications for the quality and dimensions of naturally durable hardwood poles without preservative treatment to be used in singlepole utility structures. The poles described are considered as simple cantilever members subject to transverse loads only. Fiber strength values, provided as a basis for determining pole class sizes, apply only to poles that meet or exceed the minimum quality specifications. These fiber strength values may be used to estimate average groundline moment capacity of the poles listed therein.

ANSI O5.5-2010 (R2016), Wood Ground Wire Moulding - Specifications and Dimensions
This standard provides minimum specifications for the quality and dimensions of wood moulding used to protect ground wires on utility pole structures.

ANSI O5.6-2010, Solid Sawn-Naturally Durable Hardwood Crossarms & Braces - Specifications & Dimensions
Consists of specifications covering solid sawn - naturally durable hardwood crossarms and braces.

AWS (American Welding Society)

ANSI/AASHTO/AWS D1.5M/D1.5-2015, AMD 1, Bridge Welding Code
This code covers the welding requirements for AASHTO welded highway bridges made from carbon and low-alloy constructional steels.

Calibration procedures are specified for a number of commercial instruments that can then provide reproducible measurements of the ferrite content of austenitic stainless steel weld metals. Certain of these instruments can be further calibrated for measurements of the ferrite content of duplex ferritic-austenitic stainless steel weld metals. Calibration with primary standards (nonmagnetic coating thickness standards from the U.S. National Institute of Standards and Technology) is the preferred method for appropriate instruments.

AWS A4.3-93 (R2006), Standard Methods for Determination of the Diffusible Hydrogen Content of Martensitic, Bainitic, and Ferritic Weld Metal Produced by Arc Welding

A standard 25 x 12 x 80 mm test specimen and method of preparation are set forth, along with two standard methods of diffusible hydrogen analysis, mercury displacement and gas chromatography. The methods are suitable for shielded metal arc welding, gas metal arc welding, flux cored arc welding, and submerged arc welding using welding conditions and electrodes given in several applicable American Welding Society filler metal specifications.

AWS A4.4M:2001 (R2016), Standard Procedures for Determination of Moisture Content of Welding Fluxes and Welding Electrode Flux Coverings

This standard describes methods for sample preparation and analysis for determination of total moisture content and other sources of hydrogen measured as water from welding fluxes and electrode coverings.


This standard describes preparation and assessment of a fillet weld test piece. Test conditions prescribed and results required should not be considered to be requirements or expectations for a procedure qualification. This specification makes use of both U.S. Customary Units and the International System of Units (SI). Since these are not equivalent, each system must be used independently of the other.

AWS A5.01M/AS 01-2013 (ISO 14344:2010 MOD), Procurement guidelines for consumables - Welding and Allied Processes - Flux and Gas Shielded Electrical Welding Processes

This document provides a means by which the information needed for the procurement of welding consumables to a filler metal specification can be stated clearly, concisely, and completely. It includes a method by which the heat, lot, testing, and certification requirements that are essential to so many of today's welding applications can be specified in the procurement document.

AWS A5.02/A5.02M-2006, Filler Metal Standard Sizes, Packaging, and Physical Attributes

This specification prescribes the requirements for Standard Sizes and Packages of all types of welding filler metals, allowing these physical attributes to be incorporated by reference into the individual specification. The annex lists the manner by which the filler metal specification may refer to appropriate requirements in this specification. This specification makes use of both U.S. Customary Units and the International System of Units (SI). Since these are not equivalent, each system must be used independently of the other.

AWS A5.1/A5.1M-2012, Specification for Carbon Steel Electrodes for Shielded Metal Arc Welding

This specification establishes the requirements for classification of carbon steel electrodes for shielded metal arc welding. The requirements include mechanical properties of weld metal, weld metal soundness, and usability of electrode. Requirements for composition of the weld metal, moisture content of low-hydrogen electrode coverings, standard sizes and lengths, marking, manufacturing, and packaging are also included. A guide to the use of the standard is included in an Annex. Optional supplemental requirements include improved toughness and ductility, lower moisture contents, and diffusible hydrogen limits.

AWS A5.10/A5.10M-2016 (ISO 18273-2004 MOD), Welding Consumables -- Wire Electrodes, Wires and Rods for Welding of Aluminum and Aluminum-Alloys -- Classification

This standard specifies requirements for classification of solid wires and rods for fusion welding of aluminum and aluminum alloys. The classification of the solid wires and rods is based on their chemical composition.

AWS A5.11/A5.11M-2010, Specification for Nickel and Nickel-Alloy Welding Electrodes for Shielded Metal Arc Welding

This specification prescribes the composition, dimensions, soundness, and properties of weld metal from more than 30 classifications of nickel and nickel-alloy covered electrodes. Major topics include general requirements, testing, manufacturing, identification, and packaging. A guide to using the specification is included in an annex. This specification makes use of both U.S. Customary Units and the International System of Units (SI). Since these are not equivalent, each system must be used independently of the other.

AWS A5.12M/A5.12-2009 (ISO 6848:2004 2009), Specification for Tungsten and Oxide Dispersed Tungsten Electrodes for Arc Welding and Cutting

This specification prescribes the requirements for the classification of bare tungsten and oxide dispersed tungsten electrodes for gas tungsten arc welding and plasma arc welding and cutting. Classification is based upon the chemical composition of the electrode. Standard sizes, finish, lengths, quantities, product identification, color coding, and chemical composition limits are specified. This specification adopts the requirements of ISO 6848:2004 and incorporates the provisions of earlier versions of AWS A5.12, allowing for classifications under both specifications.

AWS A5.13/A5.13M-2010, Specification for Surfacing Electrodes for Shielded Metal Arc Welding

This specification prescribes the requirements for classification of surfacing electrodes for shielded metal arc welding. Classification is based upon the chemical composition of the deposited weld metal except for tungsten carbide electrodes where classification is based on the mesh range, quantity, and composition of the tungsten carbide granules. A guide is appended to the specification as a source of information as to the characteristics and applications of the classified electrodes.

AWS A5.14/A5.14M-2011, Specification for Nickel and Nickel-Alloy Bare Welding Electrodes and Rods

Specifies the chemical compositions of 50 nickel and nickel-alloy welding electrodes and rods, including three compositions not previously classified. Major topics include general requirements, testing, packaging, and application guidelines. This specification makes use of both U.S. Customary Units and the International System of Units (SI). Since these are not equivalent, each system must be used independently of the other.

AWS A5.15-1990 (R2016), Specification for Welding Electrodes and Rods for Cast Iron

The specification prescribes requirements for Rods of oxyfuel gas welding, electrodes for GMAW, electrodes for FCAW, and electrodes for SMAW classifications.

AWS A5.16/A5.16M-2013 (ISO 24034-2005 MOD), Specification for Titanium and Titanium-Alloy Welding Electrodes and Rods

This specification prescribes the requirements for the classification of over 30 titanium and titanium-alloy welding electrodes and rods. Classification is based upon the chemical composition of the electrode. Major topics include general requirements, testing, packaging, and application guidelines. This specification makes use of both U.S. Customary Units and the International System of Units (SI). Since these are not equivalent, each system must be used independently of the other. This specification adopts the requirements of ISO 24034 and incorporates the provisions of earlier versions of A5.16/A5.16M, allowing for classifications under both specifications.
This specification provides requirements for the classification of solid and composite carbon steel electrodes and fluxes for submerged arc welding. Electrode classification is based on chemical composition of the electrode for solid electrodes, and chemical composition of the weld metal for composite electrodes. Flux classification is based on the mechanical properties of weld metal produced with the flux and an electrode classified herein. Other requirements include sizes, making, manufacturing and packaging. The form and usability of the flux are also included.

This specification prescribes requirements for the classification of bare magnesium alloy welding electrodes and rods for use with the gas metal arc, gas tungsten arc, oxyfuel gas, and plasma arc welding process.

AWS A5.2/A5.2M-2007, Specification for Carbon and Low Alloy Steel Rods for Oxyfuel Gas Welding
This specification prescribes the requirements for classification of carbon and low alloy steel rods for oxyfuel gas welding. The classification requirements include the mechanical properties of the weld metal. Additional requirements are included for chemical composition of the rod and for manufacture, sizes, lengths, and packaging. A guide is appended to the specification as a source of information concerning the classification system employed and the intended use of the rods.

AWS A5.20/A5.20M-2005 (R2015), Specification for Carbon Steel Electrodes for Flux Cored Arc Welding
This specification prescribes requirements for the classification of carbon steel electrodes for flux cored arc welding (FCAW) either with or without shielding gas. (Metal cored carbon steel electrodes are classified according to AWS A5.18/A5.18M.)

AWS A5.21/A5.21M-2010, Specification for Bare Electrodes and Rods for Surfacing
This specification prescribes the requirements for classification of bare electrodes and rods for surfacing. Solid surfacing electrodes and rods are classified on the basis of the composition of the material as manufactured. Metal cored and flux cored composite (tubular) surfacing electrodes and rods are classified on the basis of the chemical composition of the deposited weld metal. Tubular tungsten carbide bare rods are classified on the basis of the mesh range, quantity, and composition of the tungsten carbide granules.

AWS A5.22/A5.22M-2012, Specification for Stainless Steel Flux Cored and Metal Cored Welding Electrodes and Rods
Classification and other requirements are specified for numerous grades of flux cored and metal cored stainless steel electrodes and rods. Designations for the flux cored electrodes and rods indicate the chemical composition of the weld metal, the position of welding, and the external shielding gas required (for those classifications for which one is required). Designations for the metal cored electrodes indicate the chemical composition of the weld metal only. The requirements include general requirements, testing and packaging. Annex A provides general application guidelines for individual alloys and other useful information about welding electrodes.

AWS A5.23/A5.23M-2011, Specification for Low-Alloy Steel Electrodes and Fluxes for Submerged Arc Welding
Provides requirements for the classification of solid and composite carbon steel and low-alloy steel electrodes and fluxes for submerged arc welding.

AWS A5.24/A5.24M-2014, Specification for Zirconium and Zirconium-Alloy Welding Electrodes and Rods
This specification prescribes requirements for the classification of zirconium and zirconium-alloy electrodes and rods for gas metal arc, gas tungsten arc, and plasma arc welding.

AWS A5.25/A5.25M-1997 (R2009), Specification for Carbon and Low-Alloy Steel Electrodes and Fluxes for Electroslag Welding
Classification requirements are specified for fluxes and solid and composite metal cored electrodes for electroslag welding. The requirements for electrodes include chemical composition of the electrode for solid electrodes and of weld metal for metal cored electrodes. Requirements for fluxes include the mechanical properties and soundness of weld metal taken from a groove weld made with a particular electrode using a prescribed welding procedure. Standard electrode sizes, marking, and packaging requirements are included.

AWS A5.26/A5.26M-1997 (R2008), Specification for Carbon and Low-Alloy Steel Electrodes for Electrogas Welding
Classification requirements are specified for solid and composite (flux cored and metal cored) electrodes for electrogas welding. The requirements include chemical composition of the electrode for solid electrodes and of weld metal for composite (cored) electrodes, in addition to the mechanical properties and soundness of weld metal taken from a groove weld made with these electrodes using the prescribed welding procedure. Standard electrode sizes, marking, and packaging requirements are included.

AWS A5.28/A5.28M-2005 (R2015), Specification for Low-Alloy Steel Electrodes and Rods for Gas Shielded Arc Welding
This specification prescribes requirements for the classification of low-alloy steel electrodes (solid, composite stranded and composite metal cored) and rods (solid) for gas metal arc (GMAW), gas tungsten arc (GTAW), and plasma arc (PAW) welding.

AWS A5.29/A5.29M-2010, Specification for Low-Alloy Steel Electrodes for Flux Cored Arc Welding
This specification prescribes the requirements for classification of low-alloy steel electrodes for flux cored arc welding. The requirements include chemical composition and mechanical properties of the weld metal and certain usability characteristics. Optional, supplemental designators are also included for improved toughness and diffusible hydrogen. Additional requirements are included for standard sizes, marking, manufacturing, and packaging. A guide is appended to the specification as a source of information concerning the classification system employed and the intended use of lowalloy steel flux cored electrodes.

AWS A5.3/A5.3M-1999 (R2007), Aluminum and Aluminum Alloy Electrodes for Shielded Metal Arc Welding
This specification prescribes requirements for the classification of covered (flux coated) E1100, E3003, and E4043 aluminum-alloy electrodes for shielded metal arc welding. Tests conducted for classification are chemical analysis of the core wire as well as tensile and bend tests from groove weld test assemblies fabricated with each of two sizes of electrode for each classification. Standard electrode sizes, electrode identification, and chemical composition limits are specified.

AWS A5.30/A5.30M:2007, Specification for Consumable Inserts
Five classes (cross-sectional design) of consumable inserts of various chemical compositions are described. Each class is subdivided into two or three styles (based on the shape of the insert). Topics include the chemical composition, general dimensional requirements, packaging and application guidelines.

AWS A5.31M/A5.31-2012, Specification for Fluxes for Brazing and Braze Welding
Fifteen fluxes for brazing and braze welding are classified according to the filler metal, form, and activity temperature range. Classification is in accordance with a classification system that employs the designator ‘FB’ to indicate fluxes for brazing and braze welding applications. In addition to selected tests for each classification, major topics include general requirements, testing procedures, and packaging requirements. An annex listing general application guidelines is included.

AWS A5.32/A5.32M:2011 (ISO 14175:2008), Welding Consumables -- Gases and Gas Mixtures for Fusion Welding and Allied Processes
This standard prescribes the requirements for the classification of gases and gas mixtures for fusion welding and allied processes. Classification is based on composition of the more popular single and multi-component gases. Additional requirements are included for purity and moisture of individual gas components, testing, re-testing, packaging and cylinder or container labeling. An annex is appended to the standard as a source of information concerning the classification system and the intended use of the gases and gas mixtures.
AWS A5.34/A5.34M-2013, Specification for Nickel-Alloy Electrodes for Flux Cored Arc Welding

The composition, soundness, and properties of weld metal from nine grades of flux cored electrodes are specified. Standard electrode sizes together with their package forms and package sizes are detailed. This specification makes use of both U. S. customary units and the International System of Units (SI). Since these are not equivalent, each system must be used independently of the other.

AWS A5.35/A5.35M-2015, Specification for Covered Electrodes for Underwater Wet Shielded Metal Arc Welding

This specification prescribes requirements for the classification, based on underwater wet welding tests and associated evaluation, of covered electrodes for underwater wet shielded metal arc welding.

AWS A5.35/A5.35M-AMD1-2016, Specification for Covered Electrodes for Underwater Wet Shielded Metal Arc Welding

This specification establishes the requirements for classification of covered electrodes for underwater wet shielded metal arc welding.

AWS A5.36/A5.36M-2016, Specification for Carbon and Low-Alloy Steel Flux Cored Electrodes for Flux Cored Arc Welding and Metal Cored Electrodes for Gas Metal Arc Welding

This specification prescribes the requirements for classification of carbon and low-alloy steel flux cored electrodes for flux cored arc welding and metal cored electrodes for gas metal arc welding. The requirements include chemical composition and mechanical properties of the weld metal and certain usability characteristics. Optional, supplemental designators are also included for diffusible hydrogen and to indicate conformance to special mechanical property requirements when the weld metal is deposited using low heat input, fast cooling rate and high heat input, slow cooling rate procedures.

AWS A5.4/A5.4M-2012, Specification for Stainless Steel Electrodes for Shielded Metal Arc Welding

Composition and other requirements are specified for more than forty classifications of covered stainless steel welding electrodes. The requirements include general requirements, testing, and packaging. Annex A provides application guidelines and other useful information about the electrodes. This specification makes use of both U. S. Customary Units and the International System of Units (SI). Since these are not equivalent, each system must be used independently of the other.

AWS A5.5/A5.5M-2014, Specification for Low-Alloy Steel Electrodes for Shielded Metal Arc Welding

This specification prescribes the requirements for classification of low-alloy steel covered electrodes used for shielded metal arc welding. The requirements include chemical composition and mechanical properties of weld metal, weld metal soundness, usability tests of electrodes, and moisture tests of the low-hydrogen electrode covering. Requirements for standard sizes and lengths, marking, manufacturing, and packaging are also included. Optional supplemental requirements include tests for absorbed moisture in the electrode covering and for diffusible hydrogen in the weld metal.

AWS A5.6/A5.6M-2008, Copper and Copper-Alloy, Covered Electrodes, Specification for

This specification prescribes the requirements for classification of copper and copper-alloy electrodes for shielded metal arc welding. Classification is based on chemical composition, mechanical properties and usability of the electrodes. Additional requirements are included for manufacture, sizes, lengths, and packaging. A guide is appended to the specification as a source of information concerning the classification system employed and intended use of the electrodes. This specification makes use of both U. S. Customary Units and the International System of Units (SI). Since these are not equivalent, each system must be used independently of the other.

AWS A5.7/A5.7M-2007, Copper and Copper-Alloy Bare Welding Rods, and Electrodes, Specification for

This specification prescribes the requirements for classifications of copper and copper alloy electrodes and rods for gas shielded metal arc, gas shielded tungsten arc, and plasma arc welding. Classification is based on chemical composition of the filler metal. Additional requirements are included for manufacture, sizes, lengths and packaging. A guide is appended to the specifications as a source of information concerning the classification system employed and intended use of the electrodes.

AWS A5.8M/A5.8-2011/AMD1-2012, Specification for Filler Metals for Brazing and Braze Welding

This specification prescribes the requirements for the classification of brazing filler metals for brazing and braze welding. The chemical composition, physical form, and packaging of more than 120 brazing filler metals are specified. The brazing filler metal groups described include aluminum, cobalt, copper, gold, magnesium, nickel, silver, titanium, and brazing filler metals for vacuum service. Information is provided concerning the liquidus, the solidus, the brazing temperature range, and general areas of application recommended for each brazing filler metal. Additional requirements are included for manufacture, sizes, lengths, and packaging.


This specification prescribes the requirements for classification of bare solid stainless steel electrodes (both as wire and strip) for gas metal arc welding, submerged arc welding, and other fusion welding processes. It also includes wire and rods for use in gas tungsten arc welding and plasma arc welding. Classification is based on chemical composition of the filler metal. A guide is appended to the specification as a source of information concerning the classification system employed and the intended use of the stainless steel filler metal.

AWS A9.5-2012, Guide for Verification and Validation in Computation Weld Mechanics

This standard provides guidelines for assessing the capability and accuracy of computational weld mechanics (CWM) models. This standard also provides general guidance for implementing verification and validation (V&V) of computational models for complex systems in weld mechanics.

AWS B1.10-2009, Guide for the Nondestructive Examination of Welds

This guide acquaints the user with the nondestructive examination methods commonly used to examine weldments. The standard also addresses which method best detects various types of discontinuities. The methods included are visual, liquid penetrant, magnetic particle, radiographic, ultrasonic, electromagnetic (eddy current), and leak testing.

AWS B1.10M/B1.10-2016, Guide for the Nondestructive Examination of Welds

This guide acquaints the user with the nondestructive examination methods commonly used to examine weldments. The standard also addresses which method best detects various types of discontinuities. The methods included are visual, liquid penetrant, magnetic particle, radiographic, ultrasonic, electromagnetic (eddy current), and leak testing.
This standard contains the essential welding variables for welding galvanized steel in the thickness range of 10 through 18 gauge, using manual shielded metal arc welding. It cites the base metals and operating conditions necessary to make the weldment, the filler metal specifications, and the allowable joint designs for fillet and groove welds. This standard contains the essential welding variables for welding galvanized steel in the thickness range of 10 through 18 gauge, using manual shielded metal arc welding. It cites the base metals and operating conditions necessary to make the weldment, the filler metal specifications, and the allowable joint designs for fillet and groove welds.

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AWS B2.1-1-204-2007, Standard Welding Procedure Specification (WPS) for Shielded Metal Arc Welding of Carbon Steel (M-1/P -1/S-1, Group 1 or 2), 1/8 through 3/4 inch Thick, E6010 (Vertical Downhill Root with the Balance Vertical Uphill), As-Welded Condition, Primarily Pipe Applications

This standard contains the essential welding variables for carbon steel in the thickness range of 1/8 through 1/2 inch, using manual shielded metal arc welding with E6010 (vertical downhill root with the balance vertical uphill). It cites the base metals and operating conditions necessary to make the weldment, the filler metal specifications, and the allowable joint designs for fillet and groove welds. This WPS was developed primarily for pipe applications.

AWS B2.1-1-205-2007, Standard Welding Procedure Specification (WPS) for Shielded Metal Arc Welding of Carbon Steel (M-1/P -1/S-1, Group 1 or 2), 1/8 through 1-1/2 inch Thick, E6010 (Vertical Uphill) Followed by E7018 (Vertical Uphill), As-Welded or PWHT Condition, (Primarily Pipe Applications

This standard contains the essential welding variables for carbon steel in the thickness range of 1/8 through 1-1/2 inch, using manual shielded metal arc welding. It cites the base metals and operating conditions necessary to make the weldment, the filler metal specifications, and the allowable joint designs for fillet and groove welds. This WPS was developed primarily for pipe applications.

AWS B2.1-1-206-2007, Standard Welding Procedure Specification (WPS) for Gas Metal Arc Welding (Short Circuiting Transfer Mode) of Carbon Steel to Austenitic Stainless Steel (M-1 to M-8, 8, Group 1), 18 through 10 Gauge, in the As-Welded Condition, with or without Backing

This standard contains the essential welding variables for carbon steel in the thickness range of 1/8 through 1-1/2 inch, using manual shielded metal arc welding with E6010 (vertical uphill) followed by E7018 (vertical uphill). It cites the base metals and operating conditions necessary to make the weldment, the filler metal specifications, and the allowable joint designs for fillet and groove welds. This WPS was developed primarily for pipe applications.

AWS B2.1-1-207-2007, Standard Welding Procedure Specification (WPS) for Gas Tungsten Arc Welding of Carbon Steel (M-1/P -1/S-1, Group 1 or 2), 1/8 through 1-1/2 inch Thick, ER70S-2, As-Welded or PWHT Condition (Primarily Pipe Applications

This standard contains the essential welding variables for carbon steel in the thickness range of 1/8 through 1-1/2 inch, using manual gas tungsten arc welding. It cites the base metals and operating conditions necessary to make the weldment, the filler metal specifications, and the allowable joint designs for fillet and groove welds. This WPS was developed primarily for pipe applications.

AWS B2.1-1-208-2007, Standard Welding Procedure Specification (WPS) for Shielded Metal Arc Welding of Carbon Steel (M-1/P -1/S-1, Group 1 or 2), 1/8 through 1-1/2 inch Thick, E7018, As-Welded or PWHT Condition, Primarily Pipe Applications

This standard contains the essential welding variables for carbon steel in the thickness range of 1/8 through 1-1/2 inch, using manual shielded metal arc welding. It cites the base metals and operating conditions necessary to make the weldment, the filler metal specifications, and the allowable joint designs for fillet and groove welds. This WPS was developed primarily for pipe applications.

AWS B2.1-1-209-2006, Standard Welding Procedure Specification (WPS) for Gas Tungsten Arc Welding Followed by Shielded Metal Arc Welding of Carbon Steel (M-1/P -1/S-1, Group 1 or 2), 1/8 through 1-1/2 inch Thick, ER70S-2 and E7018, As-Welded or PWHT Condition (Primarily Pipe Applications

This standard contains the essential welding variables for carbon steel in the thickness range of 1/8 through 1-1/2 inch, using manual gas tungsten arc welding followed by shielded metal arc welding. It cites the base metals and operating conditions necessary to make the weldment, the filler metal specifications, and the allowable joint designs for fillet and groove welds. This WPS was developed primarily for pipe applications.

AWS B2.1-1-210-2012, Standard Welding Procedure Specification (WPS) for Gas Tungsten Arc Welding with Consumable Insert Root of Carbon Steel (M-1/P-1/S-1, Group 1 or 2), 1/8 through 1-1/2 inch Thick, INMs-1 and ER70S-2, As-Welded or PWHT Condition, Primarily Pipe Applications

Contains the essential welding variables for carbon steel in the thickness range of 1/8 through 1-1/2 inch, using manual gas tungsten arc welding with consumable insert root. It cites the base metals and operating conditions necessary to make the weldment, the filler metal specifications, and the allowable joint designs for groove welds. This WPS was developed primarily for pipe applications.

AWS B2.1-1-211-2012, Standard Welding Procedure Specification (WPS) for Gas Tungsten Arc Welding with Consumable Insert Root followed by Shielded Metal Arc Welding of Carbon Steel (M-1/P-1/S-1, Group 1 or 2), 1/8 through 1-1/2 inch Thick, INMs-1, ER70S-2, and E7018, As-Welded or PWHT Condition, Primarily Pipe Applications

Contains the essential welding variables for carbon steel in the thickness range of 1/8 through 1-1/2 inch, using manual gas tungsten arc welding with consumable insert root, followed by shielded metal arc welding. It cites the base metals and operating conditions necessary to make the weldment, the filler metal specifications, and the allowable joint designs for groove welds. This WPS was developed primarily for pipe applications.

AWS B2.1-1-212-2013, Standard Welding Procedure Specification (WPS) for Gas Tungsten Arc Welding to Austenitic Stainless Steel (M-1 to M-8/P-8, Group 1), 10 through 18 Gauge, in the As-Welded Condition, with or without Backing

This standard contains the essential welding variables for welding carbon steel to austenitic stainless steel in the thickness range of 10 through 18 gauge, using manual shielded metal arc welding. It cites the base metals and operating conditions necessary to make the weldment, the filler metal specifications, and the allowable joint designs for fillet welds and groove welds.

AWS B2.1-1-8-227-2002 (R2013), Standard Welding Procedure Specification (SWPS) for Gas Metal Arc Welding of Carbon Steel to Austenitic Stainless Steel (M-1 to M-8/P-8, Group 1), 1/16 through 1-1/2 inch Thick, ER309(L), As-Welded Condition, Primarily Pipe Applications

This standard contains the essential welding variables for carbon steel to austenitic stainless steel in the thickness range of 1/16 through 1-1/2 inch, using manual gas tungsten arc welding. It cites the base metals and operating conditions necessary to make the weldment, the filler metal specifications, and the allowable joint designs for groove and fillet welds. This SWPS was developed primarily for pipe applications.
AWS B2.1-1/8-227:2002-AMDI-2010, Standard Welding Procedure Specification (SWPS) for Gas Tungsten Arc Welding of Carbon Steel (M-1/P-1/S-1, Groups 1 or 2) to Austenitic Stainless Steel (M-8/P-8/S-8, Group 1), 1/16 through 1-1/2 inch thick, ER309(L), As-Welded Condition, Primarily Pipe Applications

This standard contains the essential welding variables for welding carbon steel to austenitic stainless steel in the thickness range of 1/16 through 1-1/2 inch, using manual gas tungsten arc welding. It cites the base metals and operating conditions necessary to make the weldment, the filler metal specifications, and the allowable joint designs for groove and fillet welds. This SWPS was developed primarily for pipe applications.

AWS B2.1-1/8-228:2002 (R2013), Standard Welding Procedure Specification (SWPS) for Shielded Metal Arc Welding of Carbon Steel (M-1/P-1/S-1, Groups 1 or 2) to Austenitic Stainless Steel (M-8/P-8/S-8, Group 1), 1/8 through 1-1/2 inch thick, E309(L) -15, -16, or -17, As-Welded Condition, Primarily Pipe Applications

This standard contains the essential welding variables for welding carbon steel to austenitic stainless steel in the thickness range of 1/8 through 1-1/2 inch, using manual shielded metal arc welding. It cites the base metals and operating conditions necessary to make the weldment, the filler metal specifications, and the allowable joint designs for groove and fillet welds. This SWPS was developed primarily for pipe applications.

AWS B2.1-1/8-229:2002-AMDI-2010, Standard Welding Procedure Specification (SWPS) for Gas Tungsten Arc Welding followed by Shielded Metal Arc Welding of Carbon Steel (M-1/P-1/S-1, Groups 1 or 2) to Austenitic Stainless Steel (M-8/P-8/S-8, Group 1), 1/8 through 1-1/2 inch thick, ER309(L) and E309 (L) -15, -16, or -17, As-Welded Condition, Primarily Pipe Applications

This standard contains the essential welding variables for welding carbon steel to austenitic stainless steel in the thickness range of 1/8 through 1-1/2 inch, using manual gas tungsten arc welding followed by shielded metal arc welding. It cites the base metals and operating conditions necessary to make the weldment, the filler metal specifications, and the allowable joint designs for groove and fillet welds. This SWPS was developed primarily for pipe applications.

AWS B2.1-1/8-230:2002 (R2013), Standard Welding Procedure Specification (SWPS) for Gas Tungsten Arc Welding with Consumable Insert Root of Carbon Steel (M-1/P-1/S-1, Groups 1 or 2) to Austenitic Stainless Steel (M-8/P-8/S-8, Group 1), 1/16 through 1-1/2 inch thick, IN309 and ER309(L), As-Welded Condition, Primarily Pipe Applications

This standard contains the essential welding variables for welding carbon steel to austenitic stainless steel in the thickness range of 1/16 through 1-1/2 inch, using manual gas tungsten arc welding with consumable insert root. It cites the base metals and operating conditions necessary to make the weldment, the filler metal specifications, and the allowable joint designs for groove welds. This SWPS was developed primarily for pipe applications.

AWS B2.1-1/8-231:2015, Standard Welding Procedure Specification (SWPS) for Gas Tungsten Arc Welding with Consumable Insert Root followed by Shielded Metal Arc Welding of Carbon Steel (M-1/P-1, Groups 1 or 2) to Austenitic Stainless Steel (M-8/P-8, Group 1), 1/8 inch [3 mm] through 1-1/2 inch [38 mm] thick, IN309, ER309(L), and E309(L)-XX, in the As-Welded Condition, Primarily Pipe Applications

This standard contains the essential welding variables for welding carbon steel to austenitic stainless steel in the thickness range of 1/8 inch [3 mm] through 1-1/2 inch [38 mm], using manual gas tungsten arc welding, with consumable insert root, followed by shielded metal arc welding. It cites the base metals and operating conditions necessary to make the weldment, the filler metal specifications and the allowable joint designs for groove welds. This SWPS was developed primarily for pipe applications.

AWS B2.1-2-015-2011, Standard Welding Procedure Specification (SWPS) for Gas Tungsten Arc Welding of Aluminum (M/P/S -22 to M/P/S-22), 18 through 10 Gauge, in the As-Welded Condition, with or without Backing

This standard contains the essential welding variables for aluminum in the thickness range of 10 through 18 gauge using manual gas tungsten arc welding. It cites the base metals and operating conditions necessary to make the weldment, the filler metal specifications, and the allowable joint designs for fillet welds and groove welds.


This standard contains the essential welding variables for chromium-molybdenum steel in the thickness range of 1/8 through 1/2 inch. in the as-welded condition, or 1/8 through 3/4 inch in the postweld heat treated (PWHT) condition, using manual gas tungsten arc welding. It cites the base metals and operating conditions necessary to make the weldment, the filler metal specifications, and the allowable joint designs for groove welds. This welding procedure specification (WPS) was developed primarily for pipe applications.
This standard contains the essential welding variables for chromium-molybdenum steel in the thickness range of 1/8 through 1/2 in. in the as-welded condition, or 1/8 through 1-1/2 in. in the postweld heat treated (PWHT) condition, using manual gas tungsten arc welding. It cites the base metals and operating conditions necessary to make the weldment, the filler metal specifications, and the allowable joint designs for groove welds. This welding procedure specification (WPS) was developed primarily for pipe applications.

This standard contains the essential welding variables for chromium-molybdenum steel in the thickness range of 1/8 through 1/2 in. in the as-welded condition, or 1/8 through 1-1/2 in. in the postweld heat treated (PWHT) condition, using manual gas tungsten arc welding with a consumable insert root, followed by shielded metal arc welding. It cites the base metals and operating conditions necessary to make the weldment, the filler metal specifications, and the allowable joint designs for groove welds. This welding procedure specification (WPS) was developed primarily for pipe applications.

This standard contains the essential welding variables for chromium-molybdenum steel in the thickness range of 1/8 through 1/2 in. in the as-welded condition, or 1/8 through 1-1/2 in. in the postweld heat treated (PWHT) condition, using manual gas tungsten arc welding. It cites the base metals and operating conditions necessary to make the weldment, the filler metal specifications, and the allowable joint designs for groove welds. This welding procedure specification (WPS) was developed primarily for pipe applications.

This standard contains the essential welding variables for chromium-molybdenum steel in the thickness range of 1/8 through 1/2 in. in the as-welded condition, or 1/8 through 1-1/2 in. in the postweld heat treated (PWHT) condition, using manual gas tungsten arc welding. It cites the base metals and operating conditions necessary to make the weldment, the filler metal specifications, and the allowable joint designs for groove welds. This welding procedure specification (WPS) was developed primarily for pipe applications.

This standard contains the essential welding variables for chromium-molybdenum steel in the thickness range of 1/8 through 1/2 in. in the as-welded condition, or 1/8 through 1-1/2 in. in the postweld heat treated (PWHT) condition, using manual gas tungsten arc welding. It cites the base metals and operating conditions necessary to make the weldment, the filler metal specifications, and the allowable joint designs for groove welds. This welding procedure specification (WPS) was developed primarily for pipe applications.

This standard contains the essential welding variables for chromium-molybdenum steel in the thickness range of 1/8 through 1/2 in. in the as-welded condition, or 1/8 through 1-1/2 in. in the postweld heat treated (PWHT) condition, using manual gas tungsten arc welding. It cites the base metals and operating conditions necessary to make the weldment, the filler metal specifications, and the allowable joint designs for groove welds. This welding procedure specification (WPS) was developed primarily for pipe applications.

This standard contains the essential welding variables for chromium-molybdenum steel in the thickness range of 1/8 through 1/2 in. in the as-welded condition, or 1/8 through 1-1/2 in. in the postweld heat treated (PWHT) condition, using manual gas tungsten arc welding. It cites the base metals and operating conditions necessary to make the weldment, the filler metal specifications, and the allowable joint designs for groove welds. This welding procedure specification (WPS) was developed primarily for pipe applications.

This standard contains the essential welding variables for chromium-molybdenum steel in the thickness range of 1/8 through 1/2 in. in the as-welded condition, or 1/8 through 1-1/2 in. in the postweld heat treated (PWHT) condition, using manual gas tungsten arc welding. It cites the base metals and operating conditions necessary to make the weldment, the filler metal specifications, and the allowable joint designs for groove welds. This welding procedure specification (WPS) was developed primarily for pipe applications.
AWS B2.1-8-005-2002 (R2013), B2.1-8-005:2002 (R20XX), Standard Welding Procedure Specification (SWPS) for Gas Metal Arc Welding (Short Circuiting Transfer Mode) of Austenitic Stainless Steel (M-8, P-8, or S-8), 18 through 10 Gauge, in the As-Welded Condition, with or without Backing

This standard contains the essential welding variables for welding austenitic stainless steel in the thickness range of 18 through 10 gauge, using semiautomatic gas metal arc welding (short circuiting transfer mode). It cites the base metals and operating conditions necessary to make the weldment, the filler metal specifications, and the allowable joint designs for fillet welds and groove welds.

AWS B2.1-8-009-2002 (R2013), Standard Welding Procedure Specification (SWPS) for Gas Tungsten Arc Welding of Austenitic Stainless Steel (M-8, P-8, or S-8), 18 through 10 Gauge, in the As-Welded Condition, with or without Backing

This standard contains the essential welding variables for welding austenitic stainless steel in the thickness range of 18 through 10 gauge using manual gas tungsten arc welding. It cites the base metals and operating conditions necessary to make the weldment, the filler metal specifications, and the allowable joint designs for fillet welds and groove welds.

AWS B2.1-8-013-2002 (R2013), Standard Welding Procedure Specification (SWPS) for Shielded Metal Arc Welding of Austenitic Stainless Steel (M-8, P-8, S-8, Group 1), 10 through 18 Gauge, in the As-Welded Condition, with or without Backing

This standard contains the essential welding variables for welding austenitic stainless steel in the thickness range of 18 through 10 gauge using manual shielded metal arc welding. It cites the base metals and operating conditions necessary to make the weldment, the filler metal specifications, and the allowable joint designs for fillet welds and groove welds.

AWS B2.1-8-024-2012, Standard Welding Procedure Specification (WPS) for Gas Tungsten Arc Welding of Austenitic Stainless Steel (M-8/P-8/S-8, Group 1), 1/16 through 1 -1/2 inch Thick, ER3XX, As-Welded Condition, Primarily Plate and Structural Applications

Contains the essential welding variables for austenitic stainless steel in the thickness range of 1/16 through 1-1/2 inch, using manual gas tungsten arc welding. It cites the base metals and operating conditions necessary to make the weldment, the filler metal specifications, and the allowable joint designs for fillet and groove welds. This WPS was developed primarily for plate and structural applications.

AWS B2.1-8-025-2012, Standard Welding Procedure Specification (WPS) for Gas Tungsten Arc Welding followed by Shielded Metal Arc Welding of Austenitic Stainless Steel (M-8/P-8/S-8, Group 1), 1/8 through 1 -1/2 inch Thick, As-Welded Condition, Primarily Plate and Structural Applications

Contains the essential welding variables for austenitic stainless steel in the thickness range of 1/8 through 1-1/2 inch, using manual gas tungsten arc welding followed by shielded metal arc welding. It cites the base metals and operating conditions necessary to make the weldment, the filler metal specifications, and the allowable joint designs for fillet and groove welds. This WPS was developed primarily for plate and structural applications.

AWS B2.1-8-212-2012, Standard Welding Procedure Specification (WPS) for Gas Tungsten Arc Welding of Austenitic Stainless Steel (M-8/P-8/S-8, Group 1), 1/8 through 1 -1/2 inch Thick, ER3XX, As-Welded Condition, Primarily Pipe Applications

Contains the essential welding variables for austenitic stainless steel in the thickness range of 1/16 through 1-1/2 inch, using manual gas tungsten arc welding. It cites the base metals and operating conditions necessary to make the weldment, the filler metal specifications, and the allowable joint designs for fillet and groove welds. This WPS was developed primarily for pipe applications.

AWS B2.1-8-213-2012, Standard Welding Procedure Specification (SWPS) for Shielded Metal Arc Welding of Austenitic Stainless Steel (M-8/P-8/S-8, Group 1), 1/8 through 1 -1/2 inch Thick, E3XX-XX, As-Welded Condition (Primarily Pipe Applications)

Contains the essential welding variables for austenitic stainless steel in the thickness range of 1/8 through 1-1/2 inch, using manual shielded metal arc welding. It cites the base metals and operating conditions necessary to make the weldment, the filler metal specifications, and the allowable joint designs for fillet and groove welds. This WPS was developed primarily for pipe applications.

AWS B2.1-8-213-97 (R2007), Standard Welding Procedure Specification (WPS) for Shielded Metal Arc Welding of Austenitic Stainless Steel (M-8/P-8/S-8, Group 1), 1/8 through 1 -1/2 inch Thick E3XX-XX, As-Welded Condition, Primarily Pipe Applications

This standard contains the essential welding variables for austenitic stainless steel in the thickness range of 1/8 through 1-1/2 inch, using manual metal arc welding. It cites the base metals and operating conditions necessary to make the weldment, the filler metal specifications, and the allowable joint designs for fillet and groove welds. This WPS was developed primarily for pipe applications.

AWS B2.1-8-214-2012, Standard Welding Procedure Specification (WPS) for Gas Tungsten Arc Welding followed by Shielded Metal Arc Welding of Austenitic Stainless Steel (M-8/P-8/S-8, Group 1), 1/8 through 1 -1/2 inch Thick, ER3XX and E3XX-XX, As-Welded Condition, Primarily Pipe Applications

Contains the essential welding variables for austenitic stainless steel in the thickness range of 1/8 through 1-1/2 inch, using manual gas tungsten arc welding followed by shielded metal arc welding. It cites the base metals and operating conditions necessary to make the weldment, the filler metal specifications, and the allowable joint designs for fillet and groove welds. This WPS was developed primarily for pipe applications.

AWS B2.1-8-215-2012, Standard Welding Procedure Specification (WPS) for Gas Tungsten Arc Welding with Consumable Inserts of Austenitic Stainless Steel (M-8/P -8/S-8, Group 1), 1/8 through 1-1/2 inch Thick, IN3XX and ER3XX, As-Welded Condition, Primarily Pipe Applications

Contains the essential welding variables for austenitic stainless steel in the thickness range of 1/8 through 1-1/2 inch, using manual gas tungsten arc welding with consumable insert root. It cites the base metals and operating conditions necessary to make the weldment, the filler metal specifications, and the allowable joint designs for groove welds. This WPS was developed primarily for pipe applications.

AWS B2.1-8-216-2012, Standard Welding Procedure Specification (WPS) for Gas Tungsten Arc Welding with Consumable Inserts followed by Shielded Metal Arc Welding of Austenitic Stainless Steel (M-8/P -8/S-8, Group 1), 1/8 through 1-1/2 inch Thick, IN3XX, ER3XXXX, and E3XX-XX, As-Welded Condition, Primarily Pipe Applications

Contains the essential welding variables for austenitic stainless steel in the thickness range of 1/8 through 1-1/2 inch, using manual gas tungsten arc welding with consumable insert root followed by shielded metal arc welding. It cites the base metals and operating conditions necessary to make the weldment, the filler metal specifications, and the allowable joint designs for groove welds. This WPS was developed primarily for pipe applications.
This specification provides the requirements for qualification of brazing procedure specifications, brazers, and brazing operators for manual, mechanized, and automatic brazing. The brazing processes included are torch brazing, furnace brazing, diffusion brazing, resistance brazing, dip brazing, infrared brazing, and induction brazing. Base metals, brazing filler metals, brazing fluxes, brazing atmospheres, and brazing joint clearances are also included.

AWS B.2.3/B.2.3M-2012, Specification for Soldering Procedure and Performance Qualification

This specification provides the requirements for qualification of soldering procedure specifications, solderers, and soldering operators for manual, mechanized, and automatic soldering. The soldering processes included are torch soldering, furnace soldering, induction soldering, resistance soldering, dip soldering, infrared soldering, and induction soldering. Base metals, soldering filler metals, soldering fluxes, soldering atmospheres, and soldering joint clearances are also included.

AWS B.2.4-2012, Specification for Welding Procedure and Performance Qualification for Thermoplastics

Provides the requirements for qualification of welding procedure specifications, welders, and welding operators for manual, semi-automatic, mechanized, and automatic welding. The welding processes included are electrofusion, hot gas, socket fusion, butt contact fusion, infrared, extrusion welding, flow fusion welding, and solvent cement welding. Base materials, filler materials, qualification variables, and testing requirements are also included.

AWS B.4.0-2016, Standard Methods for Mechanical Testing of Welds

This specification establishes standard methods for mechanical testing of welds. The significance of each test, test apparatus, preparation of the test specimens, and the test procedure are described. Example test results sheets are provided. It is beyond the scope of this document to define the required mechanical properties or acceptance criteria for the weld metal.

AWS B.5.1-2012, Specification for the Qualification of Welding Inspectors

This standard defines the qualification requirements to qualify welding inspectors. The qualification requirements for visual welding inspectors include experience and satisfactory completion of an examination, which includes demonstrated capabilities, and proof of visual acuity. The examination tests the inspector's knowledge of welding processes, welding procedures, nondestructive examinations, destructive tests, terms, definitions, symbols, reports, welding metallurgy, related mathematics, safety, quality assurance, and responsibilities.

AWS B.5.1-2013-AMD1-2013, Specification for the Qualification of Welding Inspectors

This standard defines the qualification requirements to qualify welding inspectors. The qualification requirements for visual welding inspectors include experience and satisfactory completion of an examination, which includes demonstrated capabilities, and proof of visual acuity. The examination tests the inspector's knowledge of welding processes, welding procedures, nondestructive examinations, destructive tests, terms, definitions, symbols, reports, welding metallurgy, related mathematics, safety, quality assurance, and responsibilities.
This document includes criteria for classifying torch brazed joints based on loading and the consequences of failure. It also provides quality assurance criteria that define the limits of acceptability in each class. This specification describes acceptable furnace soldering equipment, materials, and procedures, as well as the required inspection for each class of solder joint so produced.

AWS C.3.2M/C.3.2-2008, Standard Methods for Evaluating the Strength of Brazed Joints

This standard describes the test methods used to obtain brazed strength data of the short-time testing of single-lap joints in shear, butt-tension, stress-rupture, creep-strength, four-point-bending, and ceramic-tensile-button specimens. Specimen preparation methods, brazing procedures, testing techniques, and methods for data analysis are detailed. Sample forms for recording data are presented. A graphical method of data presentation relates shear stress to overlap distance.

AWS C.3.3-2008 (R2016), Recommended Practices for the Design, Manufacture, and Examination of Critical Brazed Components

This standard lists the necessary steps to assure the suitability of brazed components for critical applications. Although such applications vary widely, they have certain common considerations with respect to materials, design, manufacture, and inspection. It is the intent of this document to identify and explain these common considerations and the best techniques for dealing with them. It is beyond the scope of this document to provide specific details on these techniques, which the user must adapt to fit each particular application.

AWS C.3.4M/C.3.4-2016, Specification for Torch Brazing

This specification presents the minimum fabrication, equipment, and process procedure requirements, as well as inspection requirements for the torch brazing of steels, stainless steels, copper, copper alloys, and heat corrosion-resistant alloys and other materials that can be adequately torch brazed. The scope of this document to provide specific details on these techniques, which the user must adapt to fit each particular application.
AWS C3.5M/C3.5-2016-AMD1, Specification for Induction Brazing
This specification provides the minimum fabrication, equipment, and process procedure requirements, as well as inspection requirements for the induction brazing of steels, copper, copper alloys, and heat- and corrosion-resistant alloys and other materials that can be adequately induction brazed (the induction brazing of aluminum alloys is addressed in AWS C3.7M/C3.7, Specification for Aluminum Brazing). This specification provides criteria for classifying induction brazed joints based on loading and the consequences of failure and quality assurance criteria defining the limits of acceptability in each class.

AWS C3.5M/C3.5-2016, Specification for Induction Brazing
This specification provides the minimum fabrication, and requirements for the induction brazing of materials such as steels, copper, copper alloys, and heat- and corrosion-resistant alloys as well as other materials that can be adequately induction brazed. Note that the induction brazing of aluminum alloys is addressed in AWS C3.7M/C3.7, Specification for Aluminum Brazing.

AWS C3.6M/C3.6-2016, Specification for Furnace Brazing
This specification presents the minimum fabrication and quality requirements for the furnace brazing of materials such as steels, stainless steels, nickel, nickel alloys, copper, copper alloys, and heat- and corrosion-resistant materials as well as other materials that can be adequately furnace brazed. Note that the furnace brazing of aluminum alloys is addressed in AWS C3.7M/C3.7, Specification for Aluminum Brazing.

AWS C3.7M/C3.7-2011, Specification for Aluminum Brazing
This specification presents the minimum fabrication, material, process procedure, and inspection requirements for the brazing of aluminum by all of the processes commonly used: atmosphere furnace, vacuum furnace, and flux processes. Its purpose is to standardize aluminum brazing requirements for all applications in which brazed aluminum joints of assured quality are required. It provides criteria for classifying aluminum brazed joints based on loading and the consequences of failure and quality assurance criteria defining the limits of acceptability in each class.

AWS C3.8M/C3.8-2011, Specification for the Ultrasonic Examination of Brazed Joints
This specification provides the minimum requirements for the pulse-echo ultrasonic examination of brazed joints. Its purpose is to standardize brazed-joint ultrasonic examination requirements for all applications in which brazed joints of assured quality are required. It provides minimum requirements for equipment, procedures, and the documentation of such tests.

AWS C3.9M/C3.9-2008, Specification for Resistance Brazing
This specification provides minimum fabrication, equipment, material, and process procedure requirements as well as discontinuity limits for the resistance brazing of steels, copper, copper alloys, heat- and corrosion-resistant alloys, and other materials that can be adequately resistance brazed. This specification provides criteria for classifying resistance brazed joints based on loading and the consequences of failure and quality assurance criteria defining the limits of acceptability in each class. This specification defines acceptable resistance brazing equipment, materials, and procedures, as well as the required inspection for each class of joint.

This document is an aid to assist users, inspectors, and producers in communicating among one another their needs with regard to the oxygen-cut surface.

AWS C4.2/C4.2M-2017, Recommended Practices for Oxyfuel Gas Cutting Torch Operation
These recommended practices for oxyfuel gas cutting include the latest procedures to be used in conjunction with oxyfuel gas cutting equipment and the latest safety recommendations. Complete lists of equipment are available from individual manufacturers.

The newly revised manual for oxyfuel gas heating torch operation includes the latest procedures to be used in conjunction with oxyfuel gas heating equipment. The manual also includes the latest safety requirements. Complete lists of equipment are available from individual manufacturers.

This second edition of Recommended Practices for Heat Shaping and Straightening covers the shaping of metal products by prudent use of heat to obtain a desired configuration. The text reviews the theory and analytical calculations that explain how heat shaping and straightening occurs. Sample calculations and tables are presented for typical materials. General heating patterns and heat shaping and straightening techniques are discussed. Specific heating applications are illustrated for various sections.

AWS C4.5M-2012, Uniform Designation System for Oxyfuel Nozzles
This document presents recommendations to Oxyfuel welding, cutting, and heating/brazing torch nozzle manufacturers regarding the identification markings to be permanently applied to the torch nozzle to identify its intended application. The identification will provide information to improve the safe operation and application of nozzles by torch operators. This standard makes use of the International System of Units (SI).

This is the U.S. national adoption of ISO 9013:2002, Thermal cutting - Classification of thermal cuts - Geometric product specification and quality tolerances. It includes three national annexes (Criteria for Describing Oxygen-Cut Surfaces with a photograph of a Surface Roughness Guide, a list of reference documents available for individuals involved with Oxyfuel Gas Welding and Cutting, and a guide for the preparation of technical inquiries to AWS) as well as a list of published AWS documents on Oxyfuel Gas Welding and Cutting.

AWS C5.1-2000 (R2011), Recommended Practices for Air Carbon Arc Gouging and Cutting
This publication establishes a method of conveying to the welder/operator the proper setup and use of air carbon arc gouging and cutting. Instructions and procedures are supplied in detail so the welder/operator can establish the correct air pressure, amperage, voltage, and techniques.

AWS C5.7-2000 (R2006), Recommended Practices for Electrogas Welding
Fundamentals of the process, including the various methods of welding, are presented. A discussion of equipment, consumables, applications, and metallurgical advantages and limitations is provided. The selection of process variables and operating conditions and typical EGW procedures is then presented. Inspection of welds, and training and qualification of welding procedures and operators are described. Finally, a troubleshooting guide, safety considerations, and a supplementary reading list are presented.

This recommended practice describes friction welding fundamentals and basic equipment requirements. Suggested procedure qualification, inspection methods, and joint designs are detailed. Typical mechanical property data are referenced.

AWS C7.1M/C7.1-2013, Recommended Practices for Electron Beam Welding
This document presents recommended practices for electron beam welding. It is intended to cover common applications of the process. Processes definitions, safe practices, general process requirements, and inspection criteria are provided.

AWS C7.2M-2010, Recommended Practices for Laser Beam Welding, Cutting, and Allied Processes
This is a working document under consideration by an AWS Committee. It is made available solely to solicit comments from interested parties, and may not be relied upon or utilized for any other purpose. Draft documents may change significantly in subsequent versions.
AWS C7.3M/C7.3-2016, Process Specification for Electron Beam Welding

This specification addresses processing and quality control requirements for electron beam welding. Processing includes both high- and low-voltage welding equipment and high and medium vacuum variations.


This specification covers the preparation, the processing and quality control requirements for laser beam welding. Welding equipment includes Gas Lasers (CO2) and Solid State Lasers (Nd:YAG, Yb:YAG, Nd:Glass, Diode, Ruby, Disk and Fiber) in both pulsed, continuous power (CW) and quasi-continuous (QCW) output as defined in AWS A3.0/A3.0, Standard Welding Terms and Definitions. It provides information regarding techniques of welding or details of equipment setup or operation is beyond the scope of this specification.

AWS C7.6/C7.6M-2017, Process Specification and Operator Qualification for Laser Hybrid Welding

This specification covers processing and quality control requirements for Laser Hybrid Processing. Equipment includes any laser source (as examples but not exclusive to CO2, Nd: YAG, Diode, Ruby, Yb Fiber (Fibre), Yb Disk (Disc), Nd: Glass) in combination with other equipment. Such equipment is defined as self-propelled, on-highway machinery and associated implements. Manufacturer’s responsibilities are presented as they relate to the operation of these equipment. Basic dimensional weld details are defined and interpreted for application throughout the document. Provisions are made to identify base metals used in these weldments.

AWS C7.1/D1.1M-2015, Structural Welding Code -- Stainless Steel

This code covers the welding requirements for any type of welded structure made from the commonly used carbon and low-alloy structural steels. Clauses 1 through 9 constitute a body of rules for the regulation of welding in steel construction. There are many areas where the code is normative and informative annexes in this code. A Commentary of the code is included with the document.

AWS D1.2/D1.2M-2013, Structural Welding Code -- Aluminum

This code covers the welding requirements for any type of welded structure made from aluminum structural alloys, except for aluminum pressure vessels and pressure piping. Clauses 1 through 7 constitute a body of rules for the regulation of welding in aluminum construction. A commentary on the code is also included with the document.

AWS D1.3/D1.3M-2007, Structural Welding Code -- Sheet Steel

This code covers the requirements associated with welding sheet steel having a minimum specified yield point no greater than 80,000 psi (550 MPa). The code covers requirements for any welded joint made from the commonly used structural quality low-carbon hot rolled and cold rolled sheet and strip steel with or without zinc coating (galvanized). Section 1 includes general provisions, section 2 design, section 3 prequalification, section 4 qualification, section 5 fabrication, and section 6 inspection.

AWS D1.4/D1.4M-2011, Structural Welding Code -- Reinforcing Steel

This code covers the requirements for welding reinforcing steel in most reinforced concrete applications. It contains a body of rules for the regulations of welding reinforcing steel and provides suitable acceptance criteria for such steels.

AWS D1.6/D1.6M-2017, Structural Welding Code - Stainless Steel

This code covers the requirements for welding stainless steel structural assemblies.

AWS D1.7/D1.7M-2009, Guide for Strengthening and Repairing Existing Structures

This guide provides information on strengthening and repairing existing structures. Included are sections on weldability, evaluation of existing welds, testing and sampling, heat straightening, and damage repair.

AWS D1.8/D1.8M-2016, Structural Welding Code - Seismic Supplement

The provisions of this code supplement the provisions of AWS D1.1/D1.1M, Structural Welding Code - Steel, and shall apply to the design, fabrication, quality control, and quality assurance of welded joints designed in accordance with the AISC Seismic Provisions for Structural Steel Buildings. All provisions of AWS D1.1/D1.1M for statically loaded structures shall apply to the designated welds, except as specifically modified herein.

AWS D1.9/D1.9M-2015, Structural Welding Code - Titanium

The code contains the requirements for designing, fabricating and inspecting of titanium structures. When the code is stipulated in contract documents, conformance with all provisions of the code shall be required, except for those provisions that the Engineer (see 1.4.1) or contract documents specifically modify or exempt. Annex A of the code contains requirements for the ballistic testing of structural titanium welds.

AWS D10.10M-2009, Recommended Practices for Local Heating of Welds in Piping and Tubing

This standard provides information on recommended practices, equipment, temperature control, insulation, and advantages and disadvantages for the methods presently available for local heating of welded joints in pipe and tubing.


This standard presents guidelines for welding the root pass of metal pipe butt joints with an open root or a consumable insert. Joint designs, assembly, consumable insert configurations, base metals, filler metals, and purging are discussed. Applicable arc welding processes and techniques are described.


This standard presents a detailed discussion of the metallurgical and welding characteristics and weldability of duplex stainless steel used in piping and tubing. A number of tables and graphs are presented in order to illustrate the text.

AWS D10.7M/D10.7-2008, Guide for the Gas Shielded Arc Welding of Aluminum and Aluminum Alloy Pipe

This document presents information concerning those properties of aluminum which affect its weldability and which cause specific problems in the fabrication of aluminum pipe. Recommendations are made for solving these problems and suggested procedures are presented for welding aluminum pipe joints with the Gas Tungsten Arc and Gas Metal Arc Welding Processes.


This specification provides standards for producing structural welds used in the manufacture and repair of earthmoving, construction, and agricultural equipment. Such equipment is defined as self-propelled, on- and off-highway machinery and associated implements. Manufacturer’s responsibilities are presented as they relate to the welding practices that have been proven successful within the industry in the production of weldments on this equipment. Basic dimensional weld details are defined and interpreted for application throughout the document. Provisions are made to identify base metals used in these weldments.
This specification provides standards for producing structural welds used in the manufacture and repair of earthmoving, construction, and agricultural equipment. Such equipment is defined as self-propelled, on- and off-highway machinery and associated implements. Manufacturer’s responsibilities are presented as they relate to the welding practices that have been proven successful within the industry in the production of weldments on this equipment. Basic dimensional weld details are defined and interpreted for application throughout the document. Provisions are made to identify base metals used in these weldments.

This specification establishes common acceptance criteria for classifying and applying carbon and low-alloy steel welded joints used in the manufacture of machines and equipment. It also covers weld joint design, workmanship, quality control requirements and procedures, welding operator and welding procedure qualification, weld joint inspection (visual, radiographic, magnetic particle, liquid penetrant), repair of weld defects, and heat treatment.

Requirements are presented for the design and fabrication of cyclically loaded press weldments, which includes the weld repair of new and existing components. Filler metals and weld procedure specifications are recommended for the applicable base metals that are limited to those consisting of carbon and low-alloy steels. Allowable unit stresses are provided for weld metal and base metal for various cyclically loaded joint designs. This specification does not address the fabrication or weld repair of pressure containing components such as hydraulic cylinders, air cylinders, or die cushions.

Establishes material and workmanship standards for manufacturers, fabricators, repair organizations, purchasers, and owner/operators of rotating equipment that is fabricated or repaired by welding. Included are sections defining process qualifications, operator qualifications, quality control, inspection requirements, and repair requirements.

This is the U.S. national adoption of ISO 17844:2004, Welding -- Comparison of Standardized Methods for the Avoidance of Cold Cracks

This specification provides requirements for the design and manufacture of welded joints of hydraulic cylinders. When specified in the purchasing documents, compliance with all the requirements shall be required. This specification does not apply to the manufacture of welded tubing used for hydraulic cylinders which is covered under ASTM and other recognized specifications. This specification does not specify load determination, design assumptions, safety factors, or calculations methods for non weld related areas of the hydraulic cylinder.

AWS D15.1/D15.1M-2012-AMD1-2013, Railroad Welding Specification for Cars and Locomotives
This specification establishes minimum standards for the manufacture and maintenance of railroad equipment. Clauses 4 through 17 cover the general requirements for welding in the railroad industry. Clauses 18 through 24 cover specific requirements for the welding of base metals thinner than 1/8 in [3 mm].

AWS D15.1/D15.1M-2012, Railroad Welding Specification for Cars and Locomotives
Establishes minimum standards for the manufacture and maintenance of railroad equipment. Clauses 4 through 17 cover the general requirements for welding in the railroad industry. Clauses 18 through 24 cover specific requirements for the welding of base metals thinner than 1/8 in [3 mm].

AWS D15.2/D15.2M-2012, Recommended Practices for Welding of Rails and Related Rail Components for Use by Rail Vehicles
This document recommends the minimum standards for the maintenance welding of rails and related rail components used by rail vehicles. Repair procedures for rails and austenitic manganese steel components are covered. Thermite welding and electric flash welding guidelines are discussed. Procedure qualification, welder qualification, and general welding safety procedures are addressed.

The requirements of this standard apply to industrial robots that are used to perform the gas metal arc welding (GMAW) and flux cored arc welding (FCAW) processes. The purpose of this standard is to establish minimum safety requirements with respect to the design, manufacture, maintenance, and operation of arc welding robots systems and ancillary equipment. It is also designed to help identify and minimize hazards involved in maintaining, operating, and setting up of arc welding robot systems.

The purpose of D16.3M/D16.3-2017, Risk Assessment Guide for Robotic Arc Welding, is to identify and mitigate potential personnel safety hazards associated with robotic applications. It is not intended to be a guideline for other industrial robotic applications. This guide is intended for persons performing risk assessment and applies to arc welding robots and robotic arc welding systems performing the gas metal arc welding (GMAW) or flux cored arc welding (FCAW) process. Applicable ANSI B11 standards include B11.9, B11.20, et al.

AWS D16.4M/D16.4-2014, Specification for the Qualification of Robotic Arc Welding Personnel
This standard provides specifications for the qualification of robotic arc welding personnel. This standard does not prevent a manufacturer, fabricator, or contractor from continuing to qualify robotic welding personnel according to other standards. Qualification is limited to those performance variables provided in this standard.

AWS D17.1/D17.1M-2010-AM01-2010, Specification for Fusion Welding for Aerospace Application
Provides the general welding requirements for welding aircraft and space hardware. It includes but is not limited to the fusion welding of aluminum-based, nickel-based, cobalt-based, magnesium-based, and titanium-based alloys using electric arc and high energy beam processes. There are requirements for welding design, personnel and procedure qualification, inspection, and acceptance criteria for aerospace, support and non-flight hardware. Additional requirements cover repair welding of existing hardware. A commentary for the specification is included.

AWS D17.1/D17.1M-2010, Specification for Fusion Welding for Aerospace Applications
This specification provides the general welding requirements for welding aircraft and space hardware. It includes but is not limited to the fusion welding of aluminum-based, nickel-based, iron-based, cobalt-based, magnesium-based, and titanium-based alloys using electric arc and high energy beam processes. There are requirements for welding design, personnel and procedure qualification, inspection, and acceptance criteria for aerospace, support and non-flight hardware. Additional requirements cover repair welding of existing hardware. A commentary for the specification is included.

AWS D17.2/D17.2M-2012, Specification for Resistance Welding for Aerospace Applications
This specification provides the general resistance welding requirements for aerospace hardware. It includes, but is not limited to, resistance spot and resistance seam welding of aluminum, magnesium, iron, nickel, cobalt, and titanium-based alloys. There are requirements for machine and procedure qualification, production witness samples, and inspection and acceptance criteria for aerospace hardware.
This specification covers the general requirements for the friction stir welding of aluminum alloys for aerospace applications. It includes the requirements for weldment design, qualification of personnel and procedures, fabrication, and inspection.

This specification provides the requirements for welds in tubing systems in dairy and other food processing plants. The document addresses qualifications, fabrication, extent of visual examination, acceptance criteria, and documentation requirements.

AWS D18.2-2009, Guide to Weld Discoloration Levels on Inside of Austenitic Stainless Steel Tube
This standard addresses factors that affect weld discoloration on the inside of austenitic stainless steel tube. The document contains a color illustration relating the discoloration to the oxygen content of the backing shielding gas.

AWS D18.3/D18.3M-2015, Specification for Welding of Tanks, Vessels, and Other Equipment in Sanitary (Hygienic) Applications
This specification covers the requirements for welding of stainless steels and nickel alloys (as well as carbon steels and other metals for some applications) in sheet, plate, bar, and other forms for the fabrication and construction of new tanks, vessels, and other equipment in sanitary (hygienic) applications. The welding of pipe or tube to a tank, vessel or other piece of sanitary equipment, for use as a nozzle or other opening, is included in this specification. This specification excludes the welding of tube and pipe for the transportation of sanitary (hygienic) system products and cleaning or sanitizing solutions.

AWS D3.6M-2017, Underwater Welding Code
This code covers the requirements for welding structures or components under the surface of water. It includes welding in both dry and wet environments.

AWS D3.9-2010, Specification for Classification of Weld-Through Paint Primers
This specification prescribes the requirements for the classification of weld-through paint primers. The classification is based on paint film thickness and welding procedure. Manufacturers may classify their products to different film thicknesses or welding procedures if they provide the details of their tests.

This specification covers the arc welding of automotive and light truck components that are manufactured from aluminum alloys.

AWS D8.1M-2013, Specification for Automotive Weld Quality -- Resistance Spot Welding of Steel
This document contains both visual and measurable acceptance criteria for resistance spot welds in steels. The information contained herein may be used as an aid by designers, resistance welding equipment manufacturers, welded product producers, and others involved in the automotive industry and resistance spot welding of steels.

AWS D8.2M-2017, Specification for Automotive Weld Quality - Resistance Spot Welding of Aluminum
This document contains both visual and measurable acceptance criteria for resistance spot welds in aluminum. The information contained herein may be used as an aid by designers, resistance welding equipment manufacturers, welded product producers and others involved in the automotive industry and resistance spot welding of aluminum.

AWS D8.8M-2014, Specification for Automotive Weld Quality-Arc Welding of Steel
This specification describes weld geometry and workmanship criteria essential to ensure the quality of automotive and light truck weldments. This specification covers the arc and hybrid arc welding of coated and uncoated steels.

AWS D8.9M-2012, Test Methods for Evaluating the Resistance Spot Welding Behavior of Automotive Sheet Metal Materials
The document contains a number of tests and test methods useful in determining the spot welding performance of coated and uncoated automotive sheet steels of all strength levels and compositions. The test methods are designed to assess current range, electrode endurance, and weld properties of automotive sheet steels. The weld property tests include tests for hold time sensitivity, weld hardness, shear tension strength, and cross tension strength. The document and the test methods, parameters, and test criteria it contains are designed exclusively for laboratory testing and are not intended as recommended practices or standards for manufacturing operations.

This code covers the arc and braze welding requirements for nonstructural sheet metal fabrications using the commonly welded metals available in sheet form. Requirements and limitations governing procedure and performance qualification are presented, and workmanship and inspection standards are supplied. The informative annexes provide useful information on materials and processes.

AWS F1.2-2013, Laboratory Method for Measuring Fume Generation Rates and Total Fume Emission of Welding and Allied Processes
This document outlines a laboratory method for the determination of fume generation rates and total fume emission. A test chamber is used to collect representative fume samples under carefully controlled conditions.

AWS F2.2-2001 (R2009), Lens Shade Selector
This chart provides minimum suggested protective lens shades and suggested comfort lens shades for a variety of commonly used welding and cutting processes.

AWS F2.3M-2011, Specification for Use and Performance of Transparent Welding Curtains and Screens
This standard informs the reader of reasonable and adequate means, ways and methods for the testing, selection and safe use of transparent welding curtains and screens. These devices are designed to provide outside viewers, at some distance from the welding arc or operation, a safe view of the operation and operator.

AWS F4.1-2007, Recommended Safe Practices for the Preparation for Welding and Cutting of Containers and Piping
This standard informs the reader of the necessary safe practices to be followed in the cleaning and preparation of containers and piping for welding or cutting. It describes various methods for cleaning, including water, steam, hot chemical and mechanical, and techniques to be used for their proper preparation, such as inerting.

This standard lists and describes flaws and defects in hot gas, hot gas extrusion, heated tool butt fusion, socket fusion, electrofusion, and flow fusion welded joints in thermoplastics. Its intent is to make possible a generally valid evaluation giving consideration to graded quality requirements. Tables illustrating cracks, voids, solid inclusions, lack of fusion, flaws and defects of shape, and other flaws and defects in thermoplastic welds are included. Flaw and defect features with descriptions and illustrations are compiled into tables to aid in the evaluation of welds.

AWS G1.2M/G1.2-1999 (R2010), Specification for Standardized Ultrasonic Welding Test Specimen for Thermoplastics
This specification outlines the requirements for the ultrasonic welding test sample for thermoplastics and its welding and testing. In order to minimize variations, the geometry for the standard test sample is defined in detailed figures including tolerances on critical dimensions that may affect its weldability. This specification can be used for but not be limited to the following investigations: Thermoplastic Ultrasonic Weldability Studies; Thermoplastic Ultrasonic Welding Optimizations; and Scientific Studies on the Ultrasonic Welding of Thermoplastics.

AWS G2.1M/G2.1-2012, Guide for the Joining of Wrought Nickel-Based Alloys
This document describes the welding of different wrought nickel-based alloys, including solid solution and precipitation hardening alloys.
AWS G2.3M/G2.3-2012, Guide for the Joining of Solid Solution Austenitic Stainless Steels
This guide presents a description of solid solution austenitic stainless steels and the processes and procedures that can be used for the joining of these materials. This standard discusses the welding processes and welding parameters, qualifications, inspection and repair methods, cleaning, and safety considerations. Practical information has been included in the form of figures, tables, and graphs that should prove useful in determining capabilities and limitations in the joining of austenitic stainless steels.

AWS G2.4/G2.4M-2014, Guide for the Fusion Welding of Titanium and Titanium Alloys
This guide provides information on welding processes and procedures that are recommended for use in titanium fabrication. The document presents detailed and up-to-date technical information on the best practices to allow first-time fabricators of titanium as well as established fabricators to join titanium parts into high quality components.

AWS G2.5/G2.5M-2012, Guide for the Fusion Welding of Zirconium and Zirconium Alloys
The standard Guide for the Fusion Welding of Zirconium and Zirconium Alloys provides instructional guidance for the welding of zirconium and zirconium alloys. This guide explains processes, equipment, materials, workshop practices, joint preparation, welding techniques, tests, and the repair of defects.

AWS J1.1/J1.1M-2013, Specification for Resistance Welding Controls
This standard provides nomenclature pertaining to the design, construction, and programming of resistance welding controls. Standard calibration and performance parameters as well as labeling and documentation requirements are also outlined. The purpose is to promote standardization, safety, and proper application of resistance welding controls.

AWS J1.2M/J1.2-2016, Guide for Installation and Maintenance of Resistance Welding Machines
While resistance welding machines vary considerably in size and complexity, there are basic principles applicable to the installation, operation, maintenance, and troubleshooting. This document is intended to provide basic information to the users of the resistance welding equipment to supplement the instructions and recommendations of the equipment manufacturer. Where there is conflict, the equipment manufacturers’ document shall take precedence.

AWS Z49.1-2012, Safety in Welding, Cutting, and Allied Processes
This standard covers all aspects of safety and health in the welding environment, emphasizing oxygen gas and arc welding processes with some coverage given to resistance welding. It contains information on protection of personnel and the general area, ventilation, fire prevention and protection, and confined spaces. A significant section is devoted to precautionary information, showing examples, and an extensive bibliography is included.

This standard contains the essential welding variables for carbon steel in the thickness range of 1/8 inch [3 mm] through 1-1/2 inch [38 mm], using manual shielded metal arc welding. It cites the base metals and operating conditions necessary to make the weldment, the filler metal specifications, and joint designs for fillet welds, partial penetration groove welds, full penetration groove welds with backing, and full penetration welds that are welded from both sides. This SWPS-N was developed primarily for naval applications that require performance to NAVSEA Technical Publication S9074-AQ-GIB-010/248.

This standard contains the essential welding variables for carbon steel in the thickness range of 1/8 inch [3 mm] through 1-1/2 inch [38 mm], using manual shielded metal arc welding. It cites the base metals and operating conditions necessary to make the weldment, the filler metal specifications, and joint designs for fillet welds, full penetration groove welds with backing, and joints welded from both sides. This SWPS-N was developed primarily for naval applications that require performance to NAVSEA Technical Publication S9074-AQ-GIB-010/248.

AWS-NAVSEA B2.1-8-308-2016, Standard Welding Procedure Specification for Naval Applications (SWPS-N) for Gas Tungsten Arc Welding of Austenitic Stainless Steel (S-8), 1/8 inch [3 mm] through 1-1/2 inch [38 mm] Thick, MIL-3XX, in the As-Welded Condition, Primarily Plate and Structural Naval Applications
This standard contains the essential welding variables for austenitic stainless steel in the thickness range of 1/8 inch [3 mm] through 1-1/2 inch [38 mm], using manual gas tungsten arc welding. It cites the base metals and operating conditions necessary to make the weldment, the filler metal specifications, and joint designs for groove and fillet welds. This SWPS-N was developed primarily for naval applications that require performance to NAVSEA Technical Publication S9074-AQ-GIB-010/248, Requirements for Welding and Brazing Procedure and Performance Qualification.

AWS-NAVSEA B2.1-8-318-2016, Standard Welding Procedure Specification for Naval Applications (SWPS-N) for Gas Tungsten Arc Welding of Austenitic Stainless Steel (S-8), 1/8 inch [3 mm] through 1-1/2 inch [38 mm] Thick, MIL-3XX, in the As-Welded Condition, Primarily Pipe for Naval Applications
This standard contains the essential welding variables for austenitic stainless steel in the thickness range of 1/8 inch [3 mm] through 1-1/2 inch [38 mm], using manual gas tungsten arc welding. It cites the base metals and operating conditions necessary to make the weldment, the filler metal specifications, and joint designs for groove and fillet welds. This SWPS-N was developed primarily for naval applications that require performance to NAVSEA Technical Publication S9074-AQ-GIB-010/248, Requirements for Welding and Brazing Procedure and Performance Qualification.

AWWA (American Water Works Association)

ANSI/AWWA A100-2015, Water Wells
This standard describes the minimum requirements for vertical water supply wells.

ANSI/AWWA B100-2015, Granular Filter Material
This standard describes gravel, high-density gravel, silica sand, high-density media, anthracite filter materials, and the placement of the materials in filters for water supply service application.

ANSI/AWWA B101-2016, Precoat Filter Media
This standard describes diatomaceous earth (DE), perlite, and other disposable filter materials used to precoat filters for water supply service.

ANSI/AWWA B102-2014, Manganese Greensand for Filters
This standard describes manganese greensand used in pressure and gravity filters to remove dissolved iron, manganese, radium, arsenic, and hydrogen sulfide for water supply service applications. It discusses the placement, handling, preparation, and regeneration of manganese greensand media.

ANSI/AWWA B112-2015, Microfiltration and Ultrafiltration Membrane Systems
This standard sets minimum requirements for microfiltration (MF) and ultrafiltration (UF) membrane systems for water and reclaimed water filtration systems. This standard does not cover the membranes used in biological wastewater treatment, such as membrane bio-reactors.

ANSI/AWWA B114-2015, Reverse Osmosis and Nanofiltration Systems for Water Treatment
This standard sets minimum requirements for reverse osmosis (RO) and nanofiltration (NF) membrane systems for water and reclaimed water treatment systems.
ANSI/AWWA B116-2014, Electrodialysis and Ion-Exchange Membrane Systems
This standard sets minimum requirements for ion-exchange membrane (IEM) systems such as electrodialysis (ED), electrodialysis reversal (EDR), electrodialysis metathesis (EDM), and electrodeionization (EDI) for water and reclaimed water treatment systems. Please note that the terms 'ion exchange' and 'ion-exchange' are used interchangeably with the terms 'ion transfer' and 'ion-transfer' in this document. Characteristics of ED/EDR membranes are compared to other types of membranes in Table 1.1.

ANSI/AWWA B130-2013, Membrane Bioreactor
This standard sets minimum requirements for membrane bioreactor (MBR) systems for water reclamation and/or wastewater treatment systems.

ANSI/AWWA B200-2017, Sodium Chloride
This standard describes sodium chloride in the forms of rock, vacuum-granulated, solar, and compressed solar salt for use in the recharging of cation-exchange materials in water supply service for softening municipal and industrial potable water, wastewater, and reclaimed water supplies. Additionally, sodium chloride is used in the recharging of anion-exchange materials for nitrate removal or de-alkalization of municipal and industrial supplies.

ANSI/AWWA B201-2013, Soda Ash
This standard describes soda ash for use in the treatment of municipal and industrial water supplies.

ANSI/AWWA B202-2013, Quicklime and Hydrated Lime
This standard describes pebble, lump, and ground quicklime and hydrated lime for use in the treatment of potable water, wastewater, or reclaimed water supply service.

ANSI/AWWA B300-2010, Hypochlorites
This standard describes chlorinated lime, calcium hypochlorite, and sodium hypochlorite for use in water, wastewater, and reclaimed water treatment.

ANSI/AWWA B300a-2011, Hypochlorites
This standard describes chlorinated lime, calcium hypochlorite, and sodium hypochlorite for use in water, wastewater, and reclaimed water treatment.

ANSI/AWWA B301-2010, Liquid Chlorine
This standard describes liquid chlorine for use in water, wastewater, and reclaimed water treatment.

ANSI/AWWA B302-2016, Ammonium Sulfate
This standard describes ammonium sulfate, (NH4) 2SO4, for the use in the treatment of potable water, wastewater, and reclaimed.

ANSI/AWWA B303-2010, Sodium Chlorite
This standard describes sodium chlorite, in either solid (granular, flake, or powdered) or aqueous-solution form, for use in making chlorine dioxide for use in water supply and wastewater service.

ANSI/AWWA B303a-2013, Sodium Chlorite
The scope of this addendum is to increase the amount of Sodium Chloride allowed in the material.

ANSI/AWWA B304-2013, Liquid Oxygen for Ozone Generation for Water, Wastewater, and Reclaimed Water Systems
This standard describes liquid oxygen (LOX) for use in the treatment of potable water, wastewater, or reclaimed water.

ANSI/AWWA B305-2015, Anhydrous Ammonia
This standard describes the use of anhydrous ammonia in the treatment of potable water, wastewater, and reclaimed water.

ANSI/AWWA B306-2015, Aqua Ammonia (Liquid Ammonium Hydroxide)
This standard describes aqua ammonia (liquid ammonium hydroxide) for use in the treatment of potable water, wastewater, or reclaimed water.

ANSI/AWWA B402-2011, Ferrous Sulfate
This standard describes ferrous sulfate (FeSO4) in moist, dried, and solution (liquid) forms for the treatment of potable water, wastewater, or reclaimed water.

ANSI/AWWA B403-2016, Aluminum Sulfate
This standard describes purified aluminum sulfate in liquid, ground, or lump form for use in the treatment of potable water, wastewater, or reclaimed water.

ANSI/AWWA B404-2014, Liquid Sodium Silicate
This standard describes liquid sodium silicate used in the preparation of activated silica, which is used as a coagulant aid for the treatment of potable water, wastewater, or reclaimed water for (1) the control of corrosion and (2) stabilization of iron and manganese.

ANSI/AWWA B405-2016, Sodium Aluminate
This standard describes sodium aluminate (Na2Al2O4) in both liquid and solid form for use in the treatment of potable water, wastewater, or reclaimed water. Sodium aluminate according to this standard is a combination of sodium oxide (Na2O) and aluminum oxide (Al2O3) with sufficient excess causticity (sodium oxide) for stabilization.

ANSI/AWWA B406-2014, Ferric Sulfate
This standard describes dry form ferric sulfate and liquid ferric sulfate for use in water treatment.

ANSI/AWWA B407-2011, Liquid Ferric Chloride
This standard describes ferric chloride in aqueous (liquid) form for use in the treatment of potable water, wastewater, and reclaimed water. Applications of the chemical include (1) water softening with lime or a combination of lime and soda ash to improve hardness reduction and coagulation, and (2) water clarification, as a coagulant, followed by settling or filtration.

ANSI/AWWA B407a-2017, Addendum to B407-11, Liquid Ferric Chloride
This is an addendum for the user of the standard to alleviate the problems of possible solids buildup during the application of ferric chloride. The standard describes ferric chloride in aqueous (liquid) form for use in the treatment of potable water, wastewater, and reclaimed water.

ANSI/AWWA B408-2010, Liquid Polyaluminum Chloride
This standard describes polyaluminum chloride (PACl) in aqueous (liquid) form for use in the treatment of potable, wastewater, and reuse or reclaimed water.

ANSI/AWWA B451-2016, Poly(Diallyldimethylammonium Chloride)
This standard describes poly (diallyldimethylammonium chloride) for use in the treatment of potable water, wastewater, or reclaimed water.

ANSI/AWWA B452-2014, EPI-DMA Polymamines
This standard describes epichlorohydrin dimethylamine (EPI-DMA) polymamines for use in the treatment of potable water, wastewater, and reclaimed water.

ANSI/AWWA B501-2013, Sodium Hydroxide (Caustic Soda)
This standard describes sodium hydroxide, anhydrous and liquid, for use in the treatment of municipal and industrial water supplies.

ANSI/AWWA B502-2017, Sodium Polyphosphate, Glassy
This standard describes sodium polyphosphate, glassy, for use in the treatment of potable water, wastewater, and reclaimed water. This material is also known as sodium hexametaphosphate, sodium tetratopolyphosphate, and Graham’s salt.

ANSI/AWWA B503-2017, Sodium Tripolyphosphate
This standard describes sodium tripolyphosphate for use in the treatment of potable water, wastewater, and reclaimed water.

ANSI/AWWA B504-2012, Monosodium Phosphate, Anhydrous and Liquid
This standard describes monosodium phosphate, anhydrous and liquid, for use in the treatment of potable water, wastewater, and reclaimed water. The product described by this standard is also known as sodium phosphate, monobasic, anhydrous and liquid.
ANSI/AWWA B505-2012, Disodium Phosphate, Anhydrous
This standard describes disodium phosphate, anhydrous, for use in the treatment of potable water, wastewater, and reclaimed water. The product described is an orthophosphate used, as formulated and in blends, to inhibit corrosion of potable water conveyance systems. The product described by this standard is also known as sodium phosphate, dibasic, anhydrous.

ANSI/AWWA B506-2013, Zinc Orthophosphate
This standard describes zinc orthophosphate (ZOP) corrosion inhibitor in dry and liquid forms for use in the treatment of potable water, wastewater, or reclaimed water.

ANSI/AWWA B507-2016, Phosphoric Acid
This standard describes phosphoric acid (H3PO4) corrosion inhibitor in liquid form used in the treatment of potable water, wastewater, and reclaimed water.

ANSI/AWWA B510-2011, Carbon Dioxide
This standard describes carbon dioxide (CO2) for use in recombination and pH adjustment in the treatment of potable water, wastewater, and reclaimed water.

ANSI/AWWA B511-2017, Potassium Hydroxide
This standard describes the use of potassium hydroxide (KOH), dry and liquid, for use in the treatment of potable water, wastewater, and reuse or reclaimed water.

ANSI/AWWA B512-2015, Sulfur Dioxide
This standard describes sulfur dioxide, a compressed, nonflammable liquefied gas, for use in the treatment of potable water, wastewater, or reclaimed water to remove excess residual chlorine.

ANSI/AWWA B550-2017, Calcium Chloride
This standard describes calcium chloride, CaCl2 in powder, pellet, granule, flake, or briquette form for use in the treatment of potable water, wastewater, and reuse or reclaimed water.

ANSI/AWWA B600-2015, Powdered Activated Carbon
This standard describes powdered activated carbon (PAC) for use in adsorption of impurities for water supply service applications.

ANSI/AWWA B601-2011, Sodium Metabisulfite
This standard describes the use of sodium metabisulfite (Na2S2O5) in the treatment of potable water, wastewater, and reuse or reclaimed water.

ANSI/AWWA B602-2017, Copper Sulfate
This standard describes copper sulfate for use in the treatment of potable water, wastewater, or reclaimed water.

ANSI/AWWA B603-2015, Permanganates
This standard describes both dry potassium permanganate (KMnO4) crystals, CAS No. 7722-64-7, as well as liquid sodium permanganate (NaMnO4) solutions, CAS No. 10101-50-5, for use in the treatment of potable and reuse or reclaimed water and wastewater.

ANSI/AWWA B604-2012, Granular Activated Carbon
This standard describes virgin granular and extruded activated carbons for use as a filter medium and adsorbent in water treatment. It involves the selection, placement, and use of granular activated carbon (GAC) in filter adsorbers where the GAC must function as filter medium and adsorbent, as well as those systems where the primary function is adsorption.

ANSI/AWWA B605-2013, Reactivation of Granular Activated Carbon
This standard describes the procurement of granular activated carbon (GAC) reactivation services and the use of reactivated GAC for water treatment. This standard does not cover the design of activated carbon handling facilities, reactivation facilities, or adsorption processes. Background information on GAC reactivation can be found in references listed in the bibliography to this standard (appendix A).

ANSI/AWWA B701-2011, Sodium Fluoride
This standard describes sodium fluoride (NaF), coarse crystalline grade, for use in the treatment of potable water.

ANSI/AWWA B702-2011, Sodium Fluorosilicate
This standard describes sodium fluorosilicate (Na2SiF6) for use in the treatment of potable water.

ANSI/AWWA B703-2011, Fluorosillic Acid
This standard describes fluorosillicic acid (H2SiF6) for use in the treatment of potable water.

ANSI/AWWA B703a-2013, Fluorosillic Acid Addendum
This addendum is to revise the container used for storage of this product.

ANSI/AWWA C110/A21.4-2016, Cement-Mortar Lining for Ductile-Iron Pipe and Fittings
This standard describes shop-applied, cement-mortar linings specified in the ANSI/AWWA C100/A21 series of standards for ductile-iron pipe and ductile-iron and gray-iron fittings for potable water, raw water, wastewater, and reclaimed water systems and is intended to be used as a supplement to those standards.

ANSI/AWWA C105/A21.5-2010, Polyethylene Encasement for Ductile-Iron Pipe Systems
This standard describes materials and installation procedures for polyethylene encasement to be applied to underground installations of ductile-iron pipe. This standard also may be used for polyethylene encasement of fittings, valves, and other appurtenances to ductile-iron pipe systems.

Describes 3- to 48-in. (80- to 1,200-mm) gray-iron or ductile-iron fittings to be used with ductile-iron pipe for potable water, wastewater, and reclaimed water for a temperature range of 33 - 120 °F (0.6 - 49 °C). Requirements for fittings with mechanical joints and flanged joints are listed in Tables 3 through 21 at the end of this standard. This standard may also be used for fittings with push-on joints or such other joints as may be agreed on at the time of purchase.

ANSI/AWWA C111/A21.11-2017, Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
This standard describes rubber-gasket joints of the following types for ductile-iron pressure pipe and ductile-iron and gray-iron fittings, valves, hydrants, and other appurtenances for potable water, raw water, non-aggressive wastewater and reclaimed water supply service.

This standard describes 3-in. through 64-in. (80 mm through 1600 mm) flanged ductile-iron pipe with ductile-iron or gray-iron threaded flanges for potable water, wastewater, and reclaimed water service.

This standard describes protective fusion-bonded coatings for the interior and exterior surfaces of ductile-iron and gray-iron fittings used for raw water, potable water, wastewater, and reclaimed water systems. The standard describes the material, application, and performance requirements for these coatings.

This standard describes the thickness design of ductile-iron pipe complying with the requirements of ANSI/AWWA C151/A21.51, Ductile-Iron Pipe, Centrifugally Cast.

This standard describes 3-in. through 64-in. (80-mm through 1,600-mm) ductile-iron pipe, centrifugally cast, for potable water, raw water, wastewater, and reclaimed water systems with push-on joints or mechanical joints. Requirements for pipe according to this standard are discussed in the text and are shown in Tables 1 through 5 and Figures 1, 2, and 3. This standard may be used for pipe with other types of joints as may be agreed on at the time of purchase.

ANSI/AWWA C153/A21.53-2011, Ductile-Iron Compact Fittings
Describes 3-in. through 64-in. (80-mm through 1,600-mm) ductile-iron compact fittings to be used with ductile-iron pipe or pipe made of other materials with similar outside diameters for conveying potable water, wastewater, and reclaimed water.

ANSI/AWWA C200-2017, Steel Water Pipe - 6 In. (150 mm) and Larger
This standard describes electrically butt-joint-welded straight-seam or spiral-seam pipe and seamless pipe, 6 in. (150 mm) in nominal diameter and larger, for the transmission and distribution of water or for use in other water system facilities.
ANSI/AWWA C203-2015, Coal-Tar Protective Coatings and Linings for Steel Water Pipe
This standard provides the minimum requirements for coal-tar protective coatings and linings used in the water supply industry for buried steel water pipelines. AWWA steel pipe coating and lining standards are written for and based on the service temperature of potable water. For operating temperatures higher than the normal temperature of potable water, consult the manufacturer for recommendations concerning temperature limitations for coal-tar protective coatings and linings.

ANSI/AWWA C205-2012, Cement-Mortar Protective Lining and Coating for Steel Water Pipe - 4 In. (100 mm) and Larger - Shop Applied
This standard describes the material, application, and curing of shop-applied cement-mortar protective linings and coatings for steel water pipe and fittings and field jointing of cement-mortar-lined-and-coated steel water pipe and fittings.

ANSI/AWWA C206-2016, Field Welding of Steel Water Pipe
This standard describes manual, semiautomatic, and automatic field welding by the metal arc-welding process for steel water pipe manufactured in accordance with ANSI/AWWA C200, Standard for Steel Water Pipe - 6 In. (150 mm) and Larger.

ANSI/AWWA C207-2013, Steel Pipe Flanges for Waterworks Service - Sizes 4 In. Through 144 In. (100 mm Through 3,600 mm)
This standard describes ring-type slip-on flanges and blind flanges. The flange pressure limits and the tables that describe them are: 1. Ring-type, slip-on flanges (see Tables 2, 3, and 4). 2. Blind flanges (see Table 5). Unless otherwise specified by the purchaser, the manufacturer shall select the type to be used.

ANSI/AWWA C208-2012, Dimensions for Fabricated Steel Water Pipe Fittings
This standard provides formulas to calculate overall dimensions of fittings for steel water transmission and distribution facilities. Many configurations of fittings are possible and alternatives to this standard may be agreed upon between the purchaser and manufacturer. The fitting dimensions shown in Figures 1 through 5 are the minimum dimensions for fittings with plain ends. In practice, fittings are seldom provided as individual pieces as shown but are shop fabricated into full or special lengths of pipe or fabricated into assemblies, combining a number of fittings.

ANSI/AWWA C209-2013, Cold-Applied Tape Coatings for Steel Water Pipe, Special Sections, Connections, and Fittings
This standard describes the protective exterior coatings, that consist of cold-applied liquid adhesives and prefabricated tapes and their applications to special sections, connections, and fittings to be used for underground and underwater steel water pipelines protected with organic coatings.

ANSI/AWWA C210-2015, Liquid-Epoxy Coatings and Linings for Steel Water Pipe and Fittings
This standard describes the material and application of shop- and field-applied, liquid-epoxy coatings and linings used in the water-supply industry for steel water pipelines installed underground or underwater, under normal construction conditions.

ANSI/AWWA C213-2015, Fusion-Bonded Epoxy Coatings and Linings for Steel Water Pipe and Fittings
This standard describes the material and application requirements for fusion-bonded epoxy coatings and linings for steel water pipe, special sections, welded joints, connections, and fittings for steel water pipelines installed underground or underwater. Fusion-bonded epoxies are heat-activated, chemically cured systems.

ANSI/AWWA C214-2013, Tape Coatings for Steel Water Pipelines
This standard describes the materials and application of tape coating systems in coating plants at fixed sites using coating techniques and equipment as recommended by the tape coating manufacturer.

ANSI/AWWA C215-2016, Extruded Polyolefin Coatings for Steel Water Pipe
This standard describes the materials, systems, and application requirements for shop-applied, extruded polyolefin coatings for the exterior of steel water pipes.

ANSI/AWWA C216-2014, Heat-Shrinkable Cross-Linked Polyolefin Coatings for Steel Water Pipe and Fittings
This standard describes the material, application, and field-procedure requirements for protective exterior coatings consisting of heat-shrinkable, cross-linked polyolefin coatings. ANSI/AWWA C216 also describes the application of protective exterior coatings to special sections, connections, and fittings to be used in underground and underwater steel pipelines.

ANSI/AWWA C217-2016, Microcrystalline Wax and Petroleum Tape Coating Systems for Steel Water Pipe and Fittings
This standard establishes minimum requirements for microcrystalline wax and petroleum tape coatings for steel water pipe and fittings. This standard describes exterior coatings that consist of cold-applied petroleum or microcrystalline wax primers and tapes, and their applications to special sections, connections, and fittings to be used with buried, submerged and aboveground steel water pipelines.

ANSI/AWWA C217a-2017, Microcrystalline Wax and Petroleum Tape Coating Systems for Steel Water Pipe and Fittings
This addendum revises the minimum specific gravity in Table 1 Properties of Primer and Coating from 0.9 to 0.85.

ANSI/AWWA C218-2016, Liquid Coatings for Aboveground Steel Water Pipe and Fittings
This standard describes six coating systems designed to protect the exterior surfaces of steel pipelines and the associated fittings used by the water supply industry in aboveground locations. The coating systems described may not perform or cost the same, but they are presented so that the appropriate coating system can be selected for the site-specific project requirements.

ANSI/AWWA C219-2017, Bolted, Sleeve-Type Couplings for Plain-End Pipe
This standard describes bolted, sleeve-type couplings, reducing or transition couplings, and flanged coupling adapters (couplings) used to join plain-end pipe. Couplings may be manufactured from carbon steel, stainless steel, or ductile iron, and are intended for use in systems conveying water. This standard describes nominal coupling sizes 1/8 in. (13 mm) and larger.

ANSI/AWWA C220-2017, Stainless Steel Pipe - 1/2 In. (13 mm) and Larger
This standard pertains to stainless-steel pipe that is seamless, longitudinal-seam, or spiral-seam welded, 1/2 in. (13 mm) in nominal diameter and larger, intended for the transmission and distribution of potable water, wastewater, reclaimed water and for use in other water-supply system facilities.

ANSI/AWWA C221-2012, Fabricated Steel Mechanical Slip-Type Expansion Joints
This standard describes fabricated steel mechanical slip-type expansion joints having packing chambers for use on pipe with plain, flanged, grooved, or shouldered ends in nominal pipe sizes from 3 in. through 144 in. (75 mm through 3,600 mm). The joints shall be manufactured from steel and are intended for use in systems conveying water. Mechanical expansion joints are not intended for use in buried conditions.

ANSI/AWWA C222-2008, Polyurethane Coatings for the Interior and Exterior of Steel Water Pipe and Fittings
This standard sets minimum requirements for shop- and field-applied polyurethane interior linings and exterior coatings used in the potable water supply industry. These coatings are used for steel water pipe, special sections, welded joints, connections or fittings for steel water pipelines installed underground or underwater operating under normal conditions.

ANSI/AWWA C222a-2009, Polyurethane Coatings for the Interior and Exterior of Steel Water Pipe and Fittings
This addendum includes an addition for a requirement for adhesion to steel in Table 1 Properties of laboratory-applied coatings, and an addition of a section on adhesion to Sec. 4.2 Laboratory-Applied Coating System Requirements.
ANSI/AWWA C223-2013, Fabricated Steel and Stainless Steel Tapping Sleeves
This standard describes fabricated steel and stainless steel tapping sleeves used to provide outlets and branches on existing pipe with or without interruption of service. They are intended for pipe sizes 4 in. (100 mm) through 48 in. (1,200 mm) with branch outlets through 36 in. (900 mm). This standard includes requirements for materials, dimensions, tolerances, finishes, and testing. This standard is not intended to apply to tapping sleeves welded to pipe.

ANSI/AWWA C224-2017, Nylon-11-Based Polyamide Coatings and Linings for Steel Water Pipe and Fittings
This standard describes Nylon-11-based polyamide systems for lining and coating of steel pipe, connections, fittings, and special sections (articles) that are used in water-handling equipment that is installed aboveground, belowground, or underwater. Polyamide systems are thermoplastic and are ordinarily applied in a shop or manufacturing facility.

ANSI/AWWA C225-2013, Fused Polyolefin Coatings for Steel Water Pipelines
This standard describes the materials and application of fused polyolefin coating systems for buried service.

ANSI/AWWA C226-2013, Stainless-Steel Fittings for Waterworks Service, Sizes 1/2 In. Through 72 In. (13 mm Through 1,800 mm)
This standard pertains to the various classes and types of stainless-steel fittings that are intended for the transmission and distribution of potable water, reclaimed water, wastewater and for use in other water-supply system facilities.

ANSI/AWWA C227-2011, Bolted, Split-Sleeve Restrained and Nonrestrained Couplings for Plain-End Pipe
This standard describes bolted, split-sleeve couplings (couplings) used to join plain-end pipe of similar outside diameter. Couplings may be manufactured from carbon steel or stainless steel and are intended for use in systems conveying water, wastewater, or air used in water treatment. This standard covers nominal coupling sizes from 1/2 in. (20 mm) through 144 in. (3,600 mm).

ANSI/AWWA C228-2014, Stainless-Steel Pipe Flange Joints for Water Service - Sizes 2 In. Through 72 In. (50 mm Through 1,800 mm)
This standard describes stainless-steel ring-type slip-on flanges and blind flanges for use in conjunction with stainless-steel pipe used in facilities of waterworks service.

ANSI/AWWA C229-2014, Fusion-Bonded Polyethylene Coatings for Steel Water Pipe and Fittings
This standard describes the materials and application requirements for factory-applied, fusion-bonded polyethylene (FBPE) coating, to the exterior of steel water pipes and fittings.

ANSI/AWWA C230-2016, Stainless-Steel Full-Encirclement Repair and Service Connection Clamps
This standard describes fabricated full-encirclement stainless-steel band clamps for use in the repair or tapped service connection of potable water, wastewater, and reclaimed water piping systems. They are intended for nominal pipe sizes 2 in. (50 mm) through 12 in. (300 mm).

ANSI/AWWA C231-2017, Field Welding of Stainless Steel Water Pipe
This standard describes manual, semiautomatic, and automatic field welding by the metal arc-welding processes for stainless steel potable water, wastewater, and reclaimed water pipe manufactured in accordance with AWWA C220. This standard describes field weldaging of two types of circumferential pipe joints: lap joints and butt joints. This standard also applies to other welding required in field fabrication and installation of specials and appurtenances.

ANSI/AWWA C300-2016, Reinforced Concrete Pressure Pipe, Steel-Cylinder Type
This standard describes the manufacture of reinforced concrete cylinder pipe in sizes 30 in. to 144 in. (760 mm to 3,660 mm), inclusive. Larger sizes have been manufactured based on the concepts of this standard. This type of pipe is designed for the internal pressure, external loads, and bedding conditions designated by the purchaser. This standard does not include requirements for design, handling, delivery, laying, field testing, or disinfection of pipe.

ANSI/AWWA C301-2014, Prestressed Concrete Pressure Pipe, Steel-Cylinder Type
This standard describes the manufacture of circumferentially prestressed concrete pressure pipe in diameter sizes 16 in. (410 mm) through 144 in. (3,660 mm) manufactured with a steel cylinder and wire reinforcement.

ANSI/AWWA C302-2016, Reinforced Concrete Pressure Pipe, Noncylinder Type
This standard describes the manufacture of circumferentially reinforced concrete pressure pipe, without a steel cylinder and not prestressed, in sizes 12 in. to 144 in. (300 mm to 3,660 mm) inclusive and for working pressures not exceeding 55 psi (380 kPa) and working plus surge pressures not exceeding a total pressure of 65 psi (450 kPa).

ANSI/AWWA C303-2017, Concrete Pressure Pipe, Bar-Wrapped, Steel-Cylinder Type
This standard describes the manufacture of concrete pressure pipe, reinforced with a steel cylinder that is helically wrapped with mild steel bar reinforcement, in sizes ranging from 10 in. through 72 in. (250 mm through 1,830 mm), inclusive, and for working pressures up to 400 psi (2,760 kPa).

ANSI/AWWA C304-2014, Design of Prestressed Concrete Cylinder Pipe
This standard defines the methods to be used in the structural design of buried prestressed concrete cylinder pipe (PCCP) under internal pressure. These methods are provided for the design of pipe subjected to the effects of working, transient, and field-test load and internal pressure combinations.

ANSI/AWWA C500-2009, Metal-Seated Gate Valves for Water Supply Service
This standard describes iron-body, brass-mounted, nonrising-stem (NRS) gates valves, including tapping gate valves, 3-in. (75-mm) NPS through 48-in. (1,200-mm) NPS, and outside screw and yoke (OS&Y) rising-stem gate valves, 3-in. (75-mm) NPS through 24-in. (600-mm) NPS, with either double-disc gates having parallel or inclined seats, or solid-wedge gates. These valves are suitable for use in approximately level settings in water systems. These valves are intended for applications where fluid velocities do not exceed 16 ft/sec (4.9 m/sec) when the valve is in the full open position.

ANSI/AWWA C502-2014, Dry-Barrel Fire Hydrants
This standard describes post-type, dry-barrel fire hydrants with compression shutoff (opening against or with the pressure) or gate shutoff for use in fire protection service in all climates, including those where freezing occurs.

ANSI/AWWA C503-2014, Wet-Barrel Fire Hydrants
This standard pertains to the various types and classes of wet-barrel fire hydrants for use in fire protection service in areas where the climate is mild and freezing temperatures do not occur. A wet-barrel hydrant has one or more valve openings above the ground line and, under normal operating conditions, the entire interior of the hydrant is subjected to water pressure at all times. Each outlet nozzle has an independent, compression-type valve (i.e., working with or against the pressure) that controls discharge from that particular outlet.

ANSI/AWWA C504-2015, Rubber-Seated Butterfly Valves
This standard establishes minimum requirements for rubber-seated butterfly valves, 3 in. (75 mm) through 72 in. (1,800 mm) in diameter, with various body and end types, for fresh and reclaimed water having a pH range from 6-12 and a temperature range from 33°-125°F (0.6°-52°C). This standard covers rubber-seated butterfly valves suitable for a maximum steady-state fluid working pressure of 250 psig (1,723 kPa), a maximum steady-state differential pressure of 250 psi (1,723 kPa), and a maximum full open fluid velocity of 16 ft/sec (4.9 m/sec) based on nominal valve size.
ANSI/AWWA C507-2014, Ball Valves, 6 In. Through 60 In. (150 mm Through 1,500 mm) This standard covers gray-iron, ductile-iron, and cast-steel, flanged-end, low-leakage, shaft- or trunnion-mounted, full-port, double- and single-seat ball valves for pressures up to 150 psi (1,050 kPa) in sizes 6-in. through 60-in. (150-mm through 1,500-mm) diameter and pressures up to 300 psi (2,100 kPa) in sizes from 6-in. through 48-in. (150-mm through 1,200-mm) diameter for use in water, wastewater, and reclaimed water systems having water with a pH greater than 6 and less than 12 and with temperatures greater than 32°F (0°C) and less than 125°F (52°C).

ANSI/AWWA C508-2017, Swing-Check Valves for Waterworks Service, 2-In. Through 48-In. (50-mm Through 1200-mm) NPS This standard describes iron-body, unassisted, swing-check, valves, 2-in. through 48-in. (50-mm through 1200-mm) NPS, with mechanical-joint or flanged ends that are installed in approximately level settings in water systems.

ANSI/AWWA C509-2015, Resilient-Seated Gate Valves for Water Supply Service This standard covers iron-body, resilient-seated gate valves with nonrising stems (NRS) and outside screw-and-yoke (OS&Y) rising stems, including tapping gate valves, for water supply service having a temperature range from 33°-125°F (0.6°-52°C).

ANSI/AWWA C510-2017, Double-Check Valve Backflow Prevention Assembly This standard describes the double check prevention assembly for potable water applications. The assembly shall be capable of withstanding a working water pressure of at least 150 psi (1,034 kPa) without damage to working parts or impairment of function and for operation on hot or cold potable water lines.

ANSI/AWWA C511-2017, Reduced-Pressure Principle Backflow Prevention Assembly This standard describes the reduced-pressure principle backflow prevention assembly for potable water applications. The assembly shall be capable of withstanding a working water pressure of at least 150 psi (1,034 kPa) with damage to working parts or impairment of function and for operation on hot or cold potable water lines.

ANSI/AWWA C512-2015, Air-Release, Air/Vacuum, and Combination Air Valves for Water and Wastewater Service This standard describes &189; - (13-mm) through 6-in. (150-mm) air-release valves and &189; - (13-mm) through 20-in (500-mm) air/vacuum valves and combination air valves having gray cast-iron, ductile-iron, carbon steel, or stainless steel bodies for use in water or wastewater systems.

ANSI/AWWA C514-2015, Air Valve and Vent Inflow Preventer Assemblies for Potable Water Distribution System and Storage Facilities This standard describes 1-in. (25-mm) through 12-in. (300-mm) air valve and vent inflow preventer assemblies designed for use on the outlet of potable water distribution system air valves furnished in accordance with ANSI/AWWA C512 or storage facility vent pipes. The assemblies shall have a minimum design pressure of 25 psi (172.4 kPa [gauge]) and prevent the entry of contaminated water between 0 and 57.7 ft. (17.6 m) of submergence at liquid temperatures ranging from 32°F (0°C) to a maximum of 125°F (52°C).

ANSI/AWWA C515-2015, Reduced-Wall, Resilient-Seated Gate Valves for Water Supply Service This standard covers reduced-wall, resilient-seated gate valves with nonrising stems (NRS) and outside screw-and-yoke (OS&Y) rising stems, including tapping gate valves, for water supply service having a temperature range of 33°-125°F (0.6°-52°C).

ANSI/AWWA C516-2015, Large Diameter Rubber-Seated Butterfly Valves Sizes 78 In. (2,000 mm) and Larger This standard establishes minimum requirements for rubber-seated butterfly valve assemblies, 78 in. (2,000 mm) diameter and larger with flanged ends for fresh and reclaimed water having a pH range from 6-12, a temperature range from 33 ° - 125 °F (0.6° - 52°C) suitable for a maximum steady-state fluid working pressure of 250 psi (1,724 kPa [gauge]), maximum steady-state differential pressure of 250 psi (1,724 kPa), a maximum full open fluid velocity of 16 ft/sec (4.9 m/sec).

ANSI/AWWA C517-2016, Resilient-Seated Cast-Iron Eccentric Plug Valves This standard describes resilient seated cast-iron eccentric plug valves, 3 in. (75 mm) through 72 in. (1,800 mm) in diameter, with flanged, grooved, or mechanical-joint ends, for water, wastewater, and reclaimed water systems having a pH range from 6 to 12 and a temperature range from 33 degrees F to 125 degrees F (0.6 degrees C to 52 degrees C).

ANSI/AWWA C518-2013, Dual-Disc Swing-Check Valves for Waterworks Service This standard establishes minimum requirements for dual-disc swing-check valves, 2-in. (50-mm) through 48-in. (1,200-mm) NPS for clean water having a pH range from 6 to 10 and a temperature range of 33 degrees-125 degrees F (0.6 degrees -52 degrees C).

ANSI/AWWA C520-2014, Knife Gate Valves, Sizes 2 In. (50 mm) Through 96 In. (2,400 mm) This standard describes bonneted, bonnetless and one- and two-piece fabricated stainless-steel and cast-ductile-iron body knife gate valves with resilient or metal seats, including tapping knife gate valves, for use in water, wastewater, and reclaimed water systems with pH range from 6 to 12 and a temperature range from 33°F &186; to 125°F &186; F (0.6°C &186; to 52°C).

ANSI/AWWA C530-2017, Pilot-Operated Control Valves This standard establishes minimum requirements for pilot-operated control valves of globe, angle and wye body styles with various end connections in sizes from 1 ½ in. through 60 in. (37.5 mm through 1,500 mm) in diameter, with water having a pH range from 6 to 9 and a temperature range from 40 degrees to 125 degrees F (4.4 degrees to 52 degrees C).

ANSI/AWWA C541-2016, Hydraulic and Pneumatic Cylinder and Vane-Type Actuators for Valves and Slide Gates This standard describes hydraulic and pneumatic linear and quarter turn actuators for operation of valves and slide gates in utility systems.

ANSI/AWWA C542-2016, Electric Motor Actuators for Valves and Slide Gates This standard describes electric motor actuators for valves and slide gates in water, wastewater, and reclaimed water utility systems. Electric motor actuators are designed to produce a multi-turn rotary motion output to actuate a multi-turn valve or gate, or to actuate an external gearhead for quarter-turn valves. Electric motor actuators not requiring external gearheads for quarter-turn valves are defined in Sec. 4.4.1.2.

ANSI/AWWA C550-2017, Protective Interior Coatings for Valves and Hydrants This standard describes protective interior coatings for valves used for water supply, wastewater collection and treatment, and reclaimed water utility systems. Electric motor actuators are designed to produce a multi-turn rotary motion output to actuate a multi-turn valve or gate, or to actuate an external gearhead for quarter-turn valves. Electric motor actuators not requiring external gearheads for quarter-turn valves are defined in Sec. 4.4.1.2.

ANSI/AWWA C560-2014, Cast-Iron Slide Gates This standard describes vertically-mounted, cast-iron slide gates with full aperture closing, designed for either seating head, unseating head, or both, in ordinary water-supply and wastewater service. The gates are primarily used to shut off or throttle water or wastewater flow through a rectangular or round orifice, end of channel, or in-channel opening. The gates may be either conventional-closure or the flush-bottom-closure type and may open upward or downward.

ANSI/AWWA C560a-2015, Cast Iron Slide Gates This addendum describes the clarification of the requirements for the manufacture, design, installation and delivery of a cast iron slide gate.

ANSI/AWWA C561-2014, Fabricated Stainless-Steel Slide Gates This standard describes vertically mounted, fabricated stainless-steel slide gates with full-aperture closure, designed for either seating or unseating head, or both, in ordinary water-supply and wastewater service. The gates are primarily used to shut off or throttle water or wastewater flow through a rectangular or round orifice, end of channel, or in-channel opening.
ANSI/AWWA C655-2009, Field Dechlorination
This standard describes procedures, materials, and requirements for the dechlorination of chlorinated or chloraminated water discharges.

ANSI/AWWA C670-2015, Online Chlorine Analyzer Operation and Maintenance
This standard describes online chlorine operation and maintenance (O&M) when the online chlorine analyzer is used in the treatment and monitoring of potable water, reclaimed water, or wastewater.

ANSI/AWWA C671-2015, Online Turbidimeter Operation and Maintenance
This standard describes online turbidimeter operation and maintenance (O & M) when the online turbidimeters are used in the treatment and monitoring of potable water, reclaimed water, or wastewater effluent.

ANSI/AWWA C700-2015, Cold-Water Meters - Displacement Type, Metal Alloy Main Case
This standard describes the various types and classes of cold-water displacement meters with metal alloy main cases, in sizes 3/4 in. (13 mm) through 2 in. (50 mm), and the materials and workmanship employed in their fabrication. The displacement meters described, known as rotating-disc or oscillating-piston meters, are positive in action because the pistons and discs displace or carry over a 0.001 mg/L xed quantity of water at each rotation or oscillation when operated under positive pressure.

ANSI/AWWA C701-2015, Cold-Water Meters - Turbine Type, for Customer Service
This standard describes the various classes of cold-water turbine meters in sizes 3/4 in. (20 mm) through 2 in. (500 mm) for water supply customer service, mainline metering, and custody transfer of water among purveyors, and the materials and workmanship employed in their fabrication. The turbine meters described in this standard are divided into class I and class II meters. Both classes of meters register by recording the revolutions of a turbine set in motion by the force of flowing water striking its blades.

ANSI/AWWA C702-2015, Cold-Water Meters - Compound Type
This standard describes the various types and classes of cold-water compound-type meters in sizes 2 in. (50 mm) through 8 in. (200 mm), and the materials and workmanship used in their fabrication. Compound meters shall consist of a combination of a turbine-type, mainline meter for measuring high rates of flow and a bypass meter of an appropriate size for measuring low rates of flow. The compound meter shall have an automatic valve mechanism for diverting low rates of flow through the bypass meter.

ANSI/AWWA C703-2015, Cold-Water Meters - Fire-Service Type
This standard describes the various types and classes of cold-water fire-service-type meters in sizes 3 in. (80 mm) through 10 in. (250 mm) and the materials and workmanship used in their fabrication.
ANSI/AWWA C704-2015, Propeller-Type Meters for Waterworks Applications
This standard describes the various types and classes of propeller meters in sizes 2 in. (50 mm) through 72 in. (1,800 mm) for waterworks applications. These meters register by recording the revolutions of a propeller set in motion by the force of flowing water striking the blades.

ANSI/AWWA C707-2010 (R2015), Encoder-Type Remote-Registration Systems for Cold-Water Meters
This standard covers encoder-type remote-registration systems for use on cold-water meters for water-utility customer service, particularly, the materials and workmanship employed in the fabrication and assembly of the on-meter registers.

ANSI/AWWA C708-2015, Cold-Water Meters - Multijet Type
This standard describes cold water, multijet meters in sizes 5/8 in. (15 mm) through 2 in. (50 mm) for water utilities' customer service and the materials and workmanship employed in their fabrication. These meters register by recording the revolutions of a rotor set in motion by the force of flowing water striking the blades.

ANSI/AWWA C710-2015, Cold-Water Meters - Displacement Type, Plastic Main Case
This standard describes the various types and classes of cold-water displacement meters with plastic main cases, in sizes 1/2 in. (13 mm) through 1 in. (25 mm), for water utility customer service, and the materials and workmanship employed in their fabrication. The displacement meters described, known as nutating-disc or oscillating-piston meters, are positive in action because the pistons and discs displace or carry over a fixed quantity of water for each nutation or oscillation when operated under positive pressure.

ANSI/AWWA C712-2015, Cold-Water Meters – SingleJet Type
This standard describes the various types and classes of cold-water, singlejet meters in sizes 5/8 in. (15 mm) through 6 in. (150 mm) for water utilities' customer service and the materials and workmanship employed in their fabrication. These meters register by recording the revolutions of a rotor powered by the force of flowing water striking its blades.

ANSI/AWWA C713-2015, Cold-Water Meters - Fluidic-Oscillator Type
This standard describes cold-water fluidic-oscillator meters with brass main cases in sizes 1/2 in. (13 mm) through 2 in. (50 mm) and the materials and workmanship employed in their fabrication. The basis for volume measurement is a transducer element that senses and utilizes fluidic oscillation rather than a moving measurement element, as required in traditional cold-water volumetric meters.

ANSI/AWWA C714-2013, Cold-Water Meters for Residential Fire Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes
This standard describes cold-water meters used for residential fire sprinkler applications that meet the requirements of NFPA 13D in single- and two-family dwellings and manufactured homes, in sizes 3/4 in. (20 mm) through 2 in. (50 mm), and the materials and workmanship employed in their fabrication.

ANSI/AWWA C750-2016, Transit-Time Flowmeters in Full Closed Conduits
This standard describes transit-time ultrasonic flowmeters for water supply service application in pipes running full. An ultrasonic flowmeter is a meter that uses acoustic energy signals to measure liquid velocity. There are currently two distinct types of ultrasonic flowmeters available: Doppler-effect and transit-time. The Doppler-effect meter is used exclusively for liquids containing solid particles or gases, and the transit-time flowmeter is used in a wide variety of applications in the water industry.

ANSI/AWWA C751-2015, Magnetic Inductive Flowmeters
Magnetic inductive flowmeters or electromagnetic flowmeters are commonly called magmeters. The flowmeter referenced in this standard will be called a magmeter or magnetic flowmeters interchangeably. Magmeters are available in wafer style and threaded and flanged end connection designs. These spool/tube design flowmeters are most commonly used in the water industry. This standard will focus on magmeters of this design.

ANSI/AWWA C800-2014, Underground Service Line Valves and Fittings
This standard covers valves, fittings, service saddles, and meter setters for use in service line from the main through the meter valve or meter-setting appurtenance.

ANSI/AWWA C900-2016, Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 In. Through 60 In. (100 mm Through 1,500 mm) for Water Transmission and Distribution
This standard covers PVC pipe and fabricated fittings manufactured for conveying potable water, reclaimed water, irrigation water, wastewater, or any fluid compatible with non-plasticized PVC. The standards include 8 dimension ratios (DR’s) and nominal sizes ranging from 4 in. through 60 in. (100 mm through 1,500 mm). Standard pipe outside diameters (OD’s) conform to the ductile iron and cast iron sizing system, referred to as cast iron or CID, and steel pipe, referred to as IPS.

ANSI/AWWA C901-2017, Polyethylene (PE) Pressure Pipe and Tubing, 3/4 In. (19 mm) Through 3 In. (76 mm), for Water Service
This standard describes polyethylene (PE) pressure pipe and tubing made from material having standard PE code designation PE4710 and intended for use in potable water, reclaimed water, and wastewater service.

ANSI/AWWA C903-2016, Polyethylene-Aluminum-Polyethylene (PE-AL-PE) Composite Pressure Pipe, 12 mm (1/2 In.) Through 51 mm (2 In.) for Water Service
This standard describes the requirements for composite polyethylene-aluminum-polyethylene pipe (hereinafter referred to as PE-AL-PE) in metric nominal inside diameter sizes 12 mm (1/2 inch) through 51 mm (2 inch). The pipe described by this standard is intended to be used for potable cold water supply outside buildings as buried water main and service pipeline.

ANSI/AWWA C904-2015, Cross-linked Polyethylene (PEX) Pressure Tubing, 1/2 In. (13 mm) Through 3 In. (76 mm), for Water Service
This standard describes Cross-linked Polyethylene (PEX) pressure tubing made from material having a standard PEX material designation code of PEX 1306, or higher, according to ASTM F876, and intended for use as underground potable water, reclaimed water, and wastewater service lines in sizes 1/2 in. (13 mm) through 3 in. (76 mm) that conform to a standard dimension ratio of SDR9. Tubing may incorporate an optional polymeric outer layer.

ANSI/AWWA C906-2014, Polyethylene (PE) Pressure Pipe and Fittings, 4 In. through 65 In. (100 mm through 1,600 mm), for Waterworks
This standard describes polyethylene (PE) pressure pipe made from materials conforming to standard PE materials designation codes PE2606, PE2706, PE2708, PE3608, PE3708, PE3710, PE4608, PE4708 and PE4710. The pipe is primarily intended for use in transporting water in either buried or aboveground installations.

ANSI/AWWA C907-2017, Injection-Molded Polyvinyl Chloride (PVC) Pressure Fittings, 4 In. Through 12 In. (100 mm Through 300 mm), for Water, Wastewater, and Reclaimed Water Service
This standard describes Pressure Class 235 polyvinyl chloride (PVC) injection-molded fittings with push-on, rubber-gasketed joints in nominal sizes 4 in. through 12 in. (100 mm Through 300 mm) for use in water, wastewater, and/or reclaimed water service.

ANSI/AWWA C909-2015, Molecularly Oriented Polyvinyl Chloride (PVC-O) Pressure Pipe, 4 In. (100 Mm) and Larger
This standard pertains to molecularly oriented polyvinyl chloride (PVC-O) pressure pipe that is manufactured from starting stock pipe made from ASTM D1784 cell class 12454 material. The starting stock materials are then oriented through circumferential expansion to provide a hydrostatic design basis (HDB) of 7,100 psi (49.0 MPa). The pipe is primarily intended for use in transporting potable water, wastewater, and reclaimed water in buried installations.
ANSI/AWWA C950-2013, Fiberglass Pressure Pipe

This standard describes the fabrication and the testing of nominal 1-in. through 156-in. (25-mm through 4,000-mm) fiberglass pipe and joining systems for use in both aboveground and belowground water services. Service and distribution piping systems and transmission piping systems are included.

ANSI/AWWA D100-2011, Welded Carbon Steel Tanks for Water Storage

The purpose of this standard is to provide minimum requirements for the design, construction, inspection, and testing of new welded carbon steel tanks for the storage of water at atmospheric pressure.

ANSI/AWWA D102-2014, Coating Steel Water-Storage Tanks

This standard describes coating systems for coating and recoating the inside and outside surfaces of steel tanks used for potable water storage in water supply service. Coating systems for new bolted steel tanks are not described in this standard (see ANSI/AWWA D103).

ANSI/AWWA D103-2009, Factory-Coated Bolted Carbon Steel Tanks for Water Storage

The purpose of this standard is to provide minimum requirements for the design, construction, inspection, and testing of new cylindrical, factory coated, bolted carbon steel tanks for the storage of water. This standard is only applicable to tanks with a base elevation substantially at ground level.

ANSI/AWWA D103a-2014, Addendum to ANSI/AWWA D103-09, Factory-Coated Bolted Carbon Steel Tanks for Water Storage

This addendum includes the modification of tank shell design equations Eq 5-1, Eq 5-2, Eq 5-3, and Eq 5-9 for shell plate thickness, allowable compressive stress, minimum bolt spacing, and maximum roof support spacing, respectively. The modifications take into account a strength reduction factor, F, based on the firing temperature of the factory-applied coatings.

ANSI/AWWA D104-2010, Automatically Controlled, Impressed-Current Cathodic Protection for the Interior Submerged Surfaces of Steel Water Storage Tanks

This standard describes automatically controlled, impressed-current cathodic protection systems intended to minimize corrosion of interior submerged surfaces of steel water storage tanks and 30-in. (750-mm) diameter and larger wet risers of elevated tanks.

ANSI/AWWA D106-2015, Sacrificial Anode Cathodic Protection Systems for the Interior Submerged Surfaces of Steel Water Storage Tanks

This standard describes sacrificial anode cathodic protection systems intended to minimize corrosion of interior submerged surfaces of steel water storage tanks. This standard does not describe automatically or manually controlled impressed current systems.

ANSI/AWWA D107-2015, Composite Elevated Tanks for Water Storage

This standard describes the design, construction, inspection, and testing of composite elevated tanks that use a welded steel tank for watertight containment and a single pedestal concrete support structure. Requirements for the steel tank, concrete support structure, foundation, and accessories are included. Site selection and procurement; tank sizing; postcommissioning inspection and maintenance; and the design, operation, and control of the water distribution system that connects to the composite elevated tank are beyond the scope of this standard.

ANSI/AWWA D108-2010, Aluminum Dome Roofs for Water Storage Facilities

This standard establishes minimum criteria for the design, fabrication, and erection of structurally supported aluminum dome roofs.

ANSI/AWWA D110-2013, Wire- and Strand-Wound, Circular, Prestressed Concrete Water Tanks

The intent of this standard is to describe current recommended practice for the design, construction, inspection, and maintenance of wire- and strand-wound, circular, prestressed concrete water-containing structures with the following four types of core walls: Type I - cast-in-place concrete with vertical prestressed reinforcement; Type II - shotcrete with a steel diaphragm; Type III - precast concrete with a steel diaphragm; and Type IV - cast-in-place concrete with a steel diaphragm.

ANSI/AWWA D115-2017, Tendon-Prestressed Concrete Water Tanks

This standard describes current and recommended practice for the design, construction, and field observations of concrete tanks using tendons for prestressing. This standard applies to containment structures for use with potable water, raw water, or wastewater.

ANSI/AWWA D120-2009, Thermosetting Fiberglass-Reinforced Plastic Tanks

This standard describes the composition, performance requirements, construction practices and workmanship, design, and methods of testing thermosetting fiberglass-reinforced plastic (FRP) tanks for the storage of water or other liquids used in water supply service.

ANSI/AWWA D121-2012, Bolted Aboveground Thermosetting Fiberglass-Reinforced Plastic Panel-Type Tanks for Water Storage

This standard describes the design, fabrication, installation, inspection, and testing of bolted aboveground thermoset fiberglass-reinforced plastic (FRP) panel-type tanks for potable water. Requirements for the fabrication, handling, construction, and testing of FRP panels, concrete and steel foundation structure, foundation, and accessories are included.

ANSI/AWWA D121a-2014, Addendum to D121-12, Bolted Aboveground Thermosetting Fiberglass-Reinforced Plastic Panel-Type Tanks For Water Storage

This addendum corrects the initial, unaged ultimate compressive strength requirements for FRP panels in the weakest direction.

ANSI/AWWA D130-2011, Geomembrane Materials for Potable Water Applications

This standard pertains to geomembrane materials supplied in sheet form for lining, covering, or lining and covering potable water reservoirs.

ANSI/AWWA E102-2017, Submersible Vertical Turbine Pumps

This standard provides minimum requirements for submersible vertical turbine pumps utilizing a discharge column pipe assembly for installation in wells, water treatment plants, water transmission systems, and water distribution systems. Electric motors are the only type of prime movers addressed in this standard.

ANSI/AWWA E103-2015, Horizontal and Vertical Line-Shaft Pumps

This standard provides minimum requirements for horizontal centrifugal pumps and for vertical line-shaft pumps for installation in wells, water treatment plants, water transmission systems, and water distribution systems.

ANSI/AWWA F101-2013, Contact-Molded, Fiberglass-Reinforced Plastic Wash-Water Troughs and Launders

This standard describes the minimum requirements for fiberglass-reinforced plastic wash-water troughs and launders made by the contact-molding process, including flat-bottom, round-bottom, and V-bottom troughs and launders. Requirements are included for materials, properties, design, construction, dimensions, tolerances, work quality, and appearance. This standard also describes the requirements for using general-purpose and chemical-resistant resins.


This standard describes the minimum requirements for fiberglass-reinforced plastic weir plates, scum baffles, mounting brackets, lap plates, cover washers, and weir pans, fabricated with the matched-die molding process. Included are requirements for design, construction, dimensions, tolerances, physical properties, work quality, appearance, and installation. This standard contains the requirements for using general-purpose and chemical-resistant resins.
This standard sets the minimum requirements for closed-vessel UV disinfection systems and equipment elements used for drinking water disinfection of Cryptosporidium, Giardia, and viruses. It does not include wastewater, reuse, or advanced oxidation treatment. Equipment and elements covered under this standard include UV reactors, related appurtenances, and reactor validation.

ANSI/AWWA G100-2017, Water Treatment Plant Operation and Management
This standard describes the critical requirements for the effective operation and management of drinking water treatment plants.

ANSI/AWWA G200-2015, Distribution Systems Operation and Management
This standard describes the critical requirements for the effective operation and management of drinking water distribution systems.

ANSI/AWWA G300-2014, Source Water Protection
This standard describes the essential elements for the effective protection of source waters.

ANSI/AWWA G400-2009, Utility Management System
This standard covers the essential requirements for an effective utility management system.

This standard describes the critical elements of effective business practices for the operation and management of water and wastewater utilities. It encompasses the major functions necessary to sustain a successful utility and information management.

ANSI/AWWA G420-2017, Communication and Customer Relations
This standard covers the essential requirements to effectively manage communication and customer relations.

This standard covers the minimum requirements for a protective security program for a water, wastewater, or reuse utility.

This standard covers the minimum requirements to establish and maintain an acceptable level of emergency preparedness based on the identified and perceived risks facing utilities within the water sector.

ANSI/AWWA G480-2013, Water Conservation Program Operation and Management
This standard describes the critical elements of an effective water conservation program. It encompasses activities undertaken by a utility within its own operations to improve water use on the supply side through distribution system management and on the demand side through customer billing and education practices. A conservation program meeting this standard has the potential to impact all water users.

ANSI/AWWA G481-2014, Reclaimed Water Programs Operation and Management
This standard describes the critical requirements for the effective operation and management of a reclaimed water program. Reclaimed water, for the purposes of this standard, is treated domestic wastewater that is at all times adequately and reliably treated to the level appropriate for the end use.

ANSI/AWWA G510-2013, Wastewater Treatment Plant Operations and Management
This standard describes the essential critical requirements for the effective operation and management of a wastewater treatment plant.

ANSI/AWWA G520-2017, Wastewater Collection System Operation and Management
This standard describes the critical requirements for the effective operation and management of a wastewater collection system.

ANSI/AWWA J100-2010 (R2013), Risk and Resilience Management of Water and Wastewater Systems
This standard sets the requirements for all-hazards risk and resilience analysis and management for the water sector and prescribes methods that can be used for addressing these requirements. The standard documents a process for identifying vulnerabilities to man-made threats, natural hazards, and dependencies and proximity to hazardous sites and provides methods to evaluate the options for improving these weaknesses in water and wastewater utilities.

B11 (B11 Standards, Inc.)

ANSI B11.0-2015, Safety of Machinery
This standard applies to new, modified or rebuilt power driven machines, not portable by hand, used to shape and/or form metal or other materials by cutting, impact, pressure, electrical or other processing techniques, or a combination of these processes. This can be a single machine or a machinery system(s). Other industry sectors may benefit from applying this standard. Where a machine-specific (type-C) standard exists and the requirements of that standard conflict with the requirements in this standard, the requirements of the machine-specific (type-C) standard shall generally apply.

ANSI B11.1-2009 (R2014), Safety Requirements for Mechanical Power Presses
The requirements of this standard apply only to those mechanically-powered machine tools commonly referred to as mechanical power presses, which transmit force mechanically to cut, form, or assemble metal or other materials by means of tools or dies attached to or operated by slides.

ANSI B11.10-2003 (R2015), Safety Requirements for Metal Sawing Machines
This standard specifies safety requirements for the design, construction, modification, operation and maintenance (including installation, dismantling and transport) of a general class of stationary machine tools that use a saw blade (tool) to cut off or change the shape of the workpiece. This standard also applies to ancillary devices integrated into the machine (e.g., part handling mechanisms, chip handling systems).

ANSI B11.11-2001 (R2012), Safety Requirements for Gear and Spline Cutting Machines
This standard specifies safety requirements for the design, construction, operation and maintenance (including installation, dismantling and transport) of gear and spline cutting machines (see 3.1). The requirements of this standard apply to machines with single or multiple spindles that are specifically constructed to produce gear teeth by the process of hobbing, milling, shaping, and broaching. It also applies to those machines that shave, hone, lap, or chamfer gear teeth and machines used to produce ratchet, spline, or sprocket teeth.

ANSI B11.12-2005 (R2015), Safety Requirements for Roll-forming and Roll-bending machines
This standard specifies the safety requirements for the design, construction, operation and maintenance (including installation, dismantling, and transport) of roll-forming and roll-bending machines.

ANSI B11.13-1992 (R2012), Single and Multiple Spindle Automatic Bar, and Chucking Machines - Safety Requirements for Construction, Care, and Use
This standard applies to single and multiple spindle automatic bar and chucking machines in which all tool movement is controlled by the machine.

ANSI B11.15-2001 (R2012), Safety Requirements for Pipe, Tube and Shape Bending Machines
The requirements of this standard apply to any power-driven machine designed for bending pipe, tube, and shapes by means of bending dies, clamp dies, pressure dies, mandrels, wiper dies, vertical bending punches, radius dies, wing dies, and associated tooling.

ANSI B11.16-2014, Safety Requirements for Powder / Metal Compacting Presses
The requirements of this standard apply to those mechanically, hydraulically or direct drive machines that are designed, modified, or converted for the purpose of compressing metallic or nonmetallic powders.
ANSI B11.2-2013, Safety Requirements for Hydraulic and Pneumatic Power Presses

The requirements of this standard apply only to those hydraulically or pneumatically powered machines, commonly referred to as hydraulic / pneumatic power presses, which transmit force to cut, form, or assemble metal or other materials by means of tools or dies attached to or operated by plungers or slides. Included: manually fed presses / transfer presses / automatically fed presses / presses utilized for hydropforming, spotting or tryout / tandem line presses / presses used in production cells. Not intended for consideration as an ISO standard.

ANSI B11.20-2004 (R2015), Safety Requirements for Integrated Manufacturing Systems

This American National Standard specifies the safety requirements for the design, construction, set-up, operation and maintenance (including installation, dismantling and transport) of integrated manufacturing systems. An integrated manufacturing system: a) incorporates two or more industrial machines, at least one of which is a machine tool; b) is linked by a material handling system; c) is interconnected with and coordinated by a control system; d) is capable of being re-programmed, re-configured or re-sequenced for the manufacturing of a variety of discrete parts or assemblies.

ANSI B11.21-2006 (R2012), Safety Requirements for Machine Tools Using Lasers for Processing Materials

This standard applies to machine tools using a laser for processing materials, and its associated equipment. It describes the hazards generated by such machines and states the protective measures to be incorporated into such machines. The standard also contains requirements for the information provided with such machines.

ANSI B11.22-2001 (R2012), Safety Requirements for Turning Centers and Automatic Numerically Controlled Turning Machines

This standard specifies the safety requirements for the design, construction, operation and maintenance (including installation, dismantling and transport) of turning centers and automatically numerically controlled turning machines.

ANSI B11.23-2001 (R2012), Safety Requirements for Machining Centers and Automatic Numerically Controlled Milling, Drilling and Boring Machines

This standard specifies the safety requirements for the design, construction, operation and maintenance (including installation, dismantling, and transport) of machining centers and automatically numerically controlled milling, drilling and boring machines. This standard is applicable to machines where the axes of travel is not greater than 1x1x1 m (39x39x39 in).

ANSI B11.24-2001 (R2012), Safety Requirements for Transfer Machines

This standard specifies the safety requirements for the design, construction, operation and maintenance (including installation, dismantling and transport) of transfer machines.

ANSI B11.25-2015, Safety requirements for large machines

This standard applies to machines with a work envelope equal to or greater than two cubic meters (2 m3) or two meters of linear axis travel or where personnel are regularly required to enter into the working envelope to perform work or tasks.

ANSI B11.3-2012, Safety Requirements for Power Press Brakes

The requirements of this standard apply to those machine tools classified as power press brakes (hereinafter referred to simply as 'press brakes'), which are designed and constructed for the specific purpose of bending material. The requirements of this standard also apply to powered folding machines. Excluded from the requirements of this standard are mechanical power presses; hydraulic power presses, hand brakes; tangential brakes; ironworker brakes; and other similar types of metal bending machines.

ANSI B11.4-2003 (R2013), Safety Requirements for Shears

This standard applies to those mechanically, hydraulically, hydromechanically, or pneumatically powered shears used to cut material by shearing and which utilize a fixed blade(s) and non-rotary moving blade(s).

ANSI B11.5-1988 (R2013), Ironworkers - Safety Requirements for Construction, Care, and Use

The requirements of this standard apply to those combination, multipurpose powered machines that punch, shear, notch, cope and form metal or other materials commonly referred to as ironworkers. The requirements of this standard also apply to those single or multipurpose powered machines similar in construction to, and identical in the use of, an ironworker or portions thereof.

ANSI B11.6-2001 (R2012), Safety Requirements for Manual Turning Machines with or without Auto Control

This standard specifies safety requirements for the design, construction, operation and maintenance (including installation, dismantling, and transport) of the general class of manually controlled horizontal and vertical spindle turning machines. Machines covered by this standard are intended to work metals and other man - made materials. This standard also applies to devices that are integral to the machine. These machines may have automatic capability but may not be equipped with automatic part handling or bar - feed mechanisms nor automatic tool changing systems.

ANSI B11.7-1995 (R2015), Cold Headers and Cold Formers - Safety Requirements for Construction, Care and Use

The requirements of this standard apply only to those mechanically powered machines commonly referred to as cold headers and cold formers, which perform many operations such as shearing, heading, upsetting, extruding, trimming, forming, cold working, or warm forming material by means of tools and dies. This type of equipment generally has the ram in a horizontal position. Included are pointers and roll formers when they are mechanically an integral part of the basic machine.

ANSI B11.8-2001 (R2012), Safety Requirements for Manual Milling, Drilling, & Boring Machines with or without Automatic Control

This standard specifies safety requirements for the design, construction, operation and maintenance (including installation, dismantling and transport) of manually controlled milling, drilling, and boring machines. This standard also applies to devices that are integral to the machine. These machines may have automatic capability but may not be equipped with automatic tool changing or automatic part handling systems.

ANSI B11.9-2010 (R2015), Safety Requirements for Grinding Machines

This standard applies to all stationary grinding machines, used in either industrial or commercial applications, that utilize an abrasive product to change the shape, size or surface finish of any material.
ANSI/ISO 12100-2012, Safety of machinery - General principles for design - Risk assessment and risk reduction
Specifies basic terminology, principles, and a methodology for achieving safety in the design of machinery. This standard specifies principles of risk assessment and risk reduction to help designers in achieving this objective. Procedures are described for identifying hazards and estimating and evaluating risks during relevant phases of the machine life cycle, and for the elimination of hazards or the provision of sufficient risk reduction.

BHMA (Builders Hardware Manufacturers Association)

ANSI/BHMA A156.1-2016, Butts and Hinges
This Standard establishes requirements for butts and hinges. Cycle tests, lateral and vertical wear tests, friction tests, strength tests, finish tests, and material and dimensional requirements are included.

ANSI/BHMA A156.10-2011, Power Operated Pedestrian Doors
Requirements in this Standard apply to power operated doors for pedestrian use which open automatically when approached by pedestrians and some small vehicular traffic or by a knowing act. Included are provisions to reduce the chance of user injury or entrapment. Power operated doors for industrial or trained traffic are not covered in this Standard.

ANSI/BHMA A156.11-2014, Cabinet Locks
This standard establishes requirements for Cabinet Locks used on doors, drawers and furniture. Cycle tests, operational tests, strength tests and finish tests are included.

ANSI/BHMA A156.115-2016, Hardware Preparation In Steel Doors And Steel Frames
These Standards cover all significant dimensional attributes for mounting common hardware products in steel doors and frames. All dimensions shall be as shown on the accompanying drawings.

ANSI/BHMA A156.12-2013, Interconnected Locks
This Standard establishes performance requirements for Interconnected Locks and includes operational, cycle, strength, material evaluation, security, and finish tests.

ANSI/BHMA A156.13-2017, Mortise Locks and Latches
This Standard establishes performance requirements for Mortise Locks and Latches and includes operational, cycle, strength, material evaluation, security, and finish tests, and dimensional criteria.

ANSI/BHMA A156.14-2013, Sliding and Folding Door Hardware
This Standard establishes requirements for Sliding and Folding Door Hardware. Cycle tests, abuse, durability static load, smoothness, static friction, kinetic friction and finish tests are included. Hardware for light to very heavy doors is covered including both residential and industrial applications.

ANSI/BHMA A156.15-2015, Release Devices - Closer Holder, Electromagnetic and Electromechanical
This Standard establishes requirements for door closers combined with hold-open devices or free-swinging door closers combined with releasing devices and includes performance tests covering operational, cyclical and finish criteria.

ANSI/BHMA A156.16-2013, Auxiliary Hardware
This Standard establishes requirements for auxiliary hardware and includes performance tests covering operational, cyclical, strength or finish criteria.

ANSI/BHMA A156.17-2014, Self Closing Hinges & Pivots
This Standard establishes requirements for Self Closing Hinges & Pivots. Cycle tests, operational tests, finish tests, material and dimensional requirements are included.

ANSI/BHMA A156.18-2016, Materials And Finishes
This Standard establishes finish test methods and code numbers for finishes on various base materials. It includes criteria for viewing comparative finishes to the BHMA match plates and establishes five categories of finishes.

ANSI/BHMA A156.19-2013, Standard for Power Assist and Low Energy Power Operated Doors
Requirements in this Standard apply only to swing door operators. The operator types are power assist, and low energy power operators, for pedestrian use, and some small vehicular use. It does not address doors, finish or hardware. The activation of all doors described in this standard requires a knowing act. Included are provisions intended to reduce the chance of user injury or entrapment.

ANSI/BHMA A156.2-2017, Bored and Preassembled Locks and Latches
This Standard establishes performance requirements for bored and preassembled locks and latches, and includes dimensional criteria, operational tests, strength tests, cycle tests, security tests, material evaluation tests, and finish tests.

ANSI/BHMA A156.20-2012, Strap and Tee Hinges, and Hasps
This Standard establishes requirements for Strap Hinges, Tee Hinges, and Hasps, and includes performance tests covering operational and strength criteria.

ANSI/BHMA A156.21-2014, Thresholds
This Standard establishes requirements for thresholds. Types are described with identifying numbers. Strength tests, fastening systems, and gasketing tests are included.

ANSI/BHMA A156.22-2017, Door Gasketing and Edge Seal Systems
This Standard establishes requirements for the performance and installation of gasketing systems including intumescents applied to, or mortised to doors, frames or both. Included are performance tests intended to evaluate resistance to smoke and air infiltration, energy performance, acoustic properties, and the life and durability of gasketing materials.

ANSI/BHMA A156.23-2010, AMERICAN NATIONAL STANDARD FOR ELECTROMAGNETIC LOCKS
This Standard establishes requirements for electromechanical locks and includes cyclical, dynamic, operational, strength and finish tests. This product is used for access control.

ANSI/BHMA A156.24-2012, Delayed Egress Locking Systems
This standard covers products used in connection with conventional exit devices or locks causing the doors to remain locked after releasing actuation for a predetermined length of time. Performance criteria are included for functional, cycle, operational, fail-safe and overload requirements.

ANSI/BHMA A156.25-2013, Electrified Locking Devices
Electrified locking systems are usually comprised of four functional components: locking devices, input devices, controlling devices, and power supplies. This standard establishes requirements for the locking devices, whose mechanical aspects are described in the applicable BHMA product standards; in addition, where the input or controlling device or both are an integral part of the locking device, they shall also be tested with the locking device covered by this standard. This standard includes requirements for cyclical, security, operational, strength, and environmental tests for these products.

ANSI/BHMA A156.26-2012, Continuous Hinges
This Standard establishes requirements for architectural continuous hinges used in building construction. Cycle, finish, abuse, overload, vertical wear, and strength tests are included.

ANSI/BHMA A156.27-2010, Power and Manual Operated Revolving Pedestrian Doors
Requirements in this standard apply to power operated revolving type doors which rotate automatically when approached by pedestrians, some small vehicular use, and manual revolving type doors for pedestrians. Included are provisions to reduce the chance of user injury and entrapment. Revolving doors for industrial or trained traffic are not covered in this Standard.
ANSI/BHMA A156.28-2013, Recommended Practices for Keying Systems

This recommended practice is intended for building owners, security professionals and others responsible for designing, implementing, and maintaining secure keying systems. Minimize legal liability by providing industry proven guidelines. It covers system design, to provide design criteria to establish and maintain a secure keying system. The purpose of this document is to provide guidelines for the essential keying conference, establish good practices for effective key management, and give building owners the ability to extend the life of keying systems to meet future demands.

ANSI/BHMA A156.29-2012, Exit Locks, Exit Alarms for Exit Devices

ANSI/BHMA A156.29 establishes requirements for Exit Locks, Exit Alarms and Alarms for Exit Devices and includes operational and finish tests. Alarms for Exit Devices include operational tests only.

ANSI/BHMA A156.3-2014, Exit Devices

This standard establishes requirements for exit devices and trim, automatic and self-latching flush bolts, removable mullions, coordinators, and carry-open bars. Performance criteria include cycle, operational, strength, material evaluation, and finish tests. Functions and types are described and numbered.

ANSI/BHMA A156.30-2014, High Security Cylinders

This standard includes security performance based requirements for both mechanical and electrified high security cylinders. For the purpose of this standard, High Security Cylinder includes mechanical lock cylinders, electromechanical cylinders, and the electronic lock sub assemblies that are analogous to the cylinder assemblies. Cylinders include their keys or electronic credentials; their detainers (mechanical pins, levers, discs) or electronic control device; and their cylinder tailpiece or cam or electronic output port.

ANSI/BHMA A156.31-2013, Electric Strikes and Frame Mounted Actuators

ANSI/BHMA A156.31 establishes requirements for Electric Strikes and Frame Mounted Actuators, and includes operational and finish tests.

ANSI/BHMA A156.32-2014, Integrated Door Opening Assemblies

This Standard establishes requirements for Integrated Door Opening Assemblies with steel, wood and fiberglass reinforced doors which are supplied to the customer with integral hardware. At a minimum, they shall include a door, frame, hanging device, and latching mechanism.

ANSI/BHMA A156.34-2016, Bored Locks and Mortise Locks with Ligature Resistant Trim

This Standard defines requirements and test methods for ligature resistant trim on bored locks and mortise locks. These requirements apply to the exposed parts of the lockset on the face of the door in the closed position only.

ANSI/BHMA A156.36-2016, Auxiliary Locks

ANSI/BHMA A156.36 establishes requirements for Auxiliary Locks, and includes dimensional criteria and five classifications of tests: operational, cycle, strength, security and, finish. This Standard was formerly part of ANSI/BHMA A156.5 for Auxiliary Locks and Associated Products. Tests described in this Standard are performed under laboratory conditions. In actual usage, results vary because of installation, maintenance and environmental conditions. Manufacturers shall indicate the Grade level to which their product is certified. Products shall meet all Grade requirements for tests listed in 1.1. A Grade 1 product shall meet all Grade 1 criteria in each classification.

ANSI/BHMA A156.37-2014, Multipoint Locks

This Standard establishes performance requirements for Multipoint Locks and includes operational tests, cycle tests, strength tests, security tests, and finish tests.

ANSI/BHMA A156.38-2014, Low Energy Power Operated Sliding and Folding Doors

Requirements in this Standard apply to low energy power operated sliding and folding door systems for pedestrian use, and some small vehicular use. The activation of all doors described in this standard requires a knowing act. Included are provisions intended to reduce the chance of user injury or entrapment.

ANSI/BHMA A156.39-2015, Residential Locksets and Latches

This Standard establishes performance requirements for bored residential locksets and latches, and includes durability, security, finish tests. Residential locksets and latches are generally used for single family homes and multifamily dwellings.

ANSI/BHMA A156.4-2013, Door Controls – Closers

This Standard contains requirements for door closers surface mounted, concealed in the door, overhead concealed and concealed in the floor. Also included are pivots for floor closers. Criteria for conformance include cycle, operational, closing force and finish tests. Optional tests which shall be specified separately are also included.

ANSI/BHMA A156.40-2015, Residential Deadbolts

ANSI/BHMA A156.40 establishes requirements for residential deadbolts and deadlatches, and includes durability, security, finish tests. Residential deadbolt and deadlatches are generally used for single family homes and multifamily dwellings.

ANSI/BHMA A156.5-2014, Cylinders and Input Devices for Locks

ANSI/BHMA A156.5 establishes requirements for mechanical cylinders, electrified input devices, and push button mechanisms, which include operational and strength tests.

ANSI/BHMA A156.6-2015, Architectural Door Trim

This Standard contains requirements for door protection plates, door edgings, push plates, door pulls, push bars, and pull bars. Included are strength and finish tests, and dimensional and material criteria.

ANSI/BHMA A156.7-2016, ANSI/BHMA A156.7

TEMPLATE HINGE DIMENSIONS

This Standard covers the requirements for the length, width, thickness, offset, and screw hole spacing for builders template hinges. Included in the standard are hinge identification symbols and screw sizes. Methods for identifying template hinges that conform to the Standard are provided.

ANSI/BHMA A156.8-2015, Door Controls - Overhead Stops and Holders

This Standard establishes requirements for overhead door stops and holders, and includes performance tests covering operational, cyclical, strength and finish criteria.

ANSI/BHMA A156.9-2015, Cabinet Hardware

This Standard contains requirements for cabinet hardware and includes hinges, knobs, pulls, catches, shelf tests, standards and brackets, drawer slides, rotating shelves and track with guides for sliding panels. Included are performance tests covering operational, cyclical, strength, and finish criteria.

BICSI (Building Industry Consulting Service International)


This standard provides requirements, recommendations, and best practices for the design and implementation of information communication technology systems and their infrastructure for educational institutions and facilities.

ANSI/BICSI 002-2014, Data Center Design and Implementation Best Practices

This project is the 3 year revision of ANSI/BICSI 002-2011, addressing changes in the evolution of data center design. This ballot being issued for approval of the last 4 substantive changes of this revision project.

ANSI/BICSI 003-2014, Building Information Modeling (BIM) Practices for Information Technology Systems

The scope of this document will define the usage of BIM elements provided by product manufacturers within the telecommunication industry as well as the required Level of Detail (LOD) that each model is compromised by its components and design elements. This document is also a guide for the ITS designer to the development process of the 3D model, related modeling tasks, and coordination with related disciplines.
This standard is written for use in the design and implementation of information technology systems used within healthcare facilities. This standard provides a reference of common technology and design practices and is not intended to be used by architects and engineers as their sole reference or as a step-by-step design guide. This standard may also be used to determine design requirements in conjunction with the system owner, occupant, or Safety and Security consultant.

ANSI/BICSI 005-2016, Electronic Safety and Security (ESS) System Design and Implementation Best Practices
This standard is written for use in the design and implementation of the structured cabling systems used within electronic safety and security systems. This standard provides a reference of common technology and design practices and is not intended to be used by architects and engineers as their sole reference or as a step-by-step design guide. This standard may also be used to determine design requirements in conjunction with the system owner, occupant, or safety and security consultant.

ANSI/BICSI 006-2015, Distributed Antenna System (DAS) Design and Implementation Best Practices
This standard provides and describes requirements, standards, and acceptable best practices for the design and installation of a distributed antenna system (DAS) used in wireless communication infrastructure.

This standard will cover the design and implementation of the information communication technology systems required to support an intelligent building/premise integrated design. Systems that are expected to be covered, include, but are not limited to: building automation/management, utility utilization, lighting, signage and wayfinding, sound and acoustical services, location and asset tracking.

BIFMA (Business and Institutional Furniture Manufacturers Association)
This standard test method is intended for determining volatile organic compound emissions from office furniture and seating under environmental and product usage conditions that are typical of those found in buildings.

ANSI/BIFMA X5.1-2017, General-Purpose Office Chairs - Tests
This standard is intended to provide manufacturers, specifiers, and users with a common basis for evaluating the safety, durability, and structural adequacy of office chairs.

ANSI/BIFMA X5.11-2015, General-Purpose Large Occupant Office Chairs - Test
Provide a common basis for evaluating durability and structural adequacy of office chairs for large occupants (up to 400 lb. users considered in the development of the tests).

ANSI/BIFMA X5.3-2007 (R2012), Vertical Files - Tests
Provides a common basis for evaluating the safety, durability, and structural performance of vertical files. The standard defines tests used to determine the acceptability of the product and specifies the acceptance levels of performance. The acceptance levels are based on the actual field and test experience of BIFMA International members.

ANSI/BIFMA X5.4-2012, Lounge and Public Seating - Tests
This standard is intended to provide manufacturers, specifiers, and users with a common basis for evaluating the safety, durability, and structural adequacy of business and institutional lounge seating. Lounge seating is normally used in indoor public spaces such as waiting, reception, or gathering areas. Lounge seating includes products with single seat units, units with multiple seating positions within one unit or ganged seating units. Lounge seating may be restrained from moving by attaching to the building structure or freestanding. Lounge seating products are generally not adjustable for personal use.

ANSI/BIFMA X5.5-2014, Desk/Table Products - Tests
To provide a common basis for evaluating the safety, durability, and structural performance of desk and table products in the office and institutional environments.

ANSI/BIFMA X5.6-2016, Panel Systems - Tests
This standard is intended to provide a common basis for evaluating the safety, durability, and structural performance of panel systems products.

ANSI/BIFMA X5.9-2012, Storage Units - Tests
This standard is intended to provide a common basis for evaluating the safety, durability and structural performance of storage units.

ANSI/BIFMA X6.1-2012, Educational Seating - Tests
This standard is intended to provide manufacturers, specifiers, and users with a common basis for evaluating the safety, durability, and structural adequacy of educational seating, including units with integrated desk or table surfaces.

ANSI/BIFMA X7.1-2011(R2016), Standard for Formaldehyde and TVOC Emissions of Low-emitting Office Furniture and Seating
This standard is intended to provide performance requirements for the emissions of volatile organic compounds, including Formaldehyde and Aldehydes, from Office Furniture and Seating.

ANSI/BIFMA/SOHO 56.5-2008 (R2013), Small Office / Home Office Furniture - Tests
This standard is intended to provide a common basis of mechanical tests for evaluating the safety, durability, and structural adequacy of storage and desk-type furniture intended for use in the small office and/or home office.

BOMA (Building Owners and Managers Association)
ANSI/BOMA Z65.1-2010, Office Buildings: Standard Methods for Measuring Floor Area
The completed standard will be used to measure floor area in both existing and new office buildings. The standard will allow comparison of values on the basis of generally agreed upon methods of measurement for office buildings. The standard will take a building-wide approach to measurement, fairly accounting for the allocation of space that benefit all tenants while providing a common basis for the measurement of floor area in a tenant area.

The revision of the existing ANSI/BOMA Industrial Standard (ANSI/BOMA Z65.2-2009) was necessary to make it consistent with the new 2010 ANSI/BOMA Z65.1-2010 Office Standard and severing the link with the old 1996 version of the Office Standard.

ANSI/BOMA Z65.3-2009, Gross Area of a Building: Standard Methods of Measurement
These methods are intended for application to Buildings containing all types of occupancies, including office, retail, industrial, single and multi-unit residential, hospitality, entertainment, and institutional buildings, both private and public. They can be applied to both new and existing Buildings containing single or multiple stories that are either owner occupied or leased to one or multiple tenants. They are not intended for application to site improvements other than Buildings. These measures of gross area not only serve the interests of property owners and managers but also, because they are succinctly defined, may appeal to others like managers and brokers.
ANSI/BOMA Z65.4-2010, Multi-Unit Residential Buildings: Standard Methods of Measurement
This standard is intended for measurement of floor area in all types of Multi-unit Residential Buildings including not only rental apartments but also residential condominiums, cooperatives, and other types of common interest communities where required or permitted by their declarations. This standard does not address horizontal perimeter boundaries or volume measurements. It is not intended for application to buildings containing occupancies other than multi-unit residential, such as single unit houses, row houses, duplex units, retail, office, or industrial buildings.

ANSI/BOMA Z65.5-2010, Retail Buildings: Standard Methods of Measurement
This standard of measurement is intended for application to buildings containing retail types of occupancies. Methodologies defined are relevant to both new and existing buildings, comprised of single or multiple stories that may be leased to one or multiple tenants. Although references are made to a development parcel this standard is not intended for application to site improvements other than buildings. The uniformity of the measurement of retail area established by this standard not only serves the interests of property owners, managers and tenants but also, because they are succinctly defined, may appeal to others like facility managers, brokers, and appraisers.

ANSI/BOMA Z65.6-2012, Mixed-Use Properties: Standard Methods of Measurement
These methods for measuring floor area are intended for application to properties containing two or more use components, including, but not limited to, office, retail, industrial, single and multi-unit residential, hospitality, entertainment, civic and institutional buildings, both private and public. They can be applied to both new and existing properties containing single or multiple floors or buildings, and properties that are either owner occupied or leased to single or multiple tenants. They are not intended for application to site improvements other than buildings, and do not address the measurement of spatial volume.

BPI (Building Performance Institute)

Specifies the requirements and process for the calculation of standardized predicted savings: a difference (delta simulation) between the modeled energy usage before an energy upgrade (or set of upgrades) and modeled energy use after an upgrade (or set of upgrades), using approved building energy simulation software. Applies to existing detached single family dwellings and townhouses that meet specific criteria.

ANSI/BPI-1100-T-2014, Home Energy Auditing Standard
This standard practice defines the minimum criteria for conducting a building science-based residential energy audit. The energy audit will address energy usage and limited aspects of building durability and occupant health and safety. The energy audit will provide a comprehensive report with a list of prioritized recommendations to improve the home and will include a cost-benefit analysis. Residential building types covered are defined as: existing detached single-family dwellings and townhouses meeting specific criteria.

ANSI/BPI-1200-S-2015, Standard Practice for Basic Analysis of Buildings
Defines the minimum criteria and procedures for conducting building science-based residential energy audits and related diagnostic tests existing detached single-family dwellings and townhouses that meet certain criteria. The energy audit and related diagnostic tests will address energy usage; limited aspects of building durability/occupant health and safety; will provide a comprehensive report with a list of prioritized recommendations to improve the home and will include a cost benefit analysis. This standard parallels ANSI/BPI-1100-T-2014 Home Energy Auditing Standard and provides specific procedures to meet the requirements detailed in ANSI/BPI-1100.

CAGI (Compressed Air and Gas Institute)

ANSI/CAGI B19.1-2011, Safety Standard for Air Compressor Systems
Addresses all aspects of air compressor systems from the entrance to the inlet device through the compressor and associated heat exchangers, dryers, and pulsation suppression devices to the point of entry to the distribution system.

ANSI/CAGI/ISO 1217-2013, Displacement Compressors: Acceptance Tests
This International Standard specifies methods for acceptance tests regarding volume rate of flow and power requirements of displacement compressors. It also specifies methods for testing liquid-ring type compressors

CAPA (Certified Automotive Parts Association)

This test method covers the procedure for retention testing of primary striker found on sheet metal hoods.

Covers the procedure for testing the dimensional stability of replacement bumper covers (full parts) when exposed to cold and heat, and identifies the criteria for acceptance.

CEMA (Conveyor Equipment Manufacturers Association)

ANSI/CEMA 102-2012, Conveyor Terms and Definitions
Comprises a compendium of standard terms and definitions for use throughout the United States conveying industry. CEMA seeks voters interested in joining ANSI Canvass group that will vote on the proposed changes to the existing standard.

ANSI/CEMA 300-2015, Screw Conveyor Dimensional Standards
Includes 34 recommended dimensional standards for major screw conveyor components. This Revision modifies three of those standards. The Changed Pages are included with this notice.

ANSI/CEMA 350-2015, Screw Conveyors for Bulk Materials
Provides accepted engineering and application guidance for proper screw conveyor design. This change adds 30 and 36 inch screw dimensions and associated data.

ANSI/CEMA 401-2003 (R2015), Roller Conveyors - Non-Powered
The first in a series of standards applying to unit handling conveyors. It establishes recommended engineering and application practice for package handling non-powered roller conveyors. Includes uniform nomenclature and certain dimensional standards. Formulas and tables are included to aid the engineer.

ANSI/CEMA 402-2003 (R2015), Belt Conveyors
The second in a series of standards applying to unit handling conveyors. It establishes recommended design and application engineering practice for package handling belt conveyors. Includes uniform nomenclature and certain dimensional standards. Formulas and tables are included to aid the engineer.

ANSI/CEMA 403-2003 (R2015), Belt Driven Live Roller Conveyors
The third in a series of standards applying to unit handling conveyors. It establishes recommended design and application engineering practice for package handling belt driven live roller conveyors. Includes uniform nomenclature and certain dimensional standards. Formulas and tables are included to aid the engineer.

ANSI/CEMA 404-2003 (R2015), Chain Driven Live Roller Conveyors
he fourth in a series of standards applying to unit handling conveyors. It establishes recommended design and application engineering practice for package handling chain driven live roller conveyors. Includes uniform nomenclature and certain dimensional standards. Formulas and tables are included to aid the engineer.
Mechanical Refrigerating Systems. Equipment, Design, and Installation of Ammonia

This standard concerns the design and construction of systems and equipment for the storage and handling of ammonia. This standard includes guidance for the design, construction, installation, and operation of ammonia systems. It applies to ammonia systems for storage, transfer, processing, or use in refrigeration, air conditioning, or industrial processes. The standard covers the design, construction, and operation of ammonia storage tanks, pipelines, and associated equipment.

ANSI/CEMA 501.1-2015, Welded Steel Wing Pulleys

Provides recommended load ratings, dimensional information, and criteria for selecting welded steel wing pulleys for bulk belt conveyors.

ANSI/CEMA B105.1-2015, Welded Steel Conveyor Pulleys

Provides recommended load ratings, dimensional information, and criteria for selecting welded steel conveyor pulleys for bulk belt conveyors.

CGA (Compressed Gas Association)

ANSI CGA G-2-1.2014, Standard Safety Requirements for the Storage and Handling of Anhydrous Ammonia (ANSI K61.1)

This standard is intended to apply to the design, construction, repair, alteration, location, installation, and operation of anhydrous ammonia systems including refrigerated ammonia storage systems. This standard does not apply to ammonia manufacturing plants, ammonia transportation pipelines; ammonia barges and tankers; or refrigeration systems where ammonia is used solely as a refrigerant. Such systems are covered in ANSI/ASHRAE 15, American National Standard Safety Code for Mechanical Refrigeration and ANSI/IICAR 2, American National Standard for Equipment, Design, and Installation of Ammonia Mechanical Refrigerating Systems.

ANSI/CGA G-13-2016, Storage and Handling of Silane and Silane Mixtures

This standard governs the installation of systems and sources that are used to store, transfer, or contain silane or silane mixtures. This standard includes guidance for siting, design of equipment, piping and controls, and the fabrication and installation of silane gas storage and closed-use systems. Additional guidance on operational steps associated with the use of silane and silane mixtures as well as fire protection, gas monitoring, ventilation, and related safeguards are provided.

ANSI/CGA H-5-2014, Standard for Bulk Hydrogen Supply Systems

This standard contains minimum requirements for locating/siting, selecting equipment, installing, starting up, maintaining, and removing bulk hydrogen supply systems.

ANSI/CGA P-18-2013, Standard for Bulk Inert Gas Systems

The purpose of this standard is to provide information on installation of bulk inert gas systems for argon, nitrogen, and helium service. This standard does not apply to carbon dioxide systems or bulk inert gas systems at health care facilities.

CPA (Composite Panel Association)

ANSI A135.4-2012, Basic Hardboard

The purpose of this Standard is to establish a nationally recognized voluntary consensus standard for basic hardboard, which can serve as a common basis for understanding among those manufacturing, specifying or using hardboard products.

ANSI A135.5-2012, Prefinished Hardboard Paneling

The purpose of this standard is to establish a nationally recognized voluntary consensus standard for prefinished hardboard paneling which can serve as a common basis for understanding among those manufacturing, specifying or using prefinished hardboard paneling products.

ANSI A135.6-2012, Engineered Wood Siding

Establishes a nationally recognized voluntary consensus standard for engineered wood siding that can serve as a common basis for understanding among those manufacturing, specifying or using engineered wood siding. The purpose of the update is to revise ANSI A135.6 and change the title of the Standard.

ANSI A135.7-2010, Engineered Wood Trim

The purpose of the Standard is to establish a nationally recognized voluntary consensus standard for engineered wood trim which can serve as a common basis for understanding among those manufacturing, specifying or using engineered wood trim. This is a new Standard for Engineered Wood Trim.

CPLSO (CPLSO)

ANSI/CPLSO-14-2016, Crane Insulators

This standard is applicable to crane insulators, not limited but including as example, for use by the construction industry including tag line insulating links, in foundries, and for radio frequency by strain insulators. This standard specifies the characteristic mechanical and electrical performance levels required for these insulating devices. The canvass list is available by emailing a request to: pratt.hugh@cplso.org.

ANSI/CPLSO-15-2017, Proximity Warning Devices

This Standard is applicable to high voltage warning devices for cranes but not limited to but including, as example, for use by the broadcasting, mining, farming and construction industry including Proximity Warning Devices, (PWD). This Standard specifies the characteristic mechanical and electrical performance levels required for these devices.

CRRC (Cool Roof Rating Council)


CRSI (Concrete Reinforcing Steel Institute)

ANSI/CRSI CG1.1-2016, CRSI Standard for Epoxy Coating Plant: Straight Bar Lines

This Standard specifies procedures used to monitor production and assess quality during the application of epoxy coating to straight steel reinforcing bars. This Standard also describes minimum requirements for documentation, observation and testing as part of a quality control program.
ANSI/CRSI CG1.2-2016, CRSI Standard for Epoxy-Coated Steel Reinforcing Bar Fabrication Facilities
This Standard describes standard practice for fabrication quality processes for epoxy-coated steel reinforcing bars.

ANSI/CRSI CG2.1-2016, CRSI Standard for Epoxy-Coated Steel Reinforcing Bar Fabrication Facilities
This Standard describes standard practice for fabrication quality processes for epoxy-coated steel reinforcing bars.

ANSI/CRSI IPG4.1-2016, Standard Practice for Stainless Steel Reinforcing Bar Fabrication Facilities
This Standard describes standard practice for fabrication quality processes for stainless steel reinforcing bars.

ANSI/CRSI RB4.1-2016, CRSI Standard for Supports for Reinforcement Used in Concrete
This specification covers the design, use, material, and minimum performance requirements of reinforcement supports used in concrete to support various types of reinforcement, including but not limited to plain and deformed reinforcing bars, prestressing steel, post-tensioning tendons, steel wire, and plain and deformed steel welded wire reinforcement.

CSA (CSA Group)

ANSI B149.6-2015, Code for Digester Gas, Landfill Gas and Biogas Generation and utilization
Standard for safety aspects of the operation and maintenance for handling, storage, and utilization of biogas.

ANSI LC 1-2016, Gas Piping Systems Using Corrugated Stainless Steel Tubing (CSST) (same as CSA 6.26-201x)
This standard details test and examination criteria for fuel gas piping systems, using corrugated stainless steel tubing, intended for installation in residential or commercial buildings, and including all components supplied or specified by the manufacturer to convey and control fuel gas to all appliances served. This standard does not apply to gas connectors for appliances.

ANSI NGV 2b-2012, Compressed Natural Gas Vehicle Fuel Containers
This standard contains specifications for the materials, design, manufacture and testing of refillable containers intended for the storage of compressed natural gas for vehicle operation and which are affixed to the vehicle. The standard covers fuel containers of up to 1000 liter capacity and pressures between 165 and 300 Bar (2400 and 4350 psig).

ANSI NGV 4.8/CSA 12.8-2012 (R2016), Natural gas vehicle fueling station reciprocating compressor guidelines (same as CSA 12.8)
This standard details construction and performance requirements for natural gas compressors for use in compressed natural gas fueling station service. The compressor package should include but not be limited to all necessary equipment from inlet connection immediately upstream from the isolation valve to the package - specified discharge connection.

ANSI PRD 1-2013, Standard for pressure relief devices for natural gas vehicle (NGV) fuel containers
This standard contains requirements for the materials, design, manufacture and testing of pressure relief devices produced for use on NGV fuel containers.

ANSI Z21.1-2016, Standard for Household Cooking Gas Appliances (same as CSA 1.1)
Details test and examination criteria for household cooking appliances for use with natural manufactured and mixed gases, liquefied petroleum gases and LP gas-air mixtures. The standard defines a household cooking appliance as an appliance for domestic food preparation, providing at least one function of (1) top or surface cooking, (2) oven cooking or (3) broiling.

ANSI Z21.10.1-2014, Standard Gas Water Heaters, Vol. I, Storage Water Heaters with Input Ratings of 75,000 Btu Per Hour or Less (same as CSA 4.1)
Details test and examination criteria for automatic storage water heaters with input ratings of 75,000 Btu per hour (21 980 W) or less for use with natural, manufactured and mixed gases, liquefied petroleum gases, and LP gas-air mixtures.

ANSI Z21.10.1b-2011, Gas Water Heaters, Volume I, Storage Water Heaters With Input Ratings Of 75,000 Btu Per Hour or Less (same as CSA 4.1b)
Details test and examination criteria for automatic storage water heaters with input ratings of 75,000 Btu per hour (21 980 W) or less for use with natural, manufactured and mixed gases, liquefied petroleum gases, and LP gas-air mixtures.

ANSI Z21.10.1b-2011a, Gas Water Heaters, Volume I, Storage Water Heaters With Input Ratings of 75,000 Btu Per Hour or Less (same as CSA 4.1b)
Applies to automatic storage water heaters having input ratings of 75,000 Btu/hr or less for use with: natural gas; manufactured gas; mixed gas; liquefied petroleum gas; LP gas-air mixtures; recreational vehicle installation convertible for use with natural gas and liquefied petroleum gases; and with combination potable water/space heating applications.

ANSI Z21.10.3-2015, Gas Water Heaters, Volume III, Storage Water Heaters with Input Ratings Above 75,000 Btu Per Hour, Circulating or Instantaneous, same as CSA 4.3 -201x
Details test and examination criteria for automatic storage, with input ratings above 75,000 Btu per hour (21 980 W), circulating and instantaneous water heaters for use with natural, manufactured and mixed gases, liquefied petroleum gases, and LP gas-air mixtures.

ANSI Z21.10.3a-2013, Standard for Gas Water Heaters, Volume III, Storage Water Heaters with Input Ratings Above 75,000 Btu Per Hour, Circulating and Instantaneous (same as CSA 4.3a)
This standard applies to large automatic storage water heaters having input ratings above 75,000 Btu/hr, instantaneous water heaters, circulating water heaters including booster water heaters for use with natural gas; manufactured gas; mixed gas; liquefied petroleum gases; and LP gas-air mixtures. This standard also applies to manufactured (mobile) home and recreational vehicle installations; and for use with combination potable water/space heating applications.

ANSI Z21.10.3b-2013, Standard for Gas Water Heaters, Volume III, Storage Water Heaters with Input Ratings Above 75,000 Btu per Hour, Circulating and Instantaneous (same as CSA 4.3b)
Details test and examination criteria for automatic storage, with input ratings above 75,000 Btu per hour (21 980 W), circulating and instantaneous water heaters for use with natural, manufactured and mixed gases, liquefied petroleum gases, and LP gas-air mixtures.

ANSI Z21.101-2012, Standard for Connectors for Other Than All Metal Construction (Same as CSA 8.5)
This standard applies to newly produced other than all-metal flexible gas connectors constructed entirely of new, unused parts and materials, consisting of flexible tubing dependent on other than all-metal construction for gas leak resistance. This connector is intended to be used in conjunction with ANSI Standard Z21.90 Gas Convenience Outlets and Optional Enclosures and is for use with indoor gas-fired appliances that are frequently moved after installation.

ANSI Z21.11.2-2016, Gas-Fired Room Heaters, Volume II, Unvented Room Heaters
Details test and examination criteria for unvented heaters for use with natural, manufactured and mixed gases, liquefied petroleum gases, and LP gas-air mixtures. Such heaters are limited to Maximum input ratings of 40,000 Btu per hour.
ANSI Z21.11.2a-2013, Standard for Gas-Fired Room Heaters, Volume II, Unvented Room Heaters
Details test and examination criteria for unvented heaters for use with natural, manufactured and mixed gases, liquefied petroleum gases, and LP gas-air mixtures. Such heaters are limited to Maximum input ratings of 40,000 Btu per hour.

ANSI Z21.11.3-2016, Gas-Fired Room Heaters, Volume III, Propane-Fired Portable Emergency Use Heater Systems
Details test and examination criteria for propane-fired portable emergency use heater systems for use with a self-contained propane supply in a listed composite cylinder. Such heater systems are not for use with line voltage and limited to a maximum input rating of 15,000 Btu/hr (4396 W).

Details test and examination criteria for replacement draft hoods for use on installed appliances using natural, manufactured and mixed gases, liquefied petroleum gases and LP gas-air mixtures, and for use on appliances that have been converted from other fuels to the above gases. They are suitable for use with gas appliances required to be installed with a draft hood as specified in the National Fuel Gas Code, ANSI Z223.1, in the event the appliance designs do not incorporate draft hoods.

ANSI Z21.13-2017, Gas-fired low pressure steam and hot boilers (Same as CSA 4.9-201x)
Details test and examination criteria for Category I, Category II, Category III and Category IV low-pressure steam and hot water boilers for use with natural, manufactured and mixed gases, liquefied petroleum gases and LP gas-air mixtures. A boiler is defined in the standard as a boiler operating at or below the following pressures or temperatures: steam heating boiler - 15 psi (103.42 kPa) steam pressure; hot water heating or supply boiler - 160 psi (1.10 Mpa) water pressure, 250°F (121°C) water temperature.

Details test and examination criteria for manually-operated gas valves, not exceeding 4 inches (102 mm) pipe size, and pilot shut-off devices, except for hose end valves and appliance connector valves, intended to be used as part of a gas-fired appliance.

ANSI Z21.17-1998 (R2014); ANSI Z21.17a-2008 (R2014), Standard for Domestic Gas Conversion Burners (same as CSA 2.7-M98; CSA 2.7a)
Details test and examination criteria for domestic conversion burners for use with natural, manufactured and mixed gases, liquefied petroleum gases and LP gas-air mixtures.

Details test and examination criteria for gas appliance pressure regulators for use with natural, manufactured and mixed gases, liquefied petroleum gases and LP gas-air mixtures. Such devices, either individual or in combination with other controls, are intended to control selected outlet gas pressures to individual gas appliances.

This standard covers testing and examination criteria for residential gas fired refrigerators provided with a direct, self contained type of system employing the absorption or adsorption principle of refrigeration using Group 2 refrigerants in quantities not exceeding 6 lb (2.72 kg) for use with natural gas, liquefied petroleum (propane) gases, or convertible for use with natural gas and liquefied petroleum (propane) gases. This standard also covers all electrical equipment, wiring and accessories built in or supplied with gas fired refrigerators for use with low voltage direct current or alternating current.

ANSI Z21.20-2007 (R2016), Z21.20a-2010 (R2016), Automatic gas ignitions systems and components (same as CSA 2.22)
Detailed test and examination criteria for automatic gas ignition systems and components, designed to ignite and reignite an appliance burner(s), for use with natural, manufactured and mixed gases, liquefied petroleum gases and LP gas-air mixtures.

ANSI Z21.20, CSA C22.2 No. 199, UL 37-2013, Automatic Electrical Controls for Household and Similar Use - Part 2-5: Particular Requirements for Automatic Electrical Burner Control Systems
This standard applies to automatic electrical burner control systems for the automatic control of burners for oil, gas, coal or other combustibles for household and similar use including heating, air conditioning and similar use. This standard is applicable to a complete burner control system and to a separate programming unit; and is also applicable to a separate electronic high-voltage ignition source and to a separate flame detector.

ANSI Z21.21-2015, Standard for Automatic Valves for Gas Appliances (same as CSA 6.5)
Details test and examination criteria for automatic valves, which may be individual automatic valves, or valves utilized as part of automatic gas ignition systems. It also applies to commercial/industrial safety shutoff valves. This standard applies to automatic valves having maximum operating gas pressure ratings from &189; to 60 psi (3.5 to 413.7kPa); and C/I valves with ratings of &189; psi (3.5 kPa) or greater.

Details test and examination criteria for: (1) Temperature relief valves and combination temperature and pressure relief valves for use on storage tanks of hot water supply systems without heater input limitation; (2) Valves having only pressure relief features for use on storage tanks of hot water supply systems with inputs up to and including 200,000 Btu per hour (58 614 W); and (3) Vacuum relief valves.

ANSI Z21.23-2010 (R2015), Gas Appliance Thermostats
Details test and examination criteria for integral gas valve type and electric type thermostats which are used as integral parts of gas-burning appliances. It presents minimum levels for the substantial and durable construction, safe operation and acceptable performance for such thermostats. The standard does not apply to wall-mounted thermostats for comfort heating control.

ANSI Z21.24-2015, Connectors for Gas Appliances, same as CSA 6.10-201x
Details test and examination criteria for gas appliance connectors limited to a maximum nominal length of 6 feet (1.83m). Such connectors are suitable for connecting gas-fired appliances to fixed gas supply lines containing natural, manufactured or mixed gases, liquefied petroleum gases or LP gas-air mixtures at pressures not in excess of &189; psig (3.5 kPa). These connectors are intended for use with residential and commercial gas appliances that are not frequently moved after installation.

ANSI Z21.35-2005 (R2015), ANSI Z21.35a-2010 (R2015), Standard for Pilot Gas Filters (same as CSA 6.8)
Details test and examination criteria for pilot gas filters that have a maximum operating gas pressure rating of &189; psi. The temperature range shall be 328&186;F to 1258&186;F (08 to 51.186; C) and may be capable of operating at a higher temperature, lower temperature, or both, when so specified by the manufacturer.

ANSI Z21.35a-2010, Pilot Gas Filters, same as CSA 6.8a-2010
Details test and examination criteria for pilot gas filters that have a maximum operating gas pressure rating of &189; psi. The temperature range shall be 328&186;F to 1258&186;F (08 to 51.186; C) and may be capable of operating at a higher temperature, lower temperature, or both, when so specified by the manufacturer.
Details test and examination criteria for gas-fired, heat activated air-conditioning and heat pump appliances which make use of the thermal output of fuel gas combustion of natural, manufactured and mixed gases, liquefied petroleum gases, and LP gas-air mixtures for providing their heating, cooling, or dehumidifying effect. These appliances supply conditioned air; heated and/or cooled liquid; or refrigerants, gases, solids, or liquids to spaces remote from or adjacent to the appliance.

Details test and examination criteria for the functions of year round space conditioning either round space conditioning either fired heat pumps, desiccant air conditioning and heat pump appliances which utilize gas, heat pumps, type heat pumps, and other gas-fired appliances. These appliances supply air, chilled liquid or refrigerant to spaces remote from or adjacent to the appliance;

Details test and examination criteria for gas-fired engine-driven air-conditioning and heat pump appliances which make use of internal combustion for use with natural, manufactured and mixed gases, liquefied petroleum gases, and LP gas-air mixtures. Consisting of sections installed indoor, outdoor, or both, these appliances supply conditioned air, chilled liquid or refrigerant to spaces remote from or adjacent to the appliance.

Details methods of testing and rating gas-fired air-conditioning and heat pump appliances which utilize natural, manufactured and mixed gases, liquefied petroleum gases, and LP gas-air mixtures. This includes engine-driven heat pumps, absorption-cycle heat pumps, desiccant-type heat pumps, and other gas-fired heat pumps. The heat pumps may provide the functions of year-round space conditioning either by direct heating and cooling of air or indirectly by production of heated and chilled water.

Details test and examination criteria for hand-operated devices which provide means for connecting and disconnecting gas-fired appliances or gas appliance connectors to gas supplies and which are for use under indoor or outdoor applications. These devices are equipped with automatic means to shut off gas flow when disconnected.

Details test and examination criteria for illuminating appliances for use with natural gas, manufactured gas, mixed gas, and liquefied petroleum gases for indoor or outdoor installations.

Details test and examination criteria for automatically operating gas-fired central furnaces for use with natural, manufactured, and mixed gases, propane gas or LP gas-air mixtures. Central furnaces are designed to supply heated air through ducts to building spaces remote from or adjacent to the appliance location. Central furnaces are intended for installation in residential, commercial and industrial structures including Direct Vent, Recreational Vehicle, Outdoor and Manufactured (Mobile) Home.

Details test and examination criteria for Type I clothes dryers for use with natural, manufactured, or mixed gases, propane gas or LP gas-air mixtures.

Details test and examination criteria for Type 2 clothes dryers for use with natural, manufactured, or mixed gases, liquefied petroleum gases or LP gas-air mixtures.

Details test and examination criteria for vented gas fireplace for use with natural and propane gases. The only function of a vented gas fireplace lies in the aesthetic effect of the flame; the appliance is not a source of heat.

Details test and examination criteria for gas hose connectors suitable for connecting portable outdoor gas-fired appliances to fixed gas supply lines containing natural, manufactured or mixed gases, liquefied petroleum gases or LP gas-air mixtures at pressures not in excess of 1/2 psi (3.45 kPa). These connectors are intended for use in unconcealed outdoor locations unlikely to be subject to excessive temperatures (above 200°F [93.5°C] and 176°F [79.4°C]).

Details test and examination criteria for gas hose connectors for portable outdoor gas-fired appliances (same as CSA 8.4)

Details test and examination criteria for gas hose connectors for portable outdoor gas-fired appliances to fixed gas supply lines containing natural, manufactured or mixed gases, liquefied petroleum gases or LP gas-air mixtures at pressures not in excess of 1/2 psi (3.45 kPa). These connectors are intended for use in unconcealed outdoor locations unlikely to be subject to excessive temperatures (above 200°F [93.5°C] and 176°F [79.4°C]).

Details test and examination criteria for gas-fired pool heaters (same as CSA 4.7)

Details test and examination criteria for pool heaters for use with natural, manufactured and mixed gases, liquefied petroleum gases, and LP gas-air mixtures. Pool heaters are designed to heat non-potable water stored at atmospheric pressure, such as water in swimming pools, spas, hot tubs and similar applications.

Details test and examination criteria for recreational vehicle cooking gas appliances with use with liquefied petroleum gases or for use with natural gas convertible for use with liquefied petroleum gases. This standard defines a recreational vehicle cooking gas appliance as an appliance for domestic food preparation, providing at least one function of (1) top or surface cooking, (2) oven cooking or (3) broiling and having design features enabling it to meet the special conditions connected for use in a recreational vehicle.

Details test and examination criteria for decorative gas appliances for use with liquefied petroleum gases for use with natural gas convertible for use with liquefied petroleum gases. This standard defines a recreational vehicle cooking gas appliance as an appliance for domestic food preparation, providing at least one function of (1) top or surface cooking, (2) oven cooking or (3) broiling and having design features enabling it to meet the special conditions connected for use in a recreational vehicle.

Details test and examination criteria for gas-fired units for installation in solid-fuel burning fireplaces, same as CSA 2.26

Details test and examination criteria for decorative appliances for installation in solid-fuel burning fireplaces for use with natural gas and propane. This appliance is defined as a “self-contained, free-standing, gas-burning appliance designed for installation only in a solid-fuel burning fireplace and whose primary function lies in the aesthetic effect of the flame.

Details test and examination criteria for gas-fired toilets for use with natural, manufactured and mixed gases, liquefied petroleum gases and LP gas-air mixtures.

Details test and examination criteria for unvented portable camp heaters or the infrared type only up to and including a maximum input of 12,000 Btuh (3.52kW) using propane, butane and liquefied petroleum gases and mixtures thereof and intended for outdoor use. This standard applies to camp heaters having regulated or non-regulated pressure and intended for direct or remote connection to the fuel container.
Details test and examination criteria for electrically operated and thermally actuated automatic vent damper devices which are installed in venting systems, in the outlets of or downstream of appliance draft hoods, of existing automatically operated listed gas-fired appliances, and to automatic vent dampers intended to be mounted outdoors on the top of fireplace chimneys and do not apply to service chimneys or common vents used for venting central heating or water heating appliances.

ANSI Z21.69-2015, Connectors for Movable Gas Appliances, same as CSA 6.16-201x
Details test and examination criteria for gas appliance connectors consisting of flexible tubing for connecting gas supply piping to a gas appliance mounted on casters or otherwise subject to movement. These connectors are limited to a maximum length of 6 feet (1.83 m). These connectors are suitable for use with natural, manufactured or mixed gases, liquefied petroleum gases, or LP gas-air mixtures, at pressures not in excess of 1/2 psi (3.5 kPa).

ANSI Z21.71-1993 (R2016), and ANSI Z21.71a-2004 (R2016), Automatic intermittent pilot ignition systems for field installation Details test and examination criteria for automatic intermittent pilot ignition systems designed to be adapted to existing continuous pilot burners on listed forced air heating appliances and boilers equipped with atmospheric burners. These systems may include pilot igniters and cables, pilot flame sensors, associated system controls, two automatic valves in series controlling main burner gas, associated system wiring and pressure regulators.

ANSI Z21.72-2015, Standard for Portable Type Gas Camp Stoves (same as CSA 11.2)
Details test and examination criteria for portable camp cook stoves for use with propane HD-5 only, having input ratings of 12,000 Btu per hour or less and intended for use both indoors in adequately ventilated structures and outdoors. This standard applies to stoves designed for self-contained fuel supplies using fuel cylinders of not more than 75 cubic inches (1230 cm³) (21/2 pounds nominal water capacity). These stoves shall have a nominal length of not less than 1 foot nor more than 6 feet.

ANSI Z21.73-2011, American National Standard/CSA Standard for Portable Type Gas Camp Lights (same as CSA 11.1)
Details test and examination criteria for portable type gas camp lights for use with propane butane, liquefied petroleum gas and any combination, and for outdoor use only.

ANSI Z21.74-2014, Standard for Portable Refrigerators
This standard covers gas fired refrigerators, having refrigerated spaces for storage of foods with input ratings of 1000 Btu per hour (293 W) or less, and which are for use with HD 5 propane gas only. These refrigerators are intended for use both indoors in adequately ventilated structures and outdoors. This standard applies to refrigerators designed for self-contained fuel supplies and using fuel cylinders of not more than 75 cubic inches (1230 cm³) (21/2 pounds nominal water capacity). Fuel supplies shall be in accordance with the Standard for the Storage and Handling of Liquefied Petroleum Gases, ANSI/NFPA No. 58.

ANSI Z21.74a-2010, Portable Refrigerators for Use with HD-5 Propane Gas
This standard covers gas fired refrigerators, having refrigerated spaces for storage of foods with input ratings of 1000 Btu per hour (293 W) or less, and which are for use with HD 5 propane gas only. These refrigerators are intended for use both indoors in adequately ventilated structures and outdoors. This standard applies to refrigerators designed for self-contained fuel supplies and using fuel cylinders of not more than 75 cubic inches (1230 cm³) (21/2 pounds nominal water capacity). Fuel supplies shall be in accordance with the Standard for the Storage and Handling of Liquefied Petroleum Gases, ANSI/NFPA No. 58.

ANSI Z21.75-2016, Standard for Connectors for Outdoor Gas Appliances and Manufactured Homes (same as CSA 6.27)
Details test and examination criteria for connectors suitable for non-rigid connection of outdoor gas appliances not frequently moved after installation, or manufactured (mobile) homes to gas supply lines containing natural, manufactured, mixed and liquefied petroleum (LP) gases and LP gas-air mixtures at pressures not in excess of 1/2 psi (3.5 kPa). These connectors shall have a nominal length of not less than 1 foot nor more than 6 feet.

ANSI Z21.76-2016, Gas-Fired Unvented Catalytic Room Heaters for use with Propane Gas
Details test and examination criteria for unvented catalytic room heaters having input ratings up to and including 40,000 Btu per hour (11 723 W) for use with liquefied petroleum (LP) gases.

Details test and examination criteria for manually-operated piezo-electric spark gas ignition systems for use with natural, manufactured and mixed gases, liquefied petroleum and LP gas-air mixtures. A piezo-electric ignition system shall perform the following functions: a) generate piezo-electric energy (spark generator); b) transmit the energy (high voltage leads); and 3) utilize the energy to produce arcs (spark electrode).

ANSI Z21.78-2010 (R2015)/CSA 6.20-2010 (R2015), Combination Gas Controls for Gas Appliances, same as CSA 6.20-2010
Details test and examination criteria for combination gas controls having a maximum operating gas pressure of &189; psi (3.45 kPa) with one or more of the following fuel gases: natural, manufactured, mixed, liquefied petroleum and liquefied petroleum gas-air mixtures.

Details test and examination criteria for gas appliance sediment traps having a maximum operating gas pressure rating of &189; psi. A sediment trap is defined as a device intended to protect appliance gas controls from dirt and foreign particles which may be present in gas piping.

ANSI Z21.8-1994 (R2012), Installation of Domestic Conversion Burners
The standard applies to the installation of a conversion burner with an input of 400,000 Btu per hour or less and design certified as complying with the Standard for Domestic Gas Conversion Burners, ANSI Z21.17/CSA 2.7.

ANSI Z21.80-2011 (R2016)/CSA 6.22-2011 (R2016), and ANSI Z21.80a-2012 (R2016)/CSA 6.22a-2012 (R2016), Line Pressure Regulators (same as CSA 6.22)
Details test and examination criteria for line pressure regulators, either individual or in combination with over pressure protection devices intended for application in natural gas piping systems between the service regulator and the gas appliance(s). This standard applies to regulators rated at 2, 5, or 10 psi (13.8, 34.5, or 68.9 kPa) with maximum outlet pressure of &189; psi; or 2 psi (3.5 or 13.8 kPa), depending on the intended application.

Details test and examination criteria for Type I and Type II cylinder connection devices intended to connect the cylinder valve on portable LP-Gas containers to the inlet of the regulator on outdoor cooking gas appliances. These cylinder connection devices are intended for vapor withdrawal service only.

ANSI Z21.84-2017, Manually Lighted, Natural Gas Decorative Gas Appliances for Installation in Solid-Fuel Burning Fireplaces, same as BSR Z21.84-201x, same as BSR Z21.84-201x
Details test and examination criteria for manually lighted, natural gas, decorative gas appliances for installation in solid-fuel burning fireplaces for use with natural gas only at a maximum input ratings of 90,000 Btu/hr. These appliances do not incorporate a pilot burner or an automatic gas ignition system. The main burner is intended to be lighted by hand each time the appliance is used.
ANSI Z21.86-2016, Standard for Vented Gas-Fired Space Heating Appliances (same as CSA 2.32-201x)
Details test and examination criteria for vented room heaters, direct vent wall furnaces, vented wall furnaces, and gravity and fan type floor furnaces for use with natural, manufactured and mixed gases, liquefied petroleum gases and LP gas air mixtures.

ANSI Z21.87-2007 (R2017) and ANSI Z21.87a-2010 (R2017), Automatic Gas shutoff devices for hot water supply systems and component
Details test and examination criteria for automatic gas shutoff valves and devices which operate when the temperature sensing element is at 210ºF (99.9ºC) or less.

ANSI Z21.88-2016, Vented Gas Fireplace Heaters (same as CSA 2.33-201x)
Test and examination criteria for vented gas fireplace heaters for use with natural and liquefied petroleum (propane) gases, which allows the view of flames and provides the simulation of a solid fuel fireplace and furnishes warm air to the space in which it is installed with or without duct connections. A vented gas-fired fireplace heater is designed to comply with minimum thermal efficiency requirements and may be controlled by an automatic thermostat. Direct vent appliances may be installed in manufactured (mobile) homes and recreational vehicles.

ANSI Z21.88b-2008, Standard for Vented Gas Fireplace Heaters (same as CSA 2.33b)
Test and examination criteria for vented gas fireplace heaters for use with natural and liquefied petroleum (propane) gases, which allows the view of flames and provides the simulation of a solid fuel fireplace and furnishes warm air to the space in which it is installed with or without duct connections. A vented gas-fired fireplace heater is designed to comply with minimum thermal efficiency requirements and may be controlled by an automatic thermostat. Direct vent appliances may be installed in manufactured (mobile) homes and recreational vehicles.

ANSI Z21.89-2007 (R2012), Standard for Outdoor Cooking Specialty Gas Appliances (Same as CSA 1.18b)
This standard applies to newly produced outdoor specialty gas appliances, (fryer/boiler, smoker, tabletop grill or any combination). Appliance may be connected to a fixed fuel piping system or self contained liquefied petroleum gas or propane gas supply system of a single cylinder with a maximum size of 20 pounds (9.1 kg) of fuel.

ANSI Z21.89b-2012, Standard for Outdoor Cooking Specialty Gas Appliances (same as CSA 1.18b)
Details test and examination criteria for portable outdoor specialty gas appliances, (fryer/boiler, smoker, tabletop grill or any combination). Appliance may be connected to a fixed fuel piping system or self contained liquefied petroleum gas or propane gas supply system of a single cylinder with a maximum size of 20 pounds (9.1 kg) of fuel.

Details test and examination criteria for gas convenience outlets and optional enclosures, capable of operation at ambient temperatures between 32°F and 200°F (0°C and 93.3°C) if intended for Indoor Use Only, or between -20°F and 200°F (-28.9°C and 93.3°C), if intended for Indoor/Outdoor Use, and at pressures not in excess of 5 psig (34.5 kPa).

ANSI Z21.91-2017, Ventless Firebox Enclosures for Gas-Fired Unvented Decorative Room Heaters, same as BSR Z21.91-201x, same as BSR Z21.91-201x
Details test and examination criteria for ventless firebox enclosures for unvented decorative room heaters. Fireboxes covered by this standard are intended for use with unvented decorative room heaters which comply with ANSI Z21.11.2 for installation in solid fuel-burning fireplaces.

Details test and examination criteria for manually operated electric gas ignition system which is intended to function as a integral part of a gas appliance. An ignition system shall ignite gas at the main or pilot burner using either spark or hot surface ignition. These ignition systems and components are for use with natural, manufactured and mixed gases; liquefied petroleum and LP gas-air mixtures.

ANSI Z21.93-2017, Excess Flow Valves for Natural Gas and Propane Gas up to Pressures of 5 psig (same as CSA 6.30)
Details test and examination criteria for excess flow valves used after the service meter or second stage regulator not to exceed 2 inch (51mm) nominal pipe size or use with natural, manufactured and mixed gases, liquefied petroleum (LP) gases, and LP gas-air mixtures at pressures not to exceed 5 psig, having a minimum operating pressure of no greater than 5 inches water column and capable of operation within an ambient temperature range of -20°F & +60°F (-29°C to +16°C). Valves shall also be capable of operation at temperatures outside this specified range when so specified by the manufacturer.

Details test and examination criteria for flammable vapor sensor systems and components for use in gas-burning appliances. This standard applies to flammable vapor sensor or system capable of operating throughout a temperature range of 32°F & 125°F (0°C & 51.7°C).

ANSI Z21.94a-2007, Automatic Flammable Vapor Sensor Systems and Components (same as CSA 6.31a)
Details test and examination criteria for flammable vapor sensor systems and components for use in gas-burning appliances. This standard applies to flammable vapor sensor or system capable of operating throughout a temperature range of 32°F & 125°F (0°C & 51.7°C).

ANSI Z21.96-2014, Standard for Gas Fired Portable Water Heaters (same as CSA 11.6)
Details test and examination criteria for portable water heaters using propane, butane and liquefied petroleum gases and mixtures thereof. This standard applies to portable water heaters having regulated or non-regulated pressure and intended for direct or remote connection to the fuel container.

ANSI Z21.97-2014, Standard for Outdoor Decorative Gas Appliances (same as CSA 2.41)
Decorative gas appliances for outdoor installation for use with natural and propane. For connection to a fixed fuel piping system, or an integral self-contained liquefied petroleum gas supply system, provided the appliance incorporates mounting means for the attachment of a maximum of two cylinders, or to a remote self-contained liquefied petroleum gas supply system. These requirements apply to appliances operating at inlet gas pressures not exceeding 1/2 psig (3.5 kPa).

ANSI Z21.98-2015, Nonmetallic Dip Tubes for Use in Water Heaters (same as CSA 4.10)
Details test and examination criteria for non-metallic dip tubes for use in water heaters.

ANSI Z83.11-2016, Standard for Gas Food Service Equipment (same as CSA 1.8)
Details test and examination criteria for gas food service equipment for use with natural, manufactured and mixed gases, propane, liquefied petroleum gases and LP gas-air mixtures. The standard provides coverage for ranges and unit broilers, baking and roasting ovens, counter appliances, deep fat fryers and kettles, steam cookers and steam generators.
 ANSI Z83.18-2016, Non-Recirculating Direct Gas-Fired Heating and Forced Ventilation Appliances for Commercial and Industrial Application

Details test and examination criteria for recirculating direct gas-fired industrial air heaters for use with natural, manufactured and mixed gases, LP gases, and LP gas-air mixtures. Its purpose is to offset building heat loss. Ventilation air to the heater is ducted directly from outdoors and the products of combustion generated by the heater are released into the air stream being heated. Inside air may be introduced before or after the combustion zone.

 ANSI Z83.19-2009 (R2014), Standard for Gas-Fired High Intensity Infrared Heaters, same as CSA 2.35 with Addenda A

Details test and examination criteria for gas-fired high-intensity infrared heaters for use with natural, manufactured, mixed and liquefied petroleum (propane) gases and may be convertible for use with natural and LP-gases. Applies to heaters for installation in and heating of outdoor spaces or nonresidential indoor spaces where flammable gases or vapors are not generally present.

 ANSI Z83.20-2016, Gas Fired Low Intensity Infrared Heaters (same as CSA 2.34)

Details test and examination criteria for gas-fired low-intensity infrared and infrared radiant tube heaters, with inputs up to 400,000 Btu/hr per burner, for use with natural, manufactured, mixed and liquefied petroleum (propane) gases and may be convertible for use with natural and LP-gases. Applies to heaters for installation in and heating of outdoor spaces or nonresidential indoor spaces where flammable gases or vapors are not generally present.

 ANSI Z83.21/CSA C22.2 No. 263/UL 921-2016, Standard for Commercial Dishwashers (same as UL 921)

Details for test and examination of commercial gas-fired and electric dishwashers for use with natural, manufactured and mixed, and liquefied petroleum gases, and LP gas-air mixtures.

 ANSI Z83.25 (CSA3.19)-2016, Direct Gas-Fired Process Air Heaters

Details for test and examination criteria for direct gas-fired process air heaters of the recirculating or non-recirculating type, whose primary purpose is to provide process heating to non-occupied spaces within commercial and industrial buildings and may also include operation as a non-recirculating ventilation air heater if operated during periods when the space is occupied.

 ANSI Z83.26-2014, Standard for Gas-Fired Outdoor Infrared Patio Heaters (same as CSA 2.37)

Patio heaters for heating residential or nonresidential outdoor spaces. Outdoor heaters may be suspended overhead, angle mounted overhead, wall mounted, or floor mounted. Floor mounted heaters may be free-standing or portable. Outdoor heaters may be connected to a fixed fuel piping system or connection to an integral self-contained LP gas supply. Cylinder size shall be limited to 20 lb of fuel.

 ANSI Z83.4-2016, Non-Recirculating Direct Gas-Fired Heating and Forced Ventilation Appliances for Commercial and Industrial Application, same as CSA 3.7-2016

Details test and examination of criteria for direct gas-fired industrial air heaters of the non-recirculating type, for use with nat., mfd. and mixed gases, LP gases, and LP gas-air mixtures. A direct gas-fired industrial air heater of the non-recirculating type is described as a heater whose purpose is to offset building heat loss. All air to the heater shall be ducted directly from outdoors and the products of combustion generated by the heater are released into the air stream being heated.

 ANSI Z83.7-2011 (R2016), Gas-Fired Construction Heaters, same as CSA 2.14

Details test and examination criteria for construction heaters for use with natural and liquefied petroleum gases. A construction heater is primarily intended for temporary use in heating buildings or structures under construction, alteration or repair. All products of combustion are released into the area being heated.

 ANSI Z83.8-2015, Gas Unit Heates, Gas Packaged Heaters, Gas Utility Heaters, and Gas-Fired Duct Furnaces (same as CSA 2.6)

Details test and examination criteria for gas packaged heaters, utility heaters, unit heaters and gas-fired duct furnaces for use with nat, mfd. and mixed gases, LP gases, and LP gas-air mixtures. A unit heater may either be suspended or floor-mounted and may be of the low- or high-static pressure type. Duct furnaces are normally installed in distribution ducts of A/C systems to supply warm air for heating and depended for air circulation on a blower not furnished as a part of the furnace.

 ANSI/CSA 12617-2016, Liquefied natural gas vehicles fueling connection devices

This International Standard specifies liquefied natural gas (LNG) refuelling nozzles and receptacles constructed entirely of new and unused parts and materials for road vehicles powered by LNG. An LNG refuelling connector consists of, as applicable, the receptacle and its protective cap (mounted on the vehicle) and the nozzle. This International standard is applicable only to such devices designed for a maximum working pressure of 3.4 MPa (34 bar) to those using LNG as vehicle fuel and having standardized mating components.

 ANSI/CSA C448-2016, Design and installation of ground source heat pump systems for commercial and residential buildings

This Standard applies to a) direct expansion GSHPs for systems using GHX as a thermal source or sink for heating or cooling, with or without a supplementary heating source; and (b) unitary single package or split system liquid source and ground source heat pumps for all systems using groundwater, submerged heat exchangers, or ground heat exchangers as a thermal source or sink for heating and/or cooling, with or without a supplementary heating source.


This standard provides uniform test methods for evaluating materials compatibility with compressed hydrogen applications. The results of these tests are intended to provide a basic comparison of materials performance in applications utilizing compressed hydrogen. It is not intended to replace the targeted testing which may be necessary to fully inform design calculations.


This part applies to stationary packaged, self-contained fuel cell power systems or fuel cell power systems comprised of factory matched packages of integrated systems which generate electricity through electrochemical reactions.

 ANSI/CSA FC3-2004 (R2017), Portable Fuel Cell Power Systems, same as R 2016, same as BSR CSA

This Standard applies to ac and dc type portable fuel cell power systems, with a rated output voltage not exceeding 600 V, for commercial, industrial, and residential indoor and outdoor use in non-hazardous locations, in accordance with the Rules of the National Electric Code, ANSI/NFPA 70.

 ANSI/CSA HGV 2-2014, Compressed hydrogen gas vehicle fuel containers

This Standard contains requirements for the material, design, manufacture, marking, and testing of serially produced, refillable Type HGV2 containers intended only for the storage of compressed hydrogen gas for on-road vehicle operation. These containers are to be permanently attached to the vehicle, have a capacity of up to 1,000 liters (35.4 ft3) water capacity, and have a nominal working pressure that does not exceed 70 MPa.

 ANSI/CSA HGV 3.1-2014, Fuel system components for compressed hydrogen gas powered vehicles

This Standard contains requirements for newly produced compressed hydrogen gas fuel system components, intended for use on hydrogen gas powered vehicles. This standard applies to devices which have a service pressure of either 25 MPa, 35 MPa, 50 MPa or 70 MPa. Components included in this standard include: check valve, manual valve, manual container valve, automatic valve, gas injector, pressure indicator, pressure regulator, pressure relief valve, pressure relief device, excess flow valve, gas tight housing and ventilation lines and passages, rigid fuel line, flexible fuel line, filter housing, fittings, and discharge line closures.
ANSI/CSA HGV 4.1-2013, Hydrogen Dispensing Systems
This standard details mechanical and electrical requirements for newly manufactured systems that dispense hydrogen gas for vehicles, intended primarily to dispense fuel directly into the vehicle fuel storage container. Each dispenser may have the capability of independently fueling more than one vehicle simultaneously. This standard does not apply to the nozzle; vehicle to station communication; compression and ancillary equipment; hydrogen gas storage containers; vehicle fueling appliances for HGV remote station or kiosk consoles and remote sequencing equipment; and other remote equipment not supplied as part of the dispenser.

ANSI/CSA HGV 4.10-2010, Fittings for Compressed Hydrogen Gas and Hydrogen Rich Gas Mixtures
Specifies uniform methods for testing and evaluating the performance of fittings for use with compressed hydrogen gas and hydrogen rich gas mixtures. This standard does not address special requirements for liquid and slush hydrogen. This standard applies to hydrogen systems applications to meet current market needs.

ANSI/CSA HGV 4.2-2013, Hoses for Compressed Hydrogen Fuel Stations, Dispensers, and Vehicle Fuel Systems
This standard contains safety requirements for the material, design, manufacture and testing of gaseous hydrogen hose and hose assemblies which are used as a part of the dispensing station to connect the dispenser to the refueling nozzle; used as part of a vehicle on-board fuel system; or used as vent lines which carry gas to a safe location for either vehicles or dispensing systems.

ANSI/CSA HGV 4.3-2016, Test Methods for Hydrogen Fueling Parameter Evaluation
This Standard establishes the test method, criteria, and apparatus to evaluate a field installed hydrogen fueling station dispensing system as it relates to achieving the protocols specified in the SAE J2601 Standard, and the SAE J2799 Standard, with light duty vehicle hydrogen storage systems less than 248.6 liters (10 kg H2). The testing evaluation applies to dispensers designed to fill vehicle storage systems following the prescribed protocols defined in SAE J2601 that targets rapid fills, while respecting temperature, pressure and fuel density safety limits.

ANSI/CSA HGV 4.4-2013, Breakaway Devices for Compressed Hydrogen Dispensing Hoses and Systems
This standard contains safety requirements for the design, manufacture and testing of fueling hose breakaway devices for use in hydrogen gas fueling applications. This standard does not apply to: residential fueling facilities; vehicle fueling appliances for hydrogen gas vehicles; dispenser breakaway devices (shear valves); and vehicular breakaway components.

ANSI/CSA HGV 4.5-2013, Priority and Sequencing Equipment for Hydrogen Vehicle Fueling
This standard contains requirements for priority and sequencing equipment, which is part of a hydrogen gas vehicle fueling system.

ANSI/CSA HGV 4.6-2013, Manually Operated Valves for Use in Gaseous Hydrogen Vehicle Fueling Systems
This standard contains safety requirements for the material, design, manufacture and testing of manually operated valves for gaseous hydrogen vehicle fueling stations. This standard does not apply to fuel storage container shut-off valves connected directly to the storage container and fueling nozzle valves covered by SAE J2600 or ISO 17268.

ANSI/CSA HGV 4.7-2013, Automatic Valves for Use in Gaseous Hydrogen Vehicle Fueling Stations
This standard contains safety requirements for the material, design and testing of automatic valves used in gaseous hydrogen vehicle fueling stations. This standard applies to pneumatically actuated valves, check valves, excess flow valves, and electrically actuated valves. This standard does not apply to actuated valves. This standard does not apply to hydraulically actuated valves, pressure regulating valves, pressure relief valves, and fueling nozzle valves as covered in SAE J2600 or ISO 17268.

ANSI/CSA HGV 4.8-2012, Hydrogen Gas Vehicle Fueling Station Compressor
This standard contains safety requirements for material, design, manufacture and testing of gaseous hydrogen compressor packages used in fueling station service, designed primarily to provide compressed hydrogen for vehicle fueling stations. This standard does not apply to vehicle fueling appliances for HGV, compressor packages used for non-vehicular fuel applications (e.g. power generation units) and internal combustion engine driven compressors.

ANSI/CSA HPRD 1-2013, Standard for Thermally Activated Pressure Relief Devices for Compressed Hydrogen Vehicle Fuel Containers
This standard contains requirements for pressure relief devices intended for use on fuel containers that comply with CSA B51, Part 2, SAE J2579, or ISO DIS 15869.2. Pressure relief devices designed to comply with this standard are intended to be used with hydrogen fuel complying with SAE J2791 or ISO 14687.

ANSI/CSA LC 4-2012 (R2017), CSA 6.32-2010 (R2017) and LC4a-2013 (R2017), CSA 6.32a-2013 (R2017) - Press-Connect Metallic Fittings for Use in Fuel Gas Distribution Systems
Details test and examination criteria for metallic press-connect type fittings and valves for use with fuel gas tube systems intended for installation above ground, below ground, indoors and outdoors, for operating pressures not exceeding 125 psig for use with copper tube #189; #8221; through #8221; nominal size.

ANSI/CSA LC 6-2008 (R2013), Standard for Natural Gas Diaphragm Pumps
Details tests and examination criteria for natural gas-operated diaphragm pumps that use natural gas as the working fluid. Applies to diaphragm pumps with a rated inlet pressure not exceeding 125 psi.

ANSI/CSA LC 7-2009 (R2014), Standard for Pipe Joint Compound
Details test and examination criteria for pipe joint sealing compounds including paste, semi-liquid type and polymeric tape intended for sealing threaded joints on metal piping having NPT tapered threads.

ANSI/CSA NGV 3.1/CSA 12.3-2014, Fuel System Components for Compressed Natural Gas Powered Vehicles
This standard establishes requirements for newly produced compressed natural gas fuel system components, intended for use on natural gas powered vehicles. This standard applies to devices which have a service pressure of either 16.5  KPa (2,400 psi), 20.7  KPa (3,000 psi) or 24.8  KPa (3,600 psi).

ANSI/CSA NGV 4.2-2014, Hoses for Natural Gas Dispensing Systems
This standard establishes requirements for newly manufactured compressed natural gas hose assemblies, intended for use in natural gas dispensing stations. Hose assemblies may be categorized by the following classes: Class A: Hose Assembly connecting the dispenser to the fuel nozzle. Class D: Hose assemblies used on other station equipment. Note: Refer to ANSI NGV 3.1-2013 /CSA 12.3-2013, Part 22 for Class B and C vehicle hoses. The requirements of this standard may be superseded by an application specific standard.

ANSI/CSA NGV 5.1-2016, Residential Fueling Appliance (same as CSA-201x)
This standard details mechanical and electrical requirements for newly manufactured systems that dispense natural gas for vehicles directly into the vehicle fuel storage container and are installed in non-commercial/ non-public locations. This standard does not apply to the nozzle, hose assemblies and connection devices associated with such equipment.

ANSI/CSA NGV 5.2-2017, Standard for Compressed Natural Gas Vehicle (NGV) Fueling Appliances
This Standard details mechanical, physical, and electrical requirements for a newly manufactured appliance that dispenses natural gas for vehicles directly into the vehicle natural gas fuel storage systems from natural gas distribution systems or supply systems other than residential gas systems, referred to as vehicle fueling appliances (VFA). (Note: Residential fueling appliances (RFA) are addressed in CSA Standard NGV 5.1.) These requirements apply to compressed natural gas appliances for installation in commercial, non-residential locations and non-retail fueling facilities.
ANSI/CSA NGV1-2017, Compressed Natural Gas Vehicle (NGV) Fueling Connection Devices
(same as CSA NGV1)
This Standard applies to newly produced compressed Natural Gas Vehicle (NGV) fueling connection devices, hereinafter referred to as ‘devices’ & #8221; constructed entirely of new, unused parts and materials. NGV fueling connection devices consist of the following components, as applicable: a) receptacle and protective cap (mounted on vehicle); b) nozzle; and c) three-way valve (external to nozzle and mounted in the fuel dispenser system). This Standard applies to devices that have a service pressure of either 8300 kPa (1200 psi), 16 500 kPa (2400 psi), 20 700 kPa (3000 psi), or 24 800 kPa (3600 psi).

ANSI/CSA NGV2-2016, Standard for Compressed natural gas vehicle fuel containers
This standard contains requirements for the materials, design, manufacture and testing of refillable containers intended for the storage of compressed natural gas for vehicle operation and which are affixed to the vehicle. The standard covers fuel containers of up to 1000 liter capacity.

ANSI/CSA NGV2a-2012, Compressed Natural Gas Vehicle Fuel Containers
This standard contains specifications for the materials, design, manufacture and testing of refillable containers intended for the storage of compressed natural gas for vehicle operation and which are affixed to the vehicle. The standard covers fuel containers of up to 1000 liter capacity and pressures between 165 and 300 Bar (2400 and 4350 psig).

ANSI/CSA Z741-2012, Geological storage of carbon dioxide
Standard applies to the storage of carbon dioxide (CO2) streams in geological media; promotes environmentally safe and long-term containment of carbon dioxide in a way that minimizes risks to the environment and human health; includes, but is not limited to, the safe design, construction, operation, maintenance, and closure of storage sites; provides recommendations for the development of management documents, community engagement, risk assessment, and risk communication.

Details and examination criteria for direct gas-fired circulating heaters primarily intended for permanent installation in agricultural animal confinement buildings for use with natural, manufactured and mixed gases, liquefied petroleum gases and LP gas-air mixtures.

ANSI/IAS NGV 4.1/CSA 12.5-1999 (R2014), NGV Dispensing Systems
This standard applies to the mechanical and electrical features of newly manufactured systems that dispense natural gas for vehicles (NGV) where such a system is intended primarily to dispense the fuel directly into the fuel storage container of the vehicle, NGV dispensers contained in a single housing, and NGV dispensers contained in multiple housings for metering and registering devices, remote electronics, remote overfill protection, hoses and nozzles.

This standard applies to newly produced compressed Natural Gas Vehicle (NGV) dispenser shear valves and fueling hose emergency breakaway shutoff devices, which are intended to minimize the escape of natural gas by automatically shutting off the flow of gas from the dispenser and control the depressurization of the hose, minimize damage to the vehicle and dispenser when a vehicle is driven off with the nozzle attached to the vehicle’s fueling receptacle and automatically shut off the flow of gas in the event of a vehicular collision with a fuel dispenser that results in the displacement of the dispenser from its gas supply connection.

This standard contains safety requirements for the material, design, manufacture and testing of manually operated valves for high pressure natural gas. These requirements do not apply to cylinder shut-off valves.

CSAA (Organization) (Central Station Alarm Association)
ANSI/CSAA CS-CO-01-2008, Carbon Monoxide Supervising Station Response Standard
This standard defines the procedure to be followed by a supervising station when a carbon monoxide detector sends an alarm signal to the supervising station. It defines the response to the premises and for the responding authorities.

ANSI/CSAA CS-V-01-2016, Alarm Verification and Notification Procedures
This standard is to be used by alarm-monitoring facilities and by federal, state and local units of government in their development of consistent administration criteria for alarms. New technologies and successful efforts to reduce false alarms have led to this standard. Various units of government that have adopted this standard recognize the life-saving benefits that monitored security and fire alarm systems provide. The intent of this standard is to achieve increased efficiency by reducing costs and eliminating wasteful efforts associated with potential false alarms.

CTA (Consumer Technology Association)
ANSI J-STD-42-B-2013, Emergency Alert Messaging for Cable
This standard defines an Emergency Alert signaling method for use by cable TV systems to signal emergencies to digital receiving devices that are offered for retail sale. Such devices include digital set-top boxes that are sold to consumers at retail,

CEA-109-D specifies Intermediate Frequencies (IFs) to be used in Standard Broadcast (AM), FM, and TV broadcast receivers. In CEA-109-D, the term Intermediate Frequency (IF) refers to the dominant interference-rejecting and passband-shaping circuits in receiver front-ends.

ANSI/CTA 2003-C-2007 (R2013), Digital Audiobook File Format and Player Requirements
CEA-2003-C defines requirements and provides recommendations to publishers, software developers, content providers, and hardware manufacturers for the data structure, usability requirements, playback systems and delivery systems for audiobooks in digital file format. It should be noted that throughout CEA-2003-C, the term audiobook is defined as any audio file or collection of audio files of primarily spoken word content that is played in a linear order. Therefore, spoken word audio with occasional music, a narration of newspaper articles, or other similar spoken word audio, would additionally be considered audiobooks under this standard.

ANSI/CTA 2005-2006 (R2013), AV Adapter to Connect Ethernet and 1394 Devices
The Adapter project is intended to provide seamless connectivity between 1394 C/CE devices and DLNA devices. The Adapter will act as a Proxy between the two interfaces, exposing the devices on the opposite network as if they were on the same network.

CEA-2006-B defines characteristics that, considered collectively, describe the performance of power amplifiers designed for use in mobile applications. Power amplifiers designed for use in mobile applications include, but are not limited to: separate single and multi-channel amplifiers, integrated amplifiers and bandwidth-limited amplifiers that are connected to and rely solely on the vehicle’s primary electrical system for power input and have output power ratings of greater than 5 watts when measurement in accordance with CEA-2006-B.
ANSI/CTA 2009-B-2010 (R2016), Receiver Performance Specification for Public Alert Receivers
This voluntary standard defines minimum performance criteria for consumer electronic products designed to receive SAME alert signals broadcast by the National Oceanic and Atmospheric Administration’s Weather Radio network and Environment Canada’s Meteorological Services of Canada Radio network. This standard does not apply to receivers not equipped to receive SAME messages (e.g., tone-alert receivers).

ANSI/CTA 2010-B-2014, Standard Method of Measurement for Subwoofers
This standard defines a method for measuring the audio performance of powered and passive subwoofers. The revision will include adding the maximum continuous SPL output capability measurement, as well as providing a reporting of the combined SPL (continuous & peak) tempered with a defined crest factor signal.

The CEA-2014-B ‘Web-based Protocol and Framework for Remote User Interface on UPnP®&#8482; Networks and the Internet (Web4CE)’ standard defines the necessary mechanisms to allow a user interface to be remotely displayed on and controlled by devices or control points other than the one hosting the logic. The basic device operations are based on the UPnP Device Architecture for UPnP networks and UPnP devices in the home. The standard also allows the remote display of user interfaces provided by third party internet services on devices in the home, and covers a wide range of UI capabilities for TVs, mobile phones and portable devices.

ANSI/CTA 2015-2007 (R2017), Mobile Electronics Cabling Standard
This standard defines size and performance requirements for power and speaker cabling used in mobile electronics applications.

ANSI/CTA 2017-A-2010 (R2016), Common Interconnection For Portable Media Players
This standard defines electrical and mechanical properties for a connector that will pass audio, video and associated metadata signals, control signals, and power between portable electronic devices and in home and in vehicle audio/video systems.

This document describes a serial communication protocol that enables command and control communication between portable electronic devices and accessories attached to those devices. This protocol builds upon functions provided by the MOST network developed by the MOST Cooperation (www.mostcooperation.com).

ANSI/CTA 2020-2007 (R2014), Other VBI Waveforms
This standard, CEA-2020, specifies four Vertical Blanking Interval (VBI) waveforms in commercial use. The electrical properties of the waveforms are covered, but the meaning of the payload data is not. The waveforms apply to TV-liners, interlaced (i.e. 480i) analog television signals. The waveforms may be present on analog inputs and analog outputs, but no conformance requirements about the actual presence of the waveforms are defined in CEA-2020.

ANSI/CTA 2028-B-2014, Color Codes for Outdoor TV Receiving Antennas
This standard defines color codes to be associated with minimum performance parameters of outdoor television (TV) receiving antennas. When used in conjunction with the CEA TV antenna selector program at www.AntennaWeb.org, these color codes can help both consumers and professional installers select appropriate outdoor TV antennas for their particular reception environments.

ANSI/CTA 2031-2008 (R2014), Testing and Measurement Methods for Mobile Loudspeaker Systems
CEA-2031 defines test procedures for rating the performance and physical size of mobile loudspeakers, and requirements for reporting these characteristics. CEA-2031, when used in conjunction with CEA-2006-A, Testing & Measurement Methods for Mobile Audio Amplifiers, enables consumers to select mobile loudspeakers with power handling capabilities that are appropriate for the power output characteristics of their mobile amplifiers.

ANSI/CTA 2032-B-2014, Indoor TV Receiving Antenna Performance Standard
This standard defines test and measurement procedures for determining the performance of indoor TV receiving antennas.

This standard describes an improved method for measuring and reporting the performance of a loudspeaker in a manner that should help consumers better understand the performance of the loudspeaker and convey a reasonably good representation of how it may sound in a room based on its off-axis response and how this response affects the consumer’s experience. Finally, it includes a number of informational annexes to help readers gain a more thorough understanding of techniques for acquiring loudspeaker data in both anechoic and non-anechoic environments, as well as methods for using this acquired data to predict loudspeaker performance. This standard applies only to loudspeaker systems, and not to raw transducers. This standard is being revised to align it with CEA -2010-B Standard Method of Measurement for Powered Subwoofers.

ANSI/CTA 2037-A-2014, Determination of Television Average Power Consumption
This standard defines a method for measuring television average power consumption. *This standard has been revised since the version submitted for public review published in the 2/22/13 version of Standards Action. This revised version of CEA-2037-A makes a number of technical changes to the test method for measuring the power consumption of a television. These modifications include changes to the test set up, the EUT set up, test equipment, test equipment accuracy, and editorial changes. The totality of the changes may have a significant effect on the measurements resulting from this standard.

ANSI/CTA 2038-2012 (R2017), Command-Driven IR-Synchronized Active Eyewear Standard
This standard describes a standard for eyewear that is required to view 3D content from displays. This document relates to both active and passive eyewear used in 3D consumer electronic systems in the home. In the case of active glasses, it standardizes interfaces, signaling, setup, control and polarization.

ANSI/CTA 2040-2011, SD Card Common Interface Standard
Describes interfaces between a Common Interface Module (CI Module) located on a microSD card and a Terminal device. The purpose of this standard is to specify the hardware, signaling, and application interface between a digital consumer electronics device e.g. television receiver (handheld, stationary or otherwise) and a small removable, replaceable CI Module that implements and embodies significant portions of a Conditional Access System (CAS).

ANSI/CTA 2041-2012, Standard for Round Tactile Feedback Feature
Defines a round tactile feedback feature for remote controls.

ANSI/CTA 2042.1-B-2015, Wireless Power Glossary of Terms
This document specifies terms and definitions for wireless power.

ANSI/CTA 2043-2013, Set-top Box (STB) Power Measurement
This standard defines a method for measuring Set-top Box power consumption using the measurement parameters of the International Electrotechnical Commission standard “IEC62087: METHODS OF MEASUREMENT FOR THE POWER CONSUMPTION OF AUDIO, VIDEO AND RELATED EQUIPMENT”. This standard clarifies test procedures, definitions, terms, and provides localization for North American markets. An informative annex maps IEC measurement values to the US EPA ENERGY STAR® Program Requirements for Set-top Boxes. CEA-2043 supersedes CEA-2013 and CEA-2022.
ANSI/CTA 2045 Amendment 1-2014, Modular Communications Interface (MCI) for Energy Management - Amendment 1

ANSI/CTA 2045.1-2014, Modular Communications Interface for Firmware Transfer Message Set
This specification is an extension of the ANSI/CEA-2045 Modular Communications Interface (MCI) for Energy Management Specification. It presents messages and methods that enable reprogramming the SGD firmware over the MCI interface.

ANSI/CTA 2045.2-2014, Modular Communications Interface for Generic Display Message Set
This specification is an extension of the ANSI/CEA-2045 Modular Communications Interface (MCI) for Energy Management Specification. It presents messages and methods that enable generic message display over the MCI interface.

ANSI/CTA 2045.3-2014, Modular Communications Interface for Thermostat Message Set
The specification is an extension of the ANSI/CEA-2045 Modular Communications Interface (MCI) for Energy Management Specification. It presents messages and methods for Thermostat based functionality.

ANSI/CTA 2047-2014, CE Energy Usage Information (CE-EUI)
This standard will enable consumer electronic devices to communicate their energy usage information for example over a home network as well as optionally respond to basic demand/response commands. The usage data may be a measured or estimated value or may use other methods to indicate energy usage. This standard should enable mapping to/from the NAESB/PAP10 EUI model as well as utilize ANSI/CEA-2045 Modular Communications Interface for Energy Management messaging where possible.

PROGRESS: 03/22/2013 - Preliminary Approval to initiate the project 10/08/2013 - R7.8 ratified the preliminary approval to initiate the project. 10/31/2013 - CPP issued 11/15/2013 - CPP closed 11/21/2013 - E-mail ballot issued Comments received and resolved during the initial ballot. 03/20/2014 - New E-mail ballot issued due to substantive changes made to the draft and lack of voting quorum during the initial balloting. 03/24/2014 - Requested BSR8 be submitted. 04/18/2014 - Ballot Closed - Ballot Approved 05/01/2014 - Recent request to submit BSR8.

ANSI/CTA 2048-2014, Host and Router Profiles for IPv6
Develop an IPv6 host and router profiles requirements standard.

ANSI/CTA 2049-2015, Determination of Small Network Equipment Average Energy Consumption
This standard defines a method for measuring Small Network Equipment (SNE) energy consumption and related items.

ANSI/CTA 2051-2017, Personal Sound Amplification Performance Criteria
This standard describes the minimum acceptable performance levels of products that serve as personal sound amplifiers.

ANSI/CTA 2052.1-2016, Glossary of Terms for Sleep Wearable Devices
This standard specifies terms and definitions for sleep wearable devices.

ANSI/CTA 2056-2016, Physical Activity Monitoring for Fitness Wearables Step Counting
This standard creates definitions and performance criteria for measuring step counting on consumer wearable or app-based physical activity monitoring devices.

ANSI/CTA 2063-2017, Small Unmanned Aerial Systems Serial Numbers
To develop a standard for serial numbers to be used by small unmanned aerial systems.

ANSI/CTA 608-E-2008 (R2014), Line 21 Data Services
CEA-608-E is a technical standard and guide for using or providing Closed Captioning services or other data services embedded in line 21 of the vertical blanking interval of the NTSC video signal. This includes provision for encoding equipment and/or decoding equipment to produce such material as well as manufacturers of television receivers which are required to include such decoders in their equipment as a matter of regulation (included in Annex F).

ANSI/CTA 708-E-2013, Digital Television (DTV) Closed Captioning
CEA-708-E defines DTV Closed Captioning (DTVCC) and provides specifications and guidelines for caption service providers, distributors of television signals, decoder and encoder manufacturers, DTV receiver manufacturers, and DTV signal processing equipment manufacturers. CEA-708-E may also be useful in other systems.

ANSI/CTA 708.1-2012 (R2017), Closed Captioning for 3D Video
This standard describes how to encode closed captioning for 3D video in CEA-708 caption services.

This specification applies to a communication protocol for networked control systems. The protocol provides peer-to-peer communication for networked control and is suitable for implementing both peer-to-peer and master-slave control strategies.

This document specifies the Control Network Power Line (PL) Channel and serves as a companion document to the CEA-709.1 Control Network Protocol Specification. Its purpose is to present the information necessary for the development of a PL physical network and nodes to communicate the share information over the network.

ANSI/CTA 709.3-1999 (R2015), Free-Topology Twisted-Pair Channel Specification
This document specifies the CEA-709.3 free-topology twisted-pair channel and serves as a companion document to the CEA-709.1 Control Network Protocol Specification. The channel supports communication at 78.125 kbps between multiple nodes, each of which consists of a transceiver, a protocol processor and application processor, a power supply and application electronics.

ANSI/CTA 709.4-2013, Fiber-Optic Channel Specification
In conjunction with ANSI/CEA-709.1 Control Network Protocol Specification, ANSI/CEA-709.4 defines a complete 7-layer protocol stack for communications on a CEA-709.4 single-fiber (half-duplex) fiber-optic channel. ANSI/CEA-709.4 specifies the physical layer (OSI Layer 1) requirements for the CEA-709.4 fiber-optic channel which encompasses the interface to the Media Access Control (MAC) layer and the interface to the medium. The single-fiber channel implemented as specified in ANSI/CEA-709.4 allows two nodes to communicate bi-directionally across a single piece of fiber cable.

This specification contains all the information necessary to facilitate the exchange of data and control information in an interoperable fashion using ANSI/CEA-709.1 and its associated data-transport media specifications. This specification establishes a minimal set of rules for compliance. It allows for extended services to be provided, given that the rules are adhered to within the system. This standard permits extended services to coexist and defines the bounds in which those services function, including the format for internal device-documentation of those services. Services outside the scope of this specification so long as they are adherent to the system are permitted but will not necessarily be interoperable with any other devices and shall not be essential for the functioning of the device. Seeking Users of control networking systems.
This Standard will provide mechanisms through which various vendors of control networking systems may exchange information in a standardized way to ensure interoperability between various control networking protocol implementations. This standard will provide specifications for the Application Elements of Control Network Protocol packets as follows: Definitions of standardized packet (network-variable) data types; Definitions of device-interface files; Definitions of standardized configuration-property types; Definitions of standardized enumeration types; Definitions of standardized functional profiles; Definition of the standardized method of file transfer between devices. It also defines the device interface for a device as specified, which is necessary to exchange data between various devices from different manufacturers. Seeking Users of control networking systems.

ANSI/CTA 762-B-2008 (R2015), DTV Remodulator Specification
This standard defines minimum specifications for a one-way data path utilizing an 8-VSB trellis remodulator in compliance with ATSC A/53, Part 2:2007, ATSC Digital Television Standard Part 2 - RF/Transmission System Characteristics. This standard applies to any type of device used to connect to an ATSC compliant digital television (DTV) receiver. Devices meeting this standard should interoperate with any ATSC compliant receiver that also supports “monitor mode.”

ANSI/CTA 766-D-2013, ANSI/CEA-766-D, U.S. and Canadian Rating Region Tables (RRT) and Content Advisory Descriptors for Transport of Content Advisory Information Using ATSC Program and System Information Protocol (PSIP)
CEA-766-C augments ATSC A/65C and designates a) the RRT which provides the receiver with the definition of the rating system and b) the Content Advisory Descriptors which provide the receiver with the specific program rating for each program.

ANSI/CTA 774-C-2014, TV Receiving Antenna Performance Presentation and Measurement
This standard defines test and measurement procedures for use by manufacturers of television receive antennas who wish to categorize their antennas in accordance with CEA-2028-A, Color Codes for Outdoor TV Receiving Antennas, for use with the CEA TV Antenna Selector Program www. AntennaWeb.org. Essential elements include procedures to determine antenna gain, front-to-back ratio, average gain to null ratio, directivity and distortion performance of active antennas with integrated amplifiers.

ANSI/CTA 775-2-A-2008 (R2013), Service Selection Information for Digital Storage Media Interoperability
CEA-775-C [1] standardizes the IEEE 1394 [3][4] High Performance Serial Bus interface for the Digital Television (DTV) receiver. A digital storage device such as a D-VHS or hard disk digital recorder may be used by the DTV or by another source device such as a cable set-top box to record or time-shift digital television signals.

ANSI/CTA 775-C-2008 (R2013), DTV 1394 Interface Specification
CEA-775-C defines mechanisms to allow a source of MPEG service, such as a cable or terrestrial set-top box, digital VCR, or DTV to utilize the MPEG decoding and display capabilities in a DTV. A method is included to allow the OSD Producer to supply bitmap graphic overlays for blending and composition in the DTV over decoded video.

ANSI/CTA 803-B-2012 (R2017), Mobile Electronics Wiring Designations for Audio, and Vehicle Security/Convenience
This standard defines the terms, abbreviations, and definitions used in the sales and installation of vehicle aftermarket audio and security equipment. The standard adds continuity to mobile electronics installation information, enables easier data collection, and ensures consistency of information to installers. CEA-803-B does not address home theater applications. See ANSI/CEA-863-B.

ANSI/CTA 805-E-2013, Data Services on the Component Video Interfaces
This standard, ANSI/CEA-805-E, specifies how data services are carried on analog Component Video Interfaces (CVI), as described in CEA-770.2-C and CEA-770.3-C. CEA-805-D applies to all CE devices carrying data on the CVI vertical blanking interval (VBI). All CEA-805-E references to component video and/or component video interfaces are analog only, and no reference to digital is implied.

ANSI/CTA 849-B-2008 (R2013), Application Profiles for CEA-775 Compliant DTVs
This standard defines transport and content coding formats a compliant DTV shall support in order to inter-operate with various digital audio and video sources. A DTV compliant with this standard shall also comply with the requirements of CEA-775-C.

ANSI/CTA 852-C-2014, Tunneling Device Area Network Protocols Over Internet Protocol Channels
The CEA-852 standard specifies a communications method that allows networked data acquisition and control devices to communicate with each other over the internet. The purpose of such devices are widely varying and include functions such as appliance monitoring, meter reading, and HVAC and lighting control to name a few. CEA-852 does not replace existing device communications protocols, but instead allows those protocols to use the internet as a communications medium.

The CEA-852.1 standard specifies a communications method that allows networked data acquisition and control devices to communicate with each other over the internet. The purpose of such devices are widely varying and include functions such as appliance monitoring, meter reading, and HVAC and lighting control to name a few.

ANSI/CTA 861-G-2016, A DTV Profile for Uncompressed High Speed Digital Interfaces
ANSI/CEA-861 establishes protocols, requirements, and recommendations for the utilization of uncompressed digital interfaces by consumer electronics devices such as digital televisions (DTVs), digital cable, satellite or terrestrial set-top boxes (STBs), and related peripheral devices including, but not limited to DVD players/recorders, and other related sources or sinks.

ANSI/CTA 885-2007 (R2013), Remote Starter Safety
This standard addresses the automotive accessories that allow the operator to start a vehicle while away from the vehicle, and the safety of such devices when installed. Remote starters that are designed for installation in manual transmission vehicles are not compliant with this standard, and shall not be labeled or promoted as such.

ANSI/CTA 909-B-2010 (R2016), Antenna Control Interface
CEA-909-B describes an antenna control subsystem for receiving terrestrial transmissions. The primary use is to facilitate television reception. The receiver controls the antenna apparatus to optimize the signal automatically for best reception by adjusting its configuration. CEA-909-B allows any receiver to operate with any antenna, regardless of manufacturer. CEA-909-B defines the data algorithms used, connection standards, and other requirements.

ANSI/CTA 931-C-2007 (R2012), Remote Control Command Pass-through Standard for Home Networking
This specification defines a standardized method for communication of certain basic operational functions between devices in a home network.

ANSI/CTA CEDIA 897-2010, F-Connector Color Coding for Home Television Systems
Defines the colors marking F-Connectors commonly used for electronic devices in a home television system.

To create a set of unified blue print icons which represent all facets of pre-wire and installation of electronic systems products and devices. This project does not cover anything outside of architectural blueprints.

J-STD-70/CEA-2035/DVS-847 standardizes metadata elements describing emergency alert events to devices in a home network, for applications involving the delivery of Commercial Video Services into the home network. Commercial Video Services are sources of audio/video content provided as live or on-demand streams from a particular service provider.

ANSI/CTA/CEDIA 2030-A-2011, Multi Room Audio Cabling Standard

This standard defines cabling and connectors for use in distributing analog and digital audio signals throughout a home. This multi-room audio standard covers stereo content (either summed or two channels) only.

ANSI/CTA/CEDIA 863-B-2011, Connection Color Codes for Home Theater Systems

This standard defines the colors for marking connections commonly used for electronic devices in a home theater system. This standard adds continuity to installation information, and ensures consistency of information to installers.

DASMA (Door and Access Systems Manufacturers Association)


This test method describes the evaluation apparatus of the physical cycling performance of a door system under normal operating conditions or other specified conditions. This test method describes the apparatus and the procedure to be used for applying cyclic operation to a test specimen.


This test method describes the determination of sectional garage doors, rolling doors and flexible doors impacted by missiles and subsequently to cyclic static pressure differentials.

ANSI/DASMA 116-2011, Standard for Section Interfaces on Residential Garage Door Systems

This standard defines performance-based and prescriptive-based methods for evaluating section interfaces. Inclusions: this specification is intended to cover residential garage door systems generally used for vehicular traffic.

ANSI/DASMA 207-2012, Standard for Rolling Sheet Doors

This standard defines minimum design and performance specifications for non-fire rated rolling sheet doors.

DMSC, Inc. (Dimensional Metrology Standards Consortium, Inc.)

ANSI/DMSI 105-2-2009, Part 1, Dimensional Measuring Interface Standard, Rev. 5.2, Part 1

The DMIS standard provides for the bi-directional communication of inspection data between computer systems and inspection equipment. DMIS provides the vocabulary to pass inspection programs to measuring equipment and to pass measurement and process data back to an analysis, collection, or archiving system. DMIS defines a neutral format for data exchange, and is designed to be man readable and man writable. Revision 5.2 also provides multi-axis capabilities as well as about five dozen enhancements over version 5.1. Also may be submitted to ISO.

ANSI/DMSI 105-3-2015 Part 1, Dimensional Measuring Interface Standard (DMIS Rev. 5.3)

The DMIS standard provides for the bi-directional communication of inspection data between computer systems and inspection equipment and can form a basis for a common inspection system native programming language. DMIS provides the vocabulary to pass inspection programs to measuring equipment and to pass measurement and process data back to an analysis, collection, or archiving system. DMIS defines a neutral format for data exchange, and is designed to be man readable and man writable.

ANSI/DMSC QIF Part 4-2014, Quality Information Framework -QIF-Plans information model and XML schema files v2.0

The scope is all information required to generate part measurement programs on any quality measurement device. Plans include: dimensional part information, e.g., geometric features, measurement features, dimensions, and tolerances, part characteristics, nominals and tolerances, CAD entity relationships, measurement rules, work instructions.


QIF Part 1 & 2 version 2.1 has the following new content. A few new characteristics and features. Enhanced persistent identification through required document QPID and external file references using QPID alias. Comprehensive ISO GPS tolerance support. Added new product data quality section with a x.509 digital certificate. New validation properties and redundancy checks were added to support QIF LOTAR.

ANSI/QIF Part 3-2015, Quality Information Framework, Model Based Definition, information model and XML schema files 2.1

The scope is to create a set of XML schemas and documentation to facilitate the representation and exchange of 3D model based product definition including semantic PMI. QIF MB includes: 3D Geometry & Topology representation, semantic PMI representation, and metrological features and characteristic representation.


QIF Part 4 version 2.1 has the following new content. New methods were added to accommodate new measurement resources contained in QIF Resources, a new document section was added to emphasize the Bill of Characteristics (BoC), and new validation properties were added to support QIF LOTAR.

ANSI/QIF Part 5-2015, Quality Information Framework - QIF-Resources information model and XML Schema files v. 2.1

QIF Part 5 version 2.1 improves on 2.0 in two main areas: enhancement to the CMM model, and the addition of various new measurement technologies. The CMM model is now both easier to understand and able to contain more pertinent information. Many new measurement technologies were added, including new measurement devices like theodolite, computed tomography, profile projector, laser tracker, etc. New sensors were added, including LVDT, confocal chromatic, structured light, CCD camera, etc.
QIF Part 6 version 2.1 has the following new content. Support of new feature actuals and characteristic actuals. New validation properties were added to support QIF LOTAR.

ANSI/QIF Part 7-2015, Quality Information Framework (QIF) - An Integrated Model for Manufacturing Quality Information; Part 7: QIF Results Information Model and XML Schema File Version 2.1
QIF Part 7 version 2.1 has the following new content. Support of new feature actuals and characteristic actuals. New validation properties were added to support QIF LOTAR.

ANSI/QIF Part 8-2015, Quality Information Framework Statistics v.2.1
XML Format for quality measurement statistical data of dimensional and non-dimensional entities, including numerical and non-numerical quantities. QIFStatistics includes references to raw measurement results, traceability, plans and model information. Includes summary statistical values (capability, standard deviation, maximum, minimum, etc.), description of the control and sampling plan, corrective action plan against multiple quality study types (Capability, Production, Gage R&R, etc.).

EASA (Electrical Apparatus Service Association)
ANSI/EASA AR100-2015, Recommended Practice for the Repair of Rotating Electrical Apparatus
This document describes record keeping, tests, analysis, and general guidelines for the repair of induction, synchronous and direct current rotating electrical apparatus. It is not intended to take the place of the customer's or the machine manufacturer's specific instructions or specifications or specific accepted and applicable industry standards or recommended practices.

ECIA (Electronic Components Industry Association)
ANSI/EIA 198-2-F-2014, Ceramic Dielectric Capacitors Classes I, II, III and IV - Part II: Test Methods
This standard establishes uniform methods for testing ceramic capacitors, including basic environmental tests to determine resistance to deleterious effects of natural elements, and physical and electrical tests. The tests described herein have been prepared to serve several purposes.

ANSI/EIA 198-3-10-2015, Multilayer (Monolithic), Uncapsulated, Ceramic Dielectric, Surface-Mount Low Inductance Chip Capacitors And Multi-Terminal Low Inductance Capacitors
These fixed value capacitors are designed for surface mount circuit applications. They are lower inductance, unencapsulated, ceramic dielectric, multilayer chip capacitors with solderable end terminations. Primarily for high frequency applications

ANSI/EIA 198-3-4-F-2009, Ceramic Dielectric Capacitors Classes I,II,III and IV - Part III, Section 4, Radial Through-Hole Capacitors, Conformally Coated and Molded Types
Provides means to characterize ceramic capacitors electrically and mechanically by use of type designators

ANSI/EIA 296-F-2015, Lead Taping of Components in Axial Lead Configuration for Automatic Handling
This standard is formulated to provide dimensions and tolerances necessary to tape axial leaded components after manufacture so that they can be automatically handled. Axial leaded components are leaded components with the lead egress concentric with the longitudinal axis centerline of the component body.

ANSI/EIA 364-01B-2000 (R2012), Acceleration Test Procedure for Electrical Connectors
Establishes test methods to determine the ability of an electrical connector and sockets to withstand a specified acceleration force without damage detrimental to its specified performance.

ANSI/EIA 364-02D-2012, Air Leakage Test Procedure for Electrical Connectors
This standard establishes a method to determine the integrity of the seal of the shell, insert and contact interfaces in an electrical connector.

ANSI/EIA 364-03D-2015, Altitude Immersion Test Procedure for Electrical Connectors
This standard establishes a test method to determine the ability of the connector-to-wire and interface area seals of a mated connector assembly to perform satisfactorily during and subsequent to simulated rapid descents from high altitude with attendant moisture condensation.

ANSI/EIA 364-04B-2015, Normal Force Test Procedure for Electrical Connectors
This procedure establishes two methods to determine the magnitude of normal force, at the point of the electrical connection, generated by a contact system at a given deflection within its normal operating levels.

ANSI/EIA 364-05B-2009 (R2015), Contact Insertion, Release and Removal Force Test Procedure for Electrical Connectors
This standard establishes a test method to determine the forces required to insert contacts into and remove contacts from their normal position in a connector.

ANSI/EIA 364-06C-2006 (R2012), Contact Resistance Test Procedure for Electrical Connectors
This standard establishes test methods to determine the resistance of mated connector contacts attached to lengths of wire by measuring the voltage drop across the contacts while they are carrying a specified current.

ANSI/EIA 364-07C-2007 (R2012), Contact Axial Concentricity Test Procedure for Electrical Connectors
This standard establishes a test method to determine the straightness of contacts by measuring a total indicator reading (TIR) value. Axial concentricity can be measured after crimping to determine axial deformation.

ANSI/EIA 364-08C-2015, Crimp Tensile Strength Test Procedure for Electrical Connectors
This standard establishes a test method to determine the tensile strength of a crimped contact to conductor joint. The values obtained give an indication of the relative strength of the joints.

ANSI/EIA 364-09C-1999 (R2012), Durability Test Procedure for Electrical Connectors and Contacts
This standard establishes a method to determine the effects caused by subjecting electrical connectors or contacts to the conditioning action of mating and unmating, simulating the expected life of the connectors.

ANSI/EIA 364-1000-A-2016, Environmental Test Methodology for Assessing the Performance of Electrical Connectors and Sockets Used in Controlled Environment Applications
This document is intended for use in all electronic components, supplies and equipment applications. This standard is recommended for use by authorized distributors purchasing and selling of electronic components, supplies and equipment. The requirements of this standard are generic and intended to be applied to organizations that procure electronic components, supplies and equipment.

ANSI/EIA 364-1000.01B-2009, Environmental Test Methodology for Assessing the Performance of Electrical Connectors and Sockets Used in Controlled Environment Applications
This standard is being superseded by EIA-3645-1000.

ANSI/EIA 364-1002A-2015, Test Methodology for Assessing the Performance of Compliant Contact Terminations Used as Free Standing Contacts or in Electrical Connectors and Sockets
This standard establishes the test procedures and test sequences for evaluating compliant contact terminations. The test sequences defined herein shall be considered generic.
ANSI/EIA 364-1004A-2016, Environmental Test Methodology for Verifying the Current Rating of Freestanding Power Contacts for Electrical Connectors and Sockets

This standard describes recommended test sequences for verifying the specified current rating of freestanding contacts or electrical connectors and sockets used in power applications. These sequences may be used to qualify products with a specified current rating.

ANSI/EIA 364-1005-2011 (R2017), Environmental Test Methodology for Determining the Susceptibility of Contacts to Fretting Corrosion

This standard describes recommended test sequences to determine the susceptibility of contacts to fretting corrosion that is a major and significant failure mechanism that can be caused by vibration and thermal cycling.

ANSI/EIA 364-100A-2012, Marking Permanence Test Procedure for Electrical Connectors and Sockets

This standard establishes a method of determining the marking permanence of electrical connectors and sockets.

ANSI/EIA 364-101-2000 (R2013), Attenuation Test Procedure for Electrical Connectors, Sockets, Cable Assemblies or Interconnection Systems

This standard describes one time and two frequency domain methods to measure attenuation as a function of frequency.

ANSI/EIA 364-102-1998 (R2012), Rise Time Degradation Test Procedure for Electrical Connectors, Sockets, Cable Assemblies or Interconnection Systems

This standard describes a method for measuring the effect a specimen has on the rise time of a signal passing through it. This standard is applicable to electrical connectors, sockets, cable assemblies, or interconnection systems.

ANSI/EIA 364-103-1998 (R2012), Propagation Delay Test Procedure for Electrical Connectors, Sockets, Cable Assemblies or Interconnection Systems

This standard describes a method for measuring the time it takes for a digital signal to propagate from one specified point to a second specified point. This standard is applicable to electrical connectors, sockets, cable assemblies or interconnection systems.

ANSI/EIA 364-104B-2015, Flammability Test Procedure for Electrical Connectors

This standard establishes a test method to determine a connector’s resistance to burning when exposed to a flame. Burning resistance is defined as the ability to not support or propagate combustion after and ignition source is removed. This test evaluates the time it takes for the flame of a burning connector to extinguish after removal of the applied flame, and the possibility of the spread of burning, as caused by burning droplets and after-glow. This test does not simulate any actual service application. It is intended to test a connector by itself in a condition that can readily be duplicated in any test laboratory.

ANSI/EIA 364-105B-2015, Altitude - Low Temperature Test Procedure for Electrical Connectors and Sockets

This standard establishes a test method to simulate actual service usage by inducing low temperatures, and apply the test voltage at simulated altitudes.

ANSI/EIA 364-106-2000 (R2013), Standing Wave Ratio (SWR) Test Procedure for Electrical Connectors

This standard establishes test methods to evaluate existing standing wave ratio (SWR) of connectors, coaxial, radio frequency (RF). Measured SWR shall not exceed that specified over the frequency range specified.

ANSI/EIA 364-107-2000 (R2013), Eye Pattern and Jitter Test Procedure for Electrical Connectors, Sockets, Cable Assemblies or Interconnection Systems

This standard describes methods for measuring an eye pattern response and jitter in the time domain.

ANSI/EIA 364-108-2000 (R2013), Impedance, Reflection Coefficient, Return Loss, and VSWR Measured in Time and Frequency Domain Test Procedure for Electrical Connectors, Cable Assemblies or Interconnection Systems

This standard describes test methods to measure impedance, reflection coefficient, return loss, and voltage standing wave ratio (VSWR) in the time and frequency domains.

ANSI/EIA 364-109-2003 (R2016), Loop Inductance Measurement Test Procedure for Electrical Connectors (1 nH - 10 nH)

This procedure applies to interconnect assemblies, such as electrical connectors and sockets.

ANSI/EIA 364-10F-2014, Fluid Imersion Test Procedure for Electrical Connectors, Sockets and Cable Assemblies

This standard establishes test methods to determine the ability of an electrical connector or connector assembly to resist degradation due to exposure to specific fluids with which the connector assembly may come into contact during its service life.

ANSI/EIA 364-111A-2015, Test Procedure for Determining the Total Ionic Contamination of an Electrical Connector or Socket Assembly or Component

This standard establishes 2 methods for determining the total amount of extractable ionic contamination on the surface of an electrical connector or socket assembly or component.

ANSI/EIA 364-112-2010 (R2016), Contact Resistance and Current Rating of Parallel Circuits Test Procedure for Electrical Connectors, Contacts and Sockets

This procedure applies to connectors and sockets when multiple circuits are electrically connected in a parallel configuration and there is a need to determine the expected parallel resistance and or current rating.

ANSI/EIA 364-113-2010 (R2016), Corrosivity of Contacts Test Procedure for Electrical Connectors and Sockets

This test procedure establishes a test method to determine whether corrosion products as a result of residual corrosive elements may be created on contact surfaces. Said products may be a result from improper cleaning or lack thereof, improper processes, entrapped particulates, etc.

ANSI/EIA 364-114-2010 (R2017), Coupling and Uncoupling Force Test Procedure for Electrical Connectors, Sockets and Applicable Accessories

This test procedure establishes a test method to determine the coupling/uncoupling forces required to couple and uncouple circular electrical connectors, sockets and applicable accessories.

ANSI/EIA 364-115-2016, Current Overload Test Procedure for Electrical Connectors and Sockets

This document outlines the general requirements for families of high-density/high-performance electrical connectors, intended for printed circuit board attachment and connection, utilizing through hole (solder and compliant pin), surface mount, or wire harness termination techniques. The connectors may include low-level signal logic type contacts, power contacts, shielded contacts and optical termini. These connectors may also offer severe operating environment performance capability, such as protective hoods, contact sealing, interfacial seals, electrostatic shielding or other advanced capabilities.

ANSI/EIA 364-116-2015, Pin Contact Stability Test Procedure for Electrical Connectors

This document is intended to develop a test standard used in military standards not presently covered by an EIA-364 Test Procedure addressing stability of a contact pin within an electrical connector.

ANSI/EIA 364-118-2016, Thermal Shock for Hermetic Electrical Connectors and Sockets

This standard is intended to develop test standards used in military standards not presently covered by an EIA-364 Test Procedure.
ANSI/EIA 364-11C-2014, Resistance to Solvents Test Procedure for Electrical Connectors and Sockets
This procedure is to determine the ability of connector materials to withstand solvents that may be used to clean components.

ANSI/EIA 364-12A-2005 (R2017), Restricted Entry Test Procedure for Electrical Connectors
This standard establishes a test method to determine the ability of socket contacts, classified as restricted entry types, to prevent the insertion of an oversized pin.

ANSI/EIA 364-13E-2011 (R2017), Mating and Unmating Force Test Procedure for Electrical Connectors and Sockets
This standard establishes a method to determine the forces required to mate and unmate electrical connectors or protective caps with connectors, connectors/socket with gages or devices. Unless otherwise specified in the referencing document, method A shall be used.

ANSI/EIA 364-14B-1999 (R2012), Ozone Exposure Test Procedure for Electrical Connectors
This standard establishes a test method to assess the ability of connectors to withstand the effects of controlled amounts of ozone and still maintain effective environmental protection.

ANSI/EIA 364-15C-2016, Contact Strength Test Procedure for Electrical Connectors
This standard establishes a test method to determine the strength for contact sizes 20 and smaller when subjected to a defined bending stress (or moment).

ANSI/EIA 364-16A-2009 (R2015), Stripping Force Test (Solderless Wrapped Connectors) Test Procedure for Electrical Connectors
This standard establishes test methods to determine the force required to move a solderless wire wrapped connection along the post parallel to the axis of the post.

ANSI/EIA 364-17C-2011 (R2017), Temperature Life with or without Electrical Load Test Procedure for Electrical Connectors and Sockets
This standard establishes a test method to determine the ability of an electrical connector and sockets to withstand elevated temperatures with or without electrical loading.

ANSI/EIA 364-19A-2008 (R2015), Torsional Insert Retention Test Procedure for Electrical Connectors
This standard establishes test methods to determine the ability of the insert retaining system to withstand the torsional stresses likely to be encountered during normal usage.

ANSI/EIA 364-20E-2015, Withstanding Voltage Test Procedure for Electrical Connectors, Sockets, and Coaxial Contacts
This standard applies to electrical connectors, sockets and coaxial contacts and the object of this test is to describe a method for measuring the withstanding voltage.

ANSI/EIA 364-21E-2014, Insulation Resistance Test Procedure for Electrical Connectors, Sockets, and Coaxial Contacts
This standard applies to electrical connectors, sockets and coaxial contacts.

ANSI/EIA 364-22B-2000 (R2012), Simulated Life Test Procedure for Electrical Connectors and Sockets
This test procedure may apply to any type or combination of current carrying members such as pin and socket contacts, relay contacts, wire and crimp connectors, or printed circuit board and contact.

ANSI/EIA 364-23C-2006 (R2012), Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets
This test procedure is to determine the ability of a component to withstand stresses caused by repeated insertion and extraction of contacts during maintenance. This test procedure applies only to connector assemblies containing removable contacts and is to be used where a connector is to be stressed in the area of contact retention and conductor sealing.

ANSI/EIA 364-25E-2017, Probe Damage Test Procedure for Electrical Connectors
This standard establishes a test method to be followed for probe damage testing; intended primarily for round socket contacts in electrical connectors and possibly applicable to other type contacts as well. This test is to simulate a form of field abuse of contacts during test by inserting probes into socket contacts. The purpose of this test is as follows: - to simulate probing of socket contacts while installed in the connector for non-removable contacts and for removable contacts while outside of the connector housing; - to verify performance characteristics of the socket contacts have not been adversely impacted as may be specified in the referencing document.

ANSI/EIA 364-26-C-2014, Salt Spray Test Procedure for Electrical Connectors, Contacts, and Sockets
Establishes a test method to assess the effects of a controlled salt-laden atmosphere on electrical connector components, finishes, and mechanisms and permit electrical readings to be taken after exposure when specified.

ANSI/EIA 364-27C-2011 (R2017), Mechanical Shock (Specified Pulse) Test Procedure for Electrical Connectors and Sockets
This test procedure establishes a test method to assess the ability of electrical components to withstand specified severities of mechanical shock.

ANSI/EIA 364-28F-2011 (R2017), Vibration Test Procedure for Electrical Connectors and Sockets
The standard test procedure details a method to assess the ability of electrical connector components to withstand specified severities of vibration.

ANSI/EIA 364-29C-2006 (R2013), Contact Retention Test Procedure for Electrical Connectors
Establishes a test method to impose axial forces on the connector contacts to determine the ability of the connector to withstand forces that tend to displace contacts from their proper location within the connector insert and resist contact pullout.

ANSI/EIA 364-30A-2009 (R2015), Capacitance Test Procedure for Electrical Connectors and Sockets
This standard describes a test method to measure capacitance from 1 KHz to 1 MHz.

ANSI/EIA 364-31E-2017, Humidity Test Procedure for Electrical Connectors and Sockets
The purpose of these tests is to evaluate materials and/or connector/socket assemblies as they are impacted by the effects of high humidity and heat. These tests are intended to be noncondensing.

ANSI/EIA 364-32G-2014, Thermal Shock (Temperature Cycling) Test Procedure for Electrical Connectors and Sockets
This test is conducted for the purpose of determining the resistance of a given electrical connector or socket to exposure at extremes of high and low temperatures and to the shock of alternate exposures to these extremes, simulating the worst probable conditions of storage, transportation and application.

ANSI/EIA 364-33A-2009 (R2015), Inductance Measurement Test Procedure for Electrical Connectors (100 nh-100 mH)
This standard describes a frequency domain test method for measuring self-inductance in the range of 100 nanohenrys to 100 millihenrys.

ANSI/EIA 364-34-2012, Ambient Condensation Test Procedure for Electrical Connectors and Sockets
Provides proposed changes resulting from committee comments received to the proposed new American National Standard that appeared in the ANSI Standards Action of Aug. 5, 2011.

ANSI/EIA 364-35C-2012, Insert Retention Test Procedure for Electrical Connectors
This standard establishes a method to determine the ability of an insert to withstand axial forces in electrical connectors.
ANSI/EIA 364-36B-2006 (R2013), Determination of Gas-Tight Characteristics Test Procedure for Electrical Connectors and/or Contact Systems

Procedure to determine integrity of contacting surfaces (at the mating and/or termination areas) by assessment of the gas-tight characteristics of the contacting surfaces.

ANSI/EIA 364-37C-2009 (R2015), Contact Engagement and Separation Test Procedure for Electrical Connectors

This standard establishes test methods which, when required by the referencing document, shall be used for measuring the engagement and separation forces on contacts.

ANSI/EIA 364-38D-2014, Cable Pull-Out Test Procedure for Electrical Connectors

This standard establishes a test method to determine the axial tensile load that can be applied to a mated pair of connectors and the holding effect of a connector cable clamp without causing any detrimental effects upon the cable or connector when subjected to inadvertent axial tensile loads.

ANSI/EIA 364-39B-1999 (R2013), Hydrostatic Test Procedure for Electrical Connectors, Contacts and Sockets

Establishes a test method to assess the ability of unmated receptacles and wired mated harnesses to withstand hydrostatic pressures that are encountered in the undersea environment.

ANSI/EIA 364-40B-2009 (R2015), Crush Test Procedure for Electrical Connectors

This standard establishes a test method to determine the ability of a connector to withstand a load such as might be encountered when run over by a wheeled vehicle. This test should only be performed on connectors designed to meet the requirements.

ANSI/EIA 364-41E-2010 (R2016), Cable Flexing Test Procedure for Electrical Connectors

This standard establishes a method to determine the effectiveness of round jacketed cable to connector strain relief seal, or flat cable to connector strain relief seal or interface to withstand strain under repeated alternating cable-flexing stresses as experienced in use with molded or mechanical backshell cable strain-relief designs commonly used with electrical connectors.

ANSI/EIA 364-42C-2012, Impact Test Procedure for Electrical Connectors

Establishes a method to determine the effects of impacts on electrical connectors.

ANSI/EIA 364-43C-2013, Cable Clamping (Bending Moment) Test Procedure for Electrical Connectors

This standard establishes a test method to determine the ability of connectors to withstand stress resulting from loads applied to rear accessory hardware such as might be experienced with cables hanging from plugs mated to wall-mounted receptacles.

ANSI/EIA 364-44A-2009 (R2015), Corona Test Procedure for Electrical Connectors

The object of this test is to detail a standard test method to determine the ability of an electrical connector to operate with an acceptable level of partial discharge at working voltages up to the extinction voltage.

ANSI/EIA 364-45C-2012, Firewall Flame Test Procedure for Electrical Connectors

This standard establishes a test method to determine the ability of a mated pair of electrical firewall connectors to resist specified flame and vibration conditions during 20 minutes of exposure by preventing flames from breaching the firewall through the connectors and providing specific electrical performance for the first 6 minutes.

ANSI/EIA 364-46C-2012, Microsecond Discontinuity Test Procedure for Electrical Connectors, Contacts, and Sockets

This procedure is to define a method of detecting a discontinuity of one microsecond or longer in a mated electrical connector, contact or socket. This procedure shall not be used for durations less than one microsecond; see EIA-364-87, test procedure for nanosecond event detection.

ANSI/EIA 364-47A-2008 (R2015), Conductor Unwrap (Solderless Wrapped Connection) Test Procedure for Electrical Connectors

This standard establishes test methods to determine if excessive damage or deformation of the conductor in a solderless wrapped connection has occurred as a result of the wrapping process.

ANSI/EIA 364-49-2013, Ultraviolet Radiation Test Procedure for Electrical Connectors and Sockets

This standard establishes a test method to determine heating effects of direct solar radiation on connector and contact materials and to help identify the actinic (photodegradation) effects of direct solar radiation on these same materials.

ANSI/EIA 364-50B-2012, Dust (Fine Sand) Test Procedure for Electrical Connectors

This standard establishes a test method to ascertain the ability of fully wired connector assemblies to resist the effects of dry dust (fine sand) laden atmosphere.


This standard establishes test methods to determine the ability of mated electrical connectors to resist the effects of ice build-up due to water splashing or brief immersion in water, where water is free to drain off of the connector surfaces.

ANSI/EIA 364-52B-2009, Soldierability of Contact Terminations Test Procedure for Electrical Connectors and Sockets

This standard has been superseded by EIA J-STD-002

ANSI/EIA 364-53B-2000 (R2016), Nitric Acid Vapor Test, Gold Finish Test Procedure for Electrical Connectors and Sockets

This standard establishes test methods to determine the magnitude of porosity as well as other surface defects inherent in application of gold contact finishes.

ANSI/EIA 364-54A-1999 (R2012), Magnetic Permeability Test Procedure for Electrical Connectors, Contacts and Sockets

The object of this test is to detail a standard method to determine whether the magnetic permeability of a test item is below a specified value. This standard applies to electrical connectors, contacts and sockets.


This standard establishes test methods to determine the current cycling characteristics of mated electrical contacts, connectors and sockets using, but not limited to, crimp, press-fit contacts, insulation displacement contact (IDC) terminations, soldered or mechanically attached termination techniques.

ANSI/EIA 364-56E-2011 (R2017), Resistance to Soldering Heat Test Procedure for Electrical Connectors and Sockets

This standard establishes a test method for determining if connectors or sockets can withstand exposure to soldering conditions either by soldering iron, solder dip, solder wave, or reflow soldering techniques.

ANSI/EIA 364-57-2011, Coupling Pin Strength Test Procedure for Circular Bayonet Electrical Connectors

Establishes a test method to determine whether coupling pin strength can withstand external forces required to rotate or unrotate circular bayonet electrical connectors with gages or devices.

ANSI/EIA 364-58A-2003 (R2016), Temperature Life with Mechanical Loading for Connectors with Removable Contacts (Static Mechanical Load at Temperature) Test Procedure for Electrical Connectors

This standard establishes test methods to determine the ability of the contact retention system in an electrical connector with removable contacts to withstand a static mechanical load at elevated temperature.

ANSI/EIA 364-60A-2008 (R2014), General Methods for Testing of Contact Finishes for Electrical Connectors and Sockets

This test procedure details the methods for determining the porosity of contact finishes used in electrical connectors, contacts and sockets.

This standard establishes a test method for determining if connectors or sockets can withstand exposure to solder rework conditions using either soldering iron, solder pot / fountain / wave solder, or hot gas / vapor techniques. It is important to note that compliant pin connectors or sockets can be affected by solder rework if they are in close proximity to other connectors or sockets undergoing solder rework.

ANSI/EIA 364-62A-2004 (R2017), Terminal Strength Test Procedure for Electrical Connectors and Sockets

This standard establishes test methods to determine the ability of the terminals of an electrical connector to withstand the mechanical stresses likely to be applied during normal assembly operations. This test method is limited to standard flat type through hole terminations, such as those typically used in connector or socket type products, that have a material thickness no thicker than 0.30 millimeters (0.012 inch). Test methods for printed circuit terminals and solderless wrap terminals are included in this standard.

ANSI/EIA 364-63-2013, Accessory Thread Strength Test Procedure for Circular Electrical Connectors

This test procedure establishes a test method to determine whether accessory thread strength and portion of the connector that accepts cable clamps and “J” adaptors shall be capable of withstanding torque requirements specified in the referencing document.

ANSI/EIA 364-64-2014, Spring Finger Force Test Procedure for Circular Connectors

To provide a new test standard that standardizes procedures currently contained in multiple military documents.

ANSI/EIA 364-65B-2009, Mixed Flowing Gas Test Procedure for Electrical Connectors and Sockets

Establishes the test procedure for producing environmentally related corrosive atmospheres to determine the reaction of plated or unplated surfaces when exposed to different concentrations of flowing gas mixtures.


This standard establishes test methods for the measurement of the EMI shielding effectiveness of electrical connectors over the frequency range of 1.0 GHz to 10.0 GHz using the mode-stirred technique. The procedure applies to both circular and rectangular connectors.

ANSI/EIA 364-68A-2008 (R2015), Actuating Mechanism Test Procedure for Electrical Connectors

This standard establishes a test method to determine the strength of the actuating mechanism of a connector release mechanism. The actuating mechanism test may be conducted as one of the tests in a sequential test plan, as a base line and after exposure to an environment.


This standard describes a frequency domain test method for measuring self-inductance.

ANSI/EIA 364-70C-2014, Temperature Rise Versus Current Test Procedure for Electrical Connectors and Sockets

This project establishes the test procedures for determining temperature rise versus current for connectors and sockets with conductor sizes equal to or less than 0000 AWG or equivalent.

ANSI/EIA 364-71C-2008 (R2014), Solder Wicking (Wave Solder Technique) for Electrical Connectors and Sockets

This standard applies to connectors and sockets that are mounted to printed wiring boards (PWB) employing through mount technology.

ANSI/EIA 364-75A-2009 (R2015), Lightning Strike Test Procedure for Electrical Connectors

This standard describes a frequency domain test method for measuring self-inductance.

ANSI/EIA 364-78B-2010, Cavity-to-Cavity Leakage Bonding Integrity Test Procedure for Electrical Connectors

Establishes a technique for evaluating the sealing integrity of the contact cavity walls of an environmentally sealed electrical connector by detecting leakage between a given contact cavity and those adjacent to it.

ANSI/EIA 364-79-2014 (R2015), Insert Bond Strength Test Procedure for Electrical Connectors

This standard provides a technique for evaluating the strength of a bond between one or more components; example - a grommet seal bonded to a connector insert.

ANSI/EIA 364-80-2015, Low Frequency Shielding Effectiveness Test Procedure for Electrical Connectors and Sockets

This test procedure describes two methods to measure the shielding transfer impedance of mated cable connectors in the frequency range 10 kHz to 100 MHz, (method A), and a connector located between a bulkhead panel and a shielded cable from 30 MHz to 500 MHz, (method B).

ANSI/EIA 364-81A-2005 (R2017), Combustion Characteristics Test Procedure for Electrical Connector Housings, Connector Assemblies and Sockets

This standard establishes a test method that may be used to characterize the resistance of connector/socket housings, including composite housings in their as molded condition with and without contacts relative to flammability for a particular application.

ANSI/EIA 364-82A-2005 (R2017), Corrosivity of Plastics Test Procedure for Electrical Connector and Socket Housings

This standard establishes a test method to determine whether a plastic electrical connector or socket housing generates corrosive elements when in contact with metallic parts or components.

ANSI/EIA 364-83-1999 (R2013), Shell-to-Shell and Shell-to-Bulkhead Resistance Test Procedure for Electrical Connectors

This standard test procedure applies to mated plugs and receptacles or mated plugs and receptacles mounted to a bulkhead with conductive shells and/or mounting flange.

ANSI/EIA 364-84-2015, Residual Magnetism Test Procedure for Electrical Contact Used in Space Applications

This standard establishes a test procedure to determine the residual magnetism of individual contacts within a connector during controlled laboratory tests designed to simulate conditions likely to be encountered in unusual atmospheres, high-altitude and space flight environments.

ANSI/EIA 364-85-2014 (R2015), General Test Procedure for Assessing Wear and Mechanical Damage Testing of Contact Finishes for Electrical Connectors

The purpose of this procedure is to determine the presence of mechanical damage, wear-through, and other gross defects in the contact finish. Most contact finishes are intended to be protective, and the presence of gross defects in the finish indicates a serious reduction of such protection.

ANSI/EIA 364-86A-2014, Polarizing/Coding Key Overstress Test Procedure for Electrical Connectors and Sockets

The objective of this test procedure is to determine the effectiveness of polarization/coding keys when a connector pair is misregistered (improperly mated).

ANSI/EIA 364-87B-2017, Nanosecond Event Detection Test Procedure for Electrical Connectors, Contacts and Sockets

The object of this procedure is to define methods for detecting events that can be as short as 1 nanosecond.

ANSI/EIA 364-88A-2009 (R2016), Residual Magnetism Test Procedure for Electrical Connectors, Contacts and Sockets

This standard establishes a test method to determine the residual magnetism of a connector after exposure to a specified magnetic field.
ANSI/EIA 364-90-2000 (R2013), Crosstalk Ratio Test Procedure for Electrical Connectors, Cable Assemblies or Interconnection Systems

This standard describes test methods for measuring the magnitude of the electromagnetic coupling between driven and quiet lines of an interconnect assembly. Both time domain (method A) and frequency domain methods (method B), single-ended and differential transmission, and insertion and reference fixture techniques are described.

ANSI/EIA 364-91B-2016, Dust Test Procedure for Electrical Connectors and Sockets

This standard establishes a test method to determine the susceptibility of an electrical connector or socket system to the potential degradation mechanism of a dust/fiber environment common to an office or manufacturing area.

ANSI/EIA 364-92-1997 (R2014), Wire Bending Test Procedure for Insulation Displacement Contacts (IDC) for Electrical Connectors

The object of this test procedure is to assess the ability of an insulation displacement connector to withstand the mechanical stress caused by bending the connected wire or ribbon cable in a specified manner.

ANSI/EIA 364-93-2009 (R2015), Repeated Wire Connection and Disconnection Test Procedure for Insulation Displacement Contacts (IDC) for Electrical Connectors

The object of this test procedure is to assess the ability of a reusable insulation displacement termination to withstand a specified number of connections and disconnections.

ANSI/EIA 364-94-2009 (R2015), Transverse Extraction Force Test Procedure for Insulation Displacement Contacts (IDC) for Electrical Connectors

The object of this test procedure is to determine the force necessary to remove the wire within the connection slot of an accessible insulation displacement termination along the longitudinal axis of the termination.

ANSI/EIA 364-95-1999 (R2012), Full Mating and Mating Stability Test Procedure for Electrical Connectors

This document defines methods to evaluate the coupled condition of a connector plug, with its mating receptacle. This procedure assesses the ability of a connector pair to remain fully mated after exposure to test conditions but not during exposure.

ANSI/EIA 364-96A-2017, Plated Through Hole Integrity Test Procedure for Electrical Connectors

This test method applies to compliant pins inserted in printed circuit boards with plated-through-holes (PTH).

ANSI/EIA 364-97-1997 (R2015), Housing Panel Retention Test Procedure for Electrical Connectors

This specification covers the test procedure for determining the mechanical retention of the panel locking feature housings when installed in panels.

ANSI/EIA 364-98-2009 (R2015), Housing Locking Mechanism Strength Test Procedure for Electrical Connectors

This specification describes a test procedure for determining the mechanical retention strength of the locking retention features of mated plastic connector housings.

ANSI/EIA 364-99-1999 (R2012), Gage Location and Retention Test Procedure for Electrical Connectors

The object of this test procedure is to determine the ability of a connector to comply with specified location and retention measurements through the use of location and retention test gages.

ANSI/EIA 364-F-2014, Electrical Connector/Socket Test Procedures Including Environmental Classifications

This standard establishes a recommended minimum test sequence and test procedures for electrical connectors and sockets. This standard also includes administrative details and guidelines for connector/socket qualification and an annex for pertinent technical information.

ANSI/EIA 468-C-2008 (R2013), Lead Taping of Components in the Radial Configuration for Automatic Handling

This standard was formulated to provide dimensions and tolerances necessary to lead tape components in the radial format (unidirectional leads) such that they may be automatically handled. Automatic handling includes insertion, preforming and other operations. The emphasis of this standard is on the requirements for high-speed automatic insertion. This standard covers the lead taping requirements for components having two or more radial configured leads, provided these components may be taped in accordance with the requirements of this document.


This document provides terminology, methods, and criteria for characterizing the internal structural features of monolithic ceramic dielectric capacitors. Its major objective is the accurate evaluation of the internal physical quality of the chip capacitor element as it relates to the functional reliability of the finished capacitor. This standard also provides needed and useful information pertaining to activities associated with destructive physical analysis, such as post-decapsulation visual inspection and destructive physical analysis reporting. In addition, it provides tutorial help for problems inherent in destructive physical analysis sample processing.

ANSI/EIA 481-E-2015, 8 mm through 200 mm Embossed Carrier Taping and 8 mm and 12 mm Punched Carrier Taping of Surface Mount Components for Automatic Handling

This standard covers requirements for taping surface mount components. Complementary standards for specialized taping requirements are included in the addendum.

ANSI/EIA 521-A-2013, Application Guide for Multilayer Ceramic Capacitors - Electrical Ceramic capacitors are those wherein the dielectric material is a high temperature, sintered, inorganic ceramic compound. As a general rule, these materials are based on mixtures of complex titinate or niobium compounds, including barium titanate, calcium titanate, strontium titanate, etc. Stannate and zirconate compounds are also used. Because of the great variety of electrical characteristics found in ceramic capacitors, the ECIA has categorized ceramic capacitors into classes.

ANSI/EIA 5408B0AE-2000 (R2009), Detail Spec for Production Land Grid Array (LGA) Sockets for Use in Electronic Equipment

Covers interconnect systems typically used for production land grid array (LGA) devices.


Covers sockets for plug-in relays of assessed quality.

ANSI/EIA 540CA00-1989 (R2007), Blank Detail Specification on Relay Sockets

Provides all information required for the identification and quality assessment of the relay socket described herein under the EIA system.


Describes relay sockets of assessed quality.


Covers relay sockets of assessed quality.

ANSI/EIA 575-B-2014, Thick Film Resistor Specification

This standard covers thick film general purpose rectangular leadless discrete fixed resistors with temperature coefficients of plus or minus 350 ppm/degrees C (ranging from plus or minus 50 ppm/degrees C to plus or minus 350 ppm/degrees C) and greater and resistance tolerances of plus or minus 5% (ranging from plus or minus 0.5% to plus or minus 5%) and greater for use in surface mounting applications using soldering techniques.
This standard covers thin film precision rectangular leadless discrete fixed resistors with temperature coefficients of ±&661617; 50 PPM/8&61616;C and tighter and resistance tolerances of 1%, 0.5%, 0.25%, 0.1% and 0.05% for use in surface mounting applications using soldering techniques.

Covers the general industry inspection requirements for multilayer ceramic chip capacitors.

ANSI/EIA 60115-1 ed. 4.0-2014, Fixed Resistors for Use in Electronic Equipment – Part 1:
Generic specification
This part of IEC 60115 is a generic specification and is applicable to fixed resistors for use in electronic equipment. It establishes standard terms, inspection procedures and methods of test for use in sectional and detail specifications of electronic components for quality assessment or any other purpose.

ANSI/EIA 60115-8 ed. 2.0-2014, Fixed Resistors for Use in Electronic Equipment – Part 8:
Sectional specification - Fixed surface mount resistors
This part of IEC 60115 is applicable to fixed surface mount resistors for use in electronic equipment. These resistors are typically described according to types (different geometric shapes) and styles (different dimensions). They have metallized terminations and are primarily intended to be mounted directly on to a circuit board.

This part of IEC 60115 is applicable to fixed surface mount resistor networks with individually measurable resistors for use in electronic equipment.

A blank detail specification is a supplementary document to the sectional specification and contains requirements for style, layout and minimum content of detail specifications. Detail specifications not complying with these requirements may not be considered as being in accordance with IEC specifications nor shall they be so described.

generic specification for fixed capacitors used in electronic equipment

ANSI/EIA 60384-11-2014, Fixed Capacitors for Use in Electronic Equipment - Part 11:
Sectional Specification - Fixed Polyethylene Terephthalate Film Dielectric Metal Foil d.c. Capacitors
This part of IEC 60384 applies to fixed direct current capacitors, for rated voltages not exceeding 6 300 V, using as dielectric a polyethylene-terephthalate film and electrodes of thin metal foils. For capacitors with rated voltages exceeding 1 000 V, additional tests and requirements may be specified in the detail specification. The capacitors covered by this standard are intended for use in electronic equipment.

ANSI/EIA 60384-13-2014, Fixed capacitors for use in electronic equipment - Part 13:
Sectional specification - Fixed polypropylene film dielectric metal foil d.c. capacitors
This part of IEC 60384 applies to fixed direct current capacitors, using as dielectric a polypropylene film with electrodes of thin metal foils. The capacitors covered by this standard are intended for use in electronic equipment.

ANSI/EIA 60384-15-2014, Fixed Capacitors for Use in Electronic Equipment - Part 15:
Sectional Specification: Fixed Tantalum Capacitors with Non-Solid or Solid Electrolyte
This standard applies to polar and bipolar tantalum electrolyte capacitors with solid and non-solid electrolyte for use in electronic equipment. It comprises capacitors for long-life applications and capacitors for general-purpose applications. Capacitors for special purpose application may need additional requirements. This standard covers three basic sub-families, namely: Sub-family 1 : Fixed non-solid electrolyte tantalum capacitors with foil electrode. 1A: Plain foil electrode. 1B: Etched foil electrode. Sub-family 2 : Fixed non-solid electrolyte tantalum capacitors with porous anode. Sub-family 3 : Fixed solid electrolyte tantalum capacitors with porous anode.

ANSI/EIA 60384-16-2014, Fixed Capacitors for Use in Electronic Equipment - Part 16:
Sectional Specification: Fixed Metallized Polypropylene Film Dielectric d.c. Capacitors
This part of IEC 60384 applies to fixed capacitors with metallized electrodes and polypropylene dielectric for use in electronic equipment. These capacitors may have "self-healing properties" depending on conditions of use. They are primarily intended for applications where the a.c. component is small with respect to the rated voltage.

ANSI/EIA 60384-2-2014, Fixed Capacitors for Use in Electronic Equipment - Part 2:
Sectional Specification - Fixed Metallized Polyethylene-Terephthalate Film Dielectric Surface Mount d.c. Capacitors
This part of IEC 60384 is applicable to fixed surface mount capacitors for direct current, with metallized electrodes and polyethylene-terephthalate dielectric for use in electronic equipment. These capacitors have metallized connecting pads or soldering strips and are intended to be mounted directly onto substrates for hybrid circuits or onto printed boards. These capacitors may have "self-healing properties" depending on conditions of use. They are primarily intended for applications where the a.c. component is small with respect to the rated voltage.

ANSI/EIA 60384-18-2014, Fixed Capacitors for Use in Electronic Equipment - Part 18:
Sectional Specification - Fixed Aluminum Electrolytic Surface Mount Capacitors with Solid (MnO2) and Non-Solid Electrolyte
IEC 60384-18:2007 applies to fixed aluminum electrolytic surface mount capacitors with solid (MnO2) and non-solid electrolyte primarily intended for d.c. applications for use in electronic equipment. It prescribes preferred ratings and characteristics and to select from IEC 60384-1 the appropriate quality assessment procedures, tests and measuring methods and to give general performance requirements for this type of capacitor. Test severities and requirements prescribed in detail specifications referring to this sectional specification should be of equal or higher performance level, because lower performance levels are not permitted. This second edition cancels and replaces the first edition published in 1993 and its Amendment 1 (1998). This edition constitutes a minor revision related to tables, figures and references.

ANSI/EIA 60384-19-2014, Fixed Capacitors for Use in Electronic Equipment - Part 19:
Sectional Specification - Fixed Metallized Polyethylene-Terephthalate Film Dielectric Surface Mount d.c. Capacitors
This part of IEC 60384 is applicable to fixed surface mount capacitors for direct current, with metallized electrodes and polyethylene-terephthalate dielectric for use in electronic equipment. These capacitors have metallized connecting pads or soldering strips and are intended to be mounted directly onto substrates for hybrid circuits or onto printed boards. These capacitors may have "self-healing properties" depending on conditions of use. They are primarily intended for applications where the a.c. component is small with respect to the rated voltage.

ANSI/EIA 60384-17-2014, Fixed Capacitors for Use in Electronic Equipment - Part 17:
Sectional Specification: Fixed Metallized Polypropylene Film Dielectric a.c. and Pulse Capacitors
This part of IEC 60384 applies to fixed capacitors with metallized electrodes and polypropylene dielectric for use in electronic equipment.

IEC 60384-20 is applicable to fixed surface mount capacitors for direct current, with metallized electrodes and polyphenylene sulfide dielectric for use in electronic equipment. These capacitors have metallized connecting pads or soldering strips and are intended to be mounted directly onto substrates for hybrid circuits or onto printed boards. These capacitors may have "self healing properties" depending on conditions of use. They are primarily intended for applications where the a.c. component is small with respect to the rated voltage. The contents of the corrigendum of February 2008 have been included in this copy.


IEC 60384-20 is applicable to fixed surface mount capacitors for direct current, with metallized electrodes and polyphenylene sulfide dielectric for use in electronic equipment. These capacitors have metallized connecting pads or soldering strips and are intended to be mounted directly onto substrates for hybrid circuits or onto printed boards. These capacitors may have "self healing properties" depending on conditions of use. They are primarily intended for applications where the a.c. component is small with respect to the rated voltage.


This part of IEC 60384 is applicable to fixed unencapsulated surface mount multilayer capacitors of ceramic dielectric, Class 1, for use in electronic equipment. These capacitors have metallized connecting pads or soldering strips and are intended to be mounted on printed boards, or directly onto substrates for hybrid circuits.


This part of IEC 60384 is applicable to fixed unencapsulated surface mount multilayer capacitors of ceramic dielectric, Class 2, for use in electronic equipment. These capacitors have metallized connecting pads or soldering strips and are intended to be mounted on printed boards, or directly onto substrates for hybrid circuits.


IEC 60384-23 is applicable to fixed surface mount capacitors for direct current, with metallized electrodes and polyethylene naphthalate dielectric for use in electronic equipment. These capacitors have metallized connecting pads or soldering strips and are intended to be mounted directly onto substrates for hybrid circuits or onto printed boards. These capacitors may have "self healing properties" depending on conditions of use. They are primarily intended for applications where the AC component is small with respect to the rated voltage.

ANSI/EIA 60384-24-2014, Fixed capacitors for use in electronic equipment - Part 24: Sectional specification - Surface mount fixed tantalum electrolytic capacitors with conductive polymer solid electrolyte

This part of IEC 60384 is applicable to tantalum electrolytic capacitors with conductive polymer solid electrolyte. These capacitors are primarily intended to be mounted directly on to substrates for hybrid circuits or to printed boards.


This part of IEC 60384 is applicable to tantalum electrolytic capacitors with conductive polymer solid electrolyte. These capacitors are primarily intended to be mounted direct on to substrates for hybrid circuits or to printed boards.

ANSI/EIA 60384-25-1-2014, Fixed capacitors for use in electronic equipment - Part 25-1: Blank detail specification - Surface mount fixed aluminum electrolytic capacitors with conductive polymer solid electrolyte - Assessment level EZ

IEC 60384-25-1 is a supplementary document to the sectional specification and contains requirements for style and layout and minimum content of detail specifications. Detail specifications not complying with these requirements may not be considered as being in accordance with IEC specification nor shall they so be described.


This part of IEC 60384 is applicable to aluminum electrolytic capacitors with conductive polymer solid electrolyte. These capacitors are primarily intended to be mounted direct on substrates for hybrid circuits or to printed boards.

ANSI/EIA 60384-26-2014, Fixed capacitors for use in electronic equipment - Part 26: Sectional specification - Fixed aluminum electrolytic capacitors with conductive polymer solid electrolyte

This part of IEC 60384 is applicable to aluminum electrolytic capacitors with conductive polymer solid electrolyte primarily intended for d.c. applications for use in electronic equipment.


This specification applies to surface mount tantalum solid electrolyte capacitors. These capacitors are primarily intended to be mounted directly onto substrates for hybrid circuits or onto printed boards. The following two styles are considered: Style 1: protected capacitors; Style 2: unprotected capacitors.

ANSI/EIA 60384-3-2017, Fixed capacitors for use in electronic equipment - Part 3: Sectional specification: Surface mount fixed tantalum electrolytic capacitors with manganese dioxide solid electrolyte

This specification applies to surface mount tantalum solid electrolyte capacitors. These capacitors are primarily intended to be mounted directly onto substrates for hybrid circuits or onto printed boards. The following two styles are considered: Style 1: protected capacitors; Style 2: unprotected capacitors.
ANSI/EIA 60384-4-2014, Aluminum electrolytic capacitors with solid (MnO2) and non-solid electrolyte
This part of IEC 60384 applies to aluminium electrolytic capacitors with solid (MnO2) and non-solid electrolyte primarily intended for d.c. applications for use in electronic equipment. It covers capacitors for long-life applications and capacitors for general-purpose applications. Capacitors for special-purpose applications may need additional requirements.

IEC 60384-8-2005 is applicable to fixed capacitors of ceramic dielectric with a defined temperature coefficient (dielectric Class 1), intended for use in electronic equipment, including leadless capacitors but excluding fixed surface mount multilayer capacitors of ceramic dielectric. Capacitors for electromagnetic interference suppression are not included, but are covered by IEC 60384-14. This third edition is a result of maintenance activities related to the previous edition. All changes that have been agreed upon can be categorized as minor revisions.

This publication also bears the number QC 300700, which is the specification number in the IEC Quality Assessment System for Electronic Components (IECQ). Applicable to fixed capacitors of ceramic dielectric with a high permittivity (dielectric Class 2), intended for use in electronic equipment, including leadless capacitors, but excluding multilayer ceramic chip capacitors. Prescribes preferred ratings and characteristics, selects from IEC 384-1 (1982) the appropriate quality assessment procedures, tests and measuring methods and gives general performance requirements for this type of capacitor. Replaces IEC 187.

ANSI/EIA 600840-2014, Method of Measurement of Non-Linearity in Resistors
This International Standard specifies a method of measurement and associated test conditions to assess the magnitude of non-linear distortion generated in a resistor.

This International Standard applies to inductors designed for electromagnetic interference suppression intended for use within, or associated with, electronic or electrical equipment and machines. It is restricted to inductors for which safety tests are appropriate.

This document is intended for use in all electronic components, supplies and equipment applications. This standard is recommended for use by authorized distributors purchasing and selling of electronic components, supplies and equipment. The requirements of this standard are generic and intended to be applied to organizations that procure electronic components, supplies and equipment.

This blank detail specification forms the basis for a uniform procedure for a common mark. It implements the approval schedule for safety tests only in IEC 60938 2, requires a declaration of design for parameters relevant to safety tests and prescribes conformance tests to be conducted on every lot prior to its release and re-qualification tests depending on changes of the design. In comparison with IEC 60938 -2 -1 which provides safety tests and performance tests, this specification is restricted to safety tests only. The use of IEC 60938-2-1 may be more appropriate for components manufactured in mass production, whereas this specification may be necessary in those cases where approval and re-qualification tests contribute considerably to the costs of the product.

This International Standard applies to fixed inductors designed for electromagnetic interference suppression and which fall within the scope of the generic specification, IEC 60938-1. It is restricted to fixed inductors for which safety tests are appropriate. This implies that inductors specified according to this specification will either be connected to mains supplies, when compliance with the mandatory tests of Table 1 is necessary, or used in other circuit positions where the equipment specification prescribes that some or all of these safety tests are required. This standard applies to fixed inductors which will be connected to an a.c. mains or other supply with a nominal voltage not exceeding 1 000 V a.c. (r.m.s.) or d.c. between conductors and with a nominal frequency not exceeding 400 Hz.

ANSI/EIA 61014-2017, Programs for reliability growth
This International Standard specifies requirements and gives guidelines for the exposure and removal of weaknesses in hardware and software items for the purpose of reliability growth. It applies when the product specification calls for a reliability growth programme of equipment (electronic, electromechanical and mechanical hardware as well as software) or when it is known that the design is unlikely to meet the requirements without improvement.

ANSI/EIA 61025-2017, Fault tree analysis (FTA)
This International Standard describes fault tree analysis and provides guidance on its application as follows: â€œ definition of basic principles; â€” describing and explaining the associated mathematical modelling; â€” explaining the relationships of FTA to other reliability modelling techniques; â€œ description of the steps involved in performing the FTA; â€œ identification of appropriate assumptions, events and failure modes; â€œ identification and description of commonly used symbols

ANSI/EIA 61124-2017, Reliability testing - Compliance tests for constant failure rate and constant failure intensity
This International Standard gives a number of optimized test plans, the corresponding operating characteristic curves and expected test times. In addition the algorithms for designing test plans using a spreadsheet program are also given, together with guidance on how to choose test plans. This standard specifies procedures to test whether an observed value of â€œ failure rate, â€œ failure intensity, â€œ mean time to failure (MTTF), â€œ mean operating time between failures (MTBF), conforms to a given requirement.

ANSI/EIA 61164-2017, Reliability growth - Statistical test and estimation methods
This International Standard gives models and numerical methods for reliability growth assessments based on failure data, which were generated in a reliability improvement programme. These procedures deal with growth, estimation, confidence intervals for product reliability and goodness-of-fit tests.

ANSI/EIA 61649-2017, Weibull Analysis
This International Standard provides methods for analysing data from a Weibull distribution using continuous parameters such as time to failure, cycles to failure, mechanical stress, etc. This standard is applicable whenever data on strength parameters, e.g. times to failure, cycles, stress, etc. are available for a random sample of items operating under test conditions or in-service, for the purpose of estimating measures of reliability performance of the population from which these items were drawn.

ANSI/EIA 61710-2017, Power law mode - Goodness-of-fit tests and estimation methods
This International Standard specifies procedures to estimate the parameters of the power law model, to provide confidence intervals for the failure intensity, to provide prediction intervals for the times to future failures, and to test the goodness-of-fit of the power law model to data from repairable items. It is assumed that the time to failure data have been collected from an item, or some identical items operating under the same conditions (e.g. environment and load).

ANSI/EIA 622-B-2015, Glossary of Electrical Connector Related Terms
This standard contains terminology definition used with electronic/electrical connectors.
ANSI/EIA 62391-1-2014, Fixed Electric Double Layer Capacitors - Part One: Generic Spec
This part of IEC 62391 applies to fixed electric double layer capacitors mainly used in DC circuits of electronic equipment. It establishes standard terms, inspection procedures and methods of test for use in sectional and detail specifications of electronic components for quality assessment or any other purpose.

ANSI/EIA 62391-2-1-2014, Fixed Electric Double Layer Capacitors - Part 2-1: Blank Detail Spec
This part of IEC 62391 series applies to electric double-layer capacitors for power application. Electric double-layer capacitors for power are intended for applications that require discharge currents in the range from mA to A. The characteristics of the capacitors include such performance as relatively high capacitance and low internal resistance. This Detail Specification contains requirements for style, layout and minimum content of detail specifications.

ANSI/EIA 62391-2-2-2014, Fixed Electric Double Layer Capacitors - Part Two Sectional Spec
This part of IEC 62391 applies to electric double-layer capacitors for power application. Electric double-layer capacitors for power are intended for applications that require discharge currents in the range from mA to A. The characteristics of the capacitors include such performance as relatively high capacitance and low internal resistance.

ANSI/EIA 62506-2017, Methods for product accelerated testing
This International Standard provides guidance on the application of various accelerated test techniques for measurement or improvement of product reliability. Identification of potential failure modes that could be experienced in the use of a product/item and their mitigation is instrumental to ensure dependability of an item. The object of the methods is to either identify potential design weaknesses or provide information on item dependability, or to achieve necessary reliability/availability improvement, all within a compressed or accelerated period of time. This standard addresses accelerated testing of non-repairable and repairable systems.

This requirements document is applicable to all types of single or multi-contact electrical connectors including: circular, rectangular printed circuit, rectangular microcircuit, rectangular D-subminiature, rectangular rack and panel, coaxial and hermetic. This document will be used to determine the minimum requirements for space applications.

ANSI/EIA 717-A-2010, Surface Mount Niobium and Tantalum Capacitor Qualification Specification
This specification defines the qualification program for surface mount tantalum and niobium capacitors.

ANSI/EIA 720-B-2016, Specification for Small Form Factor 63.5 millimeters (2.5 inches) Disk Drives
This standard defines the dimensions and connector locations of 63.5 millimeters (2.5 inch) small form factor disk drives. The purpose of this standard is to define the external characteristics of small form factor disk drives so that products from different vendors may be used in the same mounting configurations. The standard provides specifications on external dimensions, connectors, controller placement, and mounting holes to assist manufacturers in the systems integration of small form factor disk drives.

ANSI/EIA 740-A-2016, Specification for Small Form Factor 88.9 Millimeter (3.5 Inches) Disk Drives
This standard defines the dimensions and interconnections of 88.9 mm (3.5 in.), small form factor disk drives. The purpose of this standard is to define the external characteristics of small form factor disk drives so that products from different vendors may be used in the same mounting configurations. The standard provides specifications on external dimensions, connectors, controller placement, mounting holes and interface pinouts to assist manufacturers in the systems integration of small form factor disk drives.

This document covers the general industry inspection requirements for molded surface mount tantalum capacitors with solid electrolyte.

ANSI/EIA 797-2014, Aluminum-Electrolytic Capacitor Application Guideline
This document identifies the characteristics of an aluminum electrolytic capacitor, which consists of a wound capacitor element, impregnated with liquid electrolyte, connected to terminals and sealed in a can. The element is comprised of an anode foil, paper separators saturated with electrolyte and a cathode foil.

ANSI/EIA 886-A-2014, Thick Film Resistor Array Specification
This specification defines the requirements for a family of thick film chip resistors arrays in ceramic with various configurations and package sizes.

This specification defines the requirements for a family of thin film resistor networks on silicon with various configurations, packaged in a molded, JEDEC-approved package.

ANSI/EIA 944-2013, Surface Mount Chip Bead Qualification Specification
This specification defines the qualification program for surface mount ferrite bead chips. The qualification program is defined in Table 1. Specification sheets can be added, as required, to define specific products or to cover unique/specific requirements. This document does not relieve the supplier of their responsibility to their own company's internal qualification program.

ANSI/EIA 948-2004 (R2017), Component Tray for Automated Handling
This standard covers requirements for component trays during automated handling.

ANSI/EIA 956-2006, Aluminum Electrolytic Chip Capacitor with Polymer Cathode
Polar, Nonhermetically sealed chip capacitor with conductive polymer and electrical circuits.

ANSI/EIA 960-B-2017, Assembly Component Tray – ACT
This standard covers requirements for Assembly Component Trays - ACTs used automated assembly processes. The standard size is covered which works with tray slots handling an envelope of 298.45 mm (11.75 inches) x 254 mm (10 inches) and the &quot;J&quot; size, which works with tray slots handling an envelope of 322.58 mm (12.7 inches) x 135.89 mm (5.35 inches).

ANSI/EIA 964-2016, Specification for QSFP+ 10 Gb/s Pluggable Transceiver
Provides a common solution for combined four-channel ports that support SONET/SDH and/or Ethernet and/or Infiniband and/or Fibre Channel specifications.

ANSI/EIA 965-2012, Specification for Mini Multilane 12 Gbs 12X Shielded Connector
Defines the plug, guide/strain relief shell, and latching requirements for the Mini Multilane Shielded Integrated Connector, based on the mating interface defined.

ANSI/EIA 966-2012, Specification for Serial Attachment 3 GBs 2X Unshielded Connector
Defines the mechanical and connector contact performance requirements for a composite connector system. This composite system is designed to support high speed serial signals and power on different contacts within the same housing.

ANSI/EIA 967-2012, Specification for Multi Serial Attachment 3 GBs 4X Unshielded Connector
Defines the terminology and physical requirements for the mating interface and physical characteristics of the Micro SAS Connector System. This connector is designed to support high speed serial signals and power. While designed specifically for the smaller, 1.8-inch Form Factor drives, including Solid State drives, it should not be considered as limited to those.
ANSI/EIA 970-2013, Test procedure for high frequency characterization of low inductance multilayer ceramic chip capacitors
This test method is used to measure the S parameters of low-inductance multilayer ceramic capacitors when mounted in shunt on a probable low inductance test fixture. The test method can be used to characterize low inductance capacitors. The output of this specification is a frequency independent lumped element representation of a capacitor consisting of three elements, equivalent series capacitance (ESC), equivalent series resistance (ESR) and equivalent series inductance (ESL) applicable in the range of 30 kHz to 3 GHz.

ANSI/EIA 971-2014, 4 mm Embossed Carrier Taping of Micro-Sized Surface Mount Components for Automatic Handling
To provide dimensions and tolerances necessary for embossed carrier tapes, 4-mm wide with 1-mm pitch, to locate micro-sized components in known positions for automated handling. The embossed tapes can also be used as shipment packages in the logistic chain.

This specification defines the terminology and physical requirements for the mating interface and physical characteristics of the Mini Multilane Connector. The dimensions specified apply to the various sizes.

This specification defines the plug, guide/strain relief shell, and latching requirements for the Mini Multilane Unshielded Shell and Plug Connectors.

This specification defines the plug, guide/strain relief shell, and latching requirements for the Mini Multilane Shielded Shell and Plug Connectors.

ANSI/EIA 977-2017, Test Method - Electronic Passive Components Exposure to Atmospheric Sulfur
This standard defines options for testing electronic components for susceptibility to the effects of environmental sulfur. Such susceptibility results in the corrosion of elemental metals, such as silver, in the presence of sulfur compound in a liquid or gaseous state, leading to component failure.

ANSI/EIA/CEA 364-59A-2006 (R2013), Low Temperature Test Procedure for Electrical Connectors and Sockets
Establishes a test method for exposing electrical connectors and sockets to low temperature for a specified duration.

ANSI/EIA/ECA 364-110-2006 (R2013), Thermal Cycling Test Procedure for Electrical Connectors and Sockets
Establishes a test method to expose connectors and sockets to extremes of high and low temperatures at a specified ramp up and ramp down rate.

ANSI/EIA/ECA 364-188-2007 (R2012), Visual and Dimensional Inspection Test Procedure for Electrical Connectors and Sockets
This standard establishes guidelines for visual and dimensional inspection of electrical connectors and sockets prior to, during, and after other test procedures.

ANSI/EIA/ECA 747B-2014, Adhesive Backed punched plastic carrier taping of singulated bare die and other surface mount components for automatic handling of devices generally less than 1.0mm thick Covers requirements of 8mm, 12mm, 16mm and 24mm taping of surface mount components generally less than 1.0mm thick and requiring high precision taping for automatic handling of devices such as singulated bare die.

EIMA (EIFS Industry Members Association)
This standard provides the minimum requirements for specifying and installing Exterior Insulation and Finish Systems (EIFS) and Exterior Insulation and Finish Systems (EIFS) with Drainage, as well as the minimum performance requirements for EIFS and EIFS with Drainage.

EMAP (Emergency Management Accreditation Program)
ANSI/EMAP EMS2016-2016, Emergency Management Standard
The standard will outline programmatic areas with standards underneath that provide necessary components of a comprehensive emergency management and homeland security program. The Standards will include all phases of emergency management to include prevention, preparedness, mitigation, response and recovery activities.

ANSI/EMAP US&R-2016, Urban Search and Rescue Standards
The standard will outline at a minimum 7 programmatic areas with standards underneath that outline the necessary components of a comprehensive Urban Search and Rescue team. The standards will include critical Urban Search and Rescue functions such as planning, coordination, communications, training and exercises, incident management, resources, etc. The standard will be used to outline necessary activities to measure Urban Search and Rescue resources and tiered response assets.

EOS/ESD (ESD Association, Inc.)
ANSI/ESD S1.1-2013, ESD Association Standard for Protection of Electrostatic Discharge Susceptible Items - Wrist Straps
This standard is intended for testing wrist straps and wrist strap systems used for the grounding of personnel engaged in working with ESD sensitive assemblies and devices. It does not address monitoring systems or garments.

ANSI/ESD S11.4-2013, ESD Association Standard for the Protection of Electrostatic Discharge Susceptible Items - Static Control Bags
This standard applies to bags used to package electronic devices and assemblies. It does not address bags for volatile materials, chemicals, explosives, or munitions. NOTE: Some bag applications may require the consideration of additional material or cleanliness controls, including particle level, nonvolatile residue, ionic substances, outgassing, or polycarbonate stress. These parameters are beyond the scope of this standard.

ANSI/ESD S20.20-2014, ESD Association Standard for the Development of an Electrostatic Discharge Control Program for Protection of Electrical and Electronic Parts, Assemblies and Equipment (Excluding Electrically Initiated Explosive Devices)
This document applies to activities that manufacture, process, assemble, install, package, label, service, test, inspect, transport or otherwise handle electrical or electronic parts, assemblies and equipment susceptible to damage by electrostatic discharges greater than or equal to 100 volts HBM, 200 volts CDM, and 35 volts on isolated conductors. Activities that handle items that are susceptible to lower withstand voltages may require additional control elements or adjusted limits. Processes designed to handle items that have an ESD sensitivity to lower withstand voltages can still claim compliance to this standard.

ANSI/ESD S541-2003 (R2008), Protection of Electrostatic Discharge Susceptible Items - Packaging Materials or ESD Sensitive Items
This standard defines the packaging properties needed to protect electrostatic discharge susceptible (ESDS) electronic items through all phases of production, transport and storage. Application requirements are defined that support the intent and purpose of the packaging requirements stated in ANSI/ESD S20.20. Test methods are referenced to evaluate packaging and packaging materials for these product and material properties. Performance limits are provided.

This standard applies to bonding and grounding for the prevention of ESD in an EPA. The procedures, materials and techniques specified in this standard may not be applicable for grounding of electrical sources operating at frequencies above 400 Hz.


Three symbols are covered in this document. The first indicates that an electrical or electronic device or assembly is susceptible to damage from an ESD event if not properly handled. The second indicates that the material or product on which the symbol is displayed is intended to provide some level of protection to ESD susceptible devices or assemblies. The third indicates the location of an ESD common point ground terminal or connection point. The application of these ESD symbols on products is at the discretion of the supplier and does not constitute or imply a specific level of product performance.


For those high pin count components (e.g., ball grid array) that interconnect different power leads through common, low-resistance power and ground planes in the package, the number of power and ground leads can be reduced by ganging or grouping supply pins together on a custom test fixture board. A minimum number of power supply pins (i.e., power or ground) should be ganged to bring the total number of tester channels used equal to the number of tester channels available on the tester.

ANSI/ESD SP 5.3.2-2004 (R2013), ESD Association Standard Practice for Electrostatic Discharge Sensitivity Testing - Socketed Device Model (SDM) - Component Level

This standard practice defines a method on how to perform component level socketed device model ESD tests and how to verify the operational state of the ESD simulator test equipment. This document is a Standard Practice and therefore does not provide any device classification guidelines.

ANSI/ESD SP 10.1.2-2016, ESD Association Standard Test Method for the Protection of Electrostatic Discharge Susceptible Items - Automated Handling Equipment (AHE)

This standard practice covers resistance-to-ground measurements of machine components and sources of charge in AHE. Two methods are described to measure sources of charge. One method measures charge indirectly by measuring the voltage or field associated with the charge. The second method directly measures the voltage induced on ESDS items.


This standard practice establishes the procedure for testing and characterizing the sensitivity of IC’s, modules, and PCB's against the effect of field-coupled pulses that are generated by ESD type pulses. The field-coupled pulses derived from the fast leading edge of transmission line pulses closely resemble electromagnetic fields as they occur inside a product subjected to human-metal ESD, such as specified by the IEC 61000-4-2. IEC 61000-4-2 is the primary standard for system level ESD test standard.


This document is intended to provide test procedures for measuring the electrical resistance of gloves or finger cots. Intrinsic resistance measurements include surface, volume, and point-to-point resistance using ANSI/ESD STM11.11, STM11.12, and STM11.13, respectively. ‘In-use’ resistance measurement of the glove/finger cot and personnel together as a system is defined using a constant area force electrode (CAFE).

ANSI/ESD SP3.3-2012 (R2017), ESD Association Standard Practice for the Protection of Electrostatic Discharge Susceptible Items - Periodic Verification of Air Ionizers

This standard practice establishes measurement procedures, under recommended conditions, to periodically determine offset voltage (ion balance) and discharge (charge neutralization) times for ionizers in their actual use locations. This standard practice does not include measurements of electromagnetic interference (EMI), or uses of ionizers in connection with ordnance, flammables, explosive devices, or electrically initiated explosive devices.

ANSI/ESD SP3.4-2012 (R2017), ESD Association Standard Practice for the Protection of Electrostatic Discharge Susceptible Items - Periodic Verification of Air Ionizer Performance Using a Small Test Fixture

This standard practice establishes measurement procedures, under recommended conditions, to periodically determine offset voltage (ion balance) and discharge (charge neutralization) times for ionizers in their actual use locations. This standard practice does not include measurements of electromagnetic interference (EMI), or uses of ionizers in connection with ordnance, flammables, explosive items, or electrically initiated explosive devices.


The pin pair combinations randomly selected as per this standard practice can be used as an alternative to Table 2A or Table 2B combinations in ANSI/ESDA/JEDEC JS-001 for testing components and microcircuits according to their susceptibility (sensitivity) to damage or degradation by exposure to a defined human body model (HBM) electrostatic discharge (ESD).


For high pin count components (e.g., ball grid array) with a large number of signal pins, the total number of pins can be reduced by splitting the signal pins into two or more equal sets or subgroups. Special test fixture boards (TFBs) can be constructed to connect each set of signal pins to specific tester channels while floating the remaining unused signal pins. Additional TFBs can be constructed to connect each remaining set of signal pins to specific tester channels while floating the remaining unused signal pins. All power, ground and control pins on the component should be wired to each TFB.

ANSI/ESD SP5.6-2010, ESD Association Standard Practice for the Electrostatic Discharge Sensitivity Testing - Human Metal Model (HMM) - Component Level

This document establishes the procedure for testing, and characterizing the electrostatic discharge (ESD) sensitivity of component pins that will be directly connected to external connectors or ports on a completed system. This method is not intended for ESD testing of device, module, or component pins that do not directly connect to a system port or connector. This document covers testing under unpowered and powered states but does not cover testing of integrated circuits in a functioning state. For the purposes of this document, the HMM test pulse will be modeled after the contact discharge defined by the IEC 61000-4-2 document.


This standard test method describes a direct current measurement method that is used for the static dissipative resistance range of planar materials. This test method is not intended for electrically conductive or insulative materials.
This standard test method defines a direct current measurement to determine the volume resistance of a static dissipative, planar material, without regard to its conduction mechanism.

This test method evaluates the performance of electrostatic discharge shielding bags. The design voltage for the test apparatus is 1000 volts.

This test method establishes procedures for testing, characterizing, and evaluating the electrostatic discharge (ESD) sensitivity (withstand voltage) of components subjected to the defined machine model (MM).

This document establishes the procedure for testing, evaluating, and classifying components and microcircuits according to their susceptibility (sensitivity) to damage or degradation by exposure to a defined human body model (HBM) electrostatic discharge (ESD).

This standard establishes test methods for measuring the electrical system resistance of floor materials in combination with persons wearing static control footwear, shoes or other devices where protection of ESD susceptible items is required.

This document establishes test methods for the measurement of the voltage on a person in combination with floor materials and static control footwear, shoes or other devices.

This standard test method is designed for use in a laboratory environment for qualification, evaluation or acceptance of worksurfaces and not for periodic testing.

This standard test method relies on the transmission line pulse (TLP) testing techniques of semiconductor components. The techniques are based on utilizing test voltages and measurement techniques that can effectively measure the test object's ability to dissipate charge from the test object placed on it.

This standard test method establishes procedures for measuring the electrical resistance of floor materials where protection of ESD susceptible items is required. The resistances measured here are from the top surface of the flooring material to its groundable point (or the ground reference) and from top surface to top surface locations. This test method tests conductive and dissipative flooring materials.

This standard test method establishes procedures for testing, evaluating, and classifying devices and microcircuits according to their susceptibility (sensitivity) to damage or degradation by exposure to a defined charged device model (CDM) electrostatic discharge (ESD). All packaged semiconductor devices, thin film circuits, surface acoustic wave (SAW) devices, opto-electronic devices, hybrid integrated circuits (HICs), and multi-chip modules (MCMs) containing any of these devices are to be evaluated according to this standard. To perform the tests, the devices must be assembled into a package similar to that expected in the final application.

This standard describes the construction and use of wire rope ladders in the entertainment industry in order to promote worker safety. The entertainment industry includes, but is not strictly limited to, musical productions, live concerts, live theater, film production, video production, corporate events, and trade shows. Wire rope ladders are used where ladders with rigid rails are impractical to use or would pose a greater danger.

E1.11 describes a protocol for transmitting digital data over an EIA-485-A datalink for the purpose of controlling entertainment lighting equipment and accessories, such as dimmers, robotic luminaires, color changers, and motion effects wheels. The protocol is not intended to be used to control equipment where injury to people or damage to property could result from a message error.


The standard applies to the instruction manuals for fog-making equipment manufactured for use in the entertainment industry. In order to use fog safely and effectively, the user must have some knowledge of the technology, have an understanding of how to operate the fog making system, and be aware of the potential hazards. This standard is designed to establish guidelines for manufacturers to provide to the user the information required for the safe and responsible use of fog equipment.

ANSI E1.15-2006 (R2016), Entertainment Technology - Recommended Practices and Guidelines for the Assembly and Use of Theatrical Boom & Base Assemblies

The standard sets minimum specifications for the assembly and use of variable and fixed-height luminaire support devices, commonly referred to as "boom and base assemblies." This standard does not apply to towers, ground-support structures, or other devices that use winches or other lifting mechanisms, and does not apply to aluminum tripod or other similar lightweight stands, or stands with castered bases.


This standard describes a standard practice for grounding contact assignment for detachable power cables on 6kW, 12kW and 18kW metal-halide lamp ballasts used in the motion picture and television industries on portable studio luminaires that use the MIL-C-5015 connector with #28-6 insert configuration on the ballast end of the power cable.

ANSI E1.17-2015, Entertainment Technology - Architecture for Control Networks

E1.17 is a suite of documents that specifies an architecture, protocols, and language that may be combined with other protocols to form flexible, networked audio, lighting, or other control systems. Changes to the existing standard only affect EPI 19, ACN Discovery on IP Networks, which was revised to work more efficiently.

ANSI E1.19-2015, Recommended Practice for the Use of Class A Ground-Fault Circuit Interrupters (GFCIs) Intended for Personnel Protection in the Entertainment Industry

The project is intended to offer guidance, in accordance with existing applicable standards, on how to select, install, use and maintain ground fault protection devices in the entertainment industry to protect persons from shock and persons and property from fire. The revisions are to incorporate new information about avoiding nuisance tripping.

ANSI E1.2-2012, Entertainment Technology - Design, Manufacture and Use of Aluminum Trusses and Towers

E1.2 describes the design, manufacture, and use of aluminum trusses, towers, and associated aluminum structural components, such as head blocks, sleeve blocks, bases, and corner blocks, used in the entertainment industry in portable structures.

ANSI E1.20-2010, Entertainment Technology -- Remote Device Management over USITT DMX512

The existing E1.20-2006, Entertainment Technology--Remote Device Management over USITT DMX512, is being revised to correct errors in the published document and to add a new message enhancement functionality. ANSI E1.20 is an extension to USITT DMX512 and ANSI E1.11 that allows for bi-directional communication on the primary data link for lighting control.

ANSI E1.21-2013, Entertainment Technology - Temporary Structures Used for Technical Production of Outdoor Entertainment Events

ANSI E1.21 is being revised to cover the design, manufacture, and use of all the portable structures (not only roofs) used to support scenery, lighting, and sound equipment, and to cover the stages in the production of outdoor entertainment events. Excluded are structures for the public, such as audience bleachers and food vendor stands.

ANSI E1.22-2016, Entertainment Technology - Fire Curtain Safety Systems

BSR E1.22-2010 is a revision of the 2009 ANSI standard. It is being updated to better align with the requirements stated in NFPA 80. The draft standard describes the materials, design, fabrication, installation, operation, testing, and maintenance of fire safety curtains and systems used for theatre proscenium opening protection.

ANSI E1.23-2010 (R2015), Entertainment Technology - Design and Execution of Theatrical Fog Effects

This Standard is intended to be applicable to the creation of theatrical effects using artificial fog or mists in theatres, arenas, and other places of entertainment or public assembly. The fogs and mists covered by this Standard are aerosols created using one or more of the following liquids: triethylene glycol, monopropylene glycol, diethylene glycol, dipropylene glycol, 1,2-butylene glycol, 1,3-butylene glycol, glycerine, white mineral oil, water, nitrogen, oxygen, and/or carbon dioxide. The aerosols within the scope of this Standard are injected directly into the environment.

ANSI E1.24-2012 (R2017), Entertainment Technology - Dimensional Requirements for Stage Pin Connectors

This configuration standard covers the dimensional requirements and mechanical requirements related to intermateability for a series of split-pin and sleeve wiring devices known as Pin Connectors or Stage Pin Connectors that are used predominately in the theatre, television and motion picture industries in North America. This is not a safety standard.

ANSI E1.25-2012, Recommended Basic Conditions for Measuring the Photometric Output of Stage and Studio Luminaries by Measuring Illumination Levels Produced on a Planar Surface

E1.25 describes the basic conditions for measuring the photometric output of stage and studio luminaries by a variety of testing methods that measure the illumination levels produced by the luminaires on a planar surface.

ANSI E1.26-2006 (R2017), Entertainment Technology - Recommended Testing Methods and Values for Shock Absorption of Floors Used in Live Performance Venues

This document sets out the energy absorption requirements for floors in venues used for live performances, and the methods for testing them. This document is to be used in conjunction with all applicable local building codes and requirements.

ANSI E1.27-1-2006 (R2016), Entertainment Technology - Standard for Portable Control Cables for Use with ANSI E1.11 (DMX512-A) and USITT DMX512/1990 Products

This standard describes the types of portable cable for the transmission of digital data among products which comply with ANSI E1.11, Entertainment Technology - USITT DMX512-A. It covers recommended cable types, connectors and their internal wiring. The working group is proposing to reaffirm the 2006 version.

ANSI E1.27-2-2009 (R2014), Recommended Practice for Permanently Installed Control Cables for Use with ANSI E1.11 (DMX512-A) and USITT DMX512/1990 Products

This document is a recommended practice for permanent data cabling installations for interconnecting lighting equipment that comply with ANSI E1.11 (DMX512-A) or with USITT DMX512/1990. The recommendations include definitions of acceptable cable and connector types and the ways in which they may be used.

ANSI E1.28-2011 (R2016), Guidance on planning followspot positions in places of public assembly

E1.28 offers guidance on the planning of permanent followspot positions, including recommendations on the locations of the followspot positions within the venue, the power likely to be needed, the waste heat generated, the amount of space likely to be needed, and the fall protection and egress issues to be considered for the followspot operator’s safety. The existing standard is being considered for reaffirmation.
ANSI E1.29-2009 (R2014), Product Safety Standard for Theatrical Fog Generators that Create Aerosols of Water, Aqueous Solutions of Glycol or Glycerin, or Aerosols of Highly Refined Alkane Mineral Oil

This standard is intended to help guide product safety testing laboratories in evaluating fog-making equipment for design or construction defects that might create unacceptable hazards. It is based on ANSI/UL 998 - 2006, Humidifiers, with modifications. Products covered are theatrical fog generators rated 600 V or less, intended for use in professional theatrical entertainment, film and video production, theme parks, and fire safety training.

ANSI E1.3-2001 (R2016), Entertainment Technology - Lighting Control Systems - 0 to 10V Analog Control Specification

The standard describes a method of controlling current-sink devices and equipment by means of an analog control voltage in the nominal range from zero to 10 volts positive. It is primarily intended for theatrical lighting controllers and controlled devices (e.g., dimmers), but any device could use this control method. E1.3 controllers are current-source devices. The working group proposes to reaffirm the existing standard, which was previously reaffirmed in 2011.

ANSI E1.30-1-2010 (R2016), EPI 23. Device Identification Subdevice Specification

This document is part of BSR E1.30, Application level equipment interoperability for control of commonly encountered entertainment technology devices using ANSI E1.17. It specifies a templated device for device identification as typically used for remote hardware and software devices. The working group is proposing to reaffirm the 2010 version.

ANSI E1.30-10-2009 (R2014), EPI 32, Identification of Draft Device Description Language Modules

ANSI E1.30-10 is a recommended way of identifying a Device Description Language Module for ACN as a trial version, one under development, not for release yet. ANSI E1.30-10 is part of an open series of E1.30 documents that suggests ways of doing common tasks with ANSI E1.17, Architecture for Control Networks.

ANSI E1.30-3-2009 (R2014), EPI 25, Time Reference in ACN Systems Using SNTP and NTP

ANSI E1.30-3-2009, EPI 25, Time Reference in ACN Systems Using SNTP and NTP, is another recipe in the E1.30 cookbook for ACN. It offers ways of providing a time reference so that events can be synchronized.

ANSI E1.30-4-2010 (R2015), EPI 26. Device Description Language (DDL) Extensions for DMX512 and E1.31 Devices

This document is part of BSR E1.30-201x, Application level equipment interoperability for control of commonly encountered entertainment technology devices using ANSI E1.17. This part defines protocol-specific extensions to ANSI E1.17’s Device Description Language for describing DMX512-type devices.

ANSI E1.31-2016, Entertainment Technology - Lightweight streaming protocol for transport of DMX512 using ACN

This standard describes a mechanism to transfer DMX512-A packets over a TCP/IP network using a subset of the ACN protocol suite. It covers data format, data protocol, data addressing, and network management. It also outlines a synchronization method to help ensure that multiple sinks can process this data concurrently when supervised by the same controller. This revision includes the addition of DMX universe synchronization.

ANSI E1.32-2012, Guide for the Inspection of Entertainment Industry Luminaires

This document provides guidance in the inspection of stage and studio luminaires used in the entertainment industry to evaluate their safety and any needed maintenance. The information contained in this document is intended to supplement the information contained in manufacturers’ maintenance instructions.

ANSI E1.34-2009 (R2014), Entertainment Technology - Measuring and Specifying the Slipperiness of Floors Used in Live Performance Venues

The document describes a simple means of measuring and specifying the slipperiness of floor surfaces used by performers in live entertainment venues. The standard is not for normal walking and working surfaces, but only for those floor surfaces used by actors, dancers, and other similar artists when performing before an audience.

ANSI E1.35-2013, Standard for Lens Quality Measurements for Pattern Projecting Luminaires Intended for Entertainment Use

ANSI E1.35 describes a method for measuring stage and studio luminaire lens quality with particular emphasis on contrast and perceived image quality (sharpness). It also offers a way for presenting these results on a datasheet in a format that is readily understood by a typical end-user. The procedure specified in this draft is slightly different and more accurate than the procedure specified in the published 2007 edition.

ANSI E1.36-2007 (R2012), Model Procedure for Permitting the Use of Tungsten-Halogen Incandescent Lamps and Stage and Studio Luminaires in Vendor Exhibit Booths in Convention and Trade Show Exhibition Halls

ANSI E1.36 is a model set of procedures that can be used by convention center and trade show exhibition hall staff to mitigate the risks perceived to be associated with the use of tungsten-halogen lamps and stage and studio luminaries in convention centers and trade show exhibition halls and to allow their use in a safe manner.

ANSI E1.37-1-2012 (R2017), Additional Message Sets for ANSI E1.20 (RDM) - Part 1, Dimmer Message Sets

ANSI E1.37-1, Additional Message Sets for ANSI E1.20 (RDM) - Part 1, is part of the E1.37 project, and provides additional get/set parameter messages (PIDs). Most of the messages in this document are intended for use with entertainment lighting dimming systems. These additional messages allow access to configuration parameters commonly found in many theatrical dimming dimming systems.


This document is part 2 of the E1.37 project. It provides additional get/set parameter messages (PIDs) for use with the ANSI E1.20 Remote Device Management protocol. Messages in this document are intended for configuring network interfaces and Domain Name System settings on devices with an IPv4 address. As published, the current standard contains errors. The version being offered for public review corrects those errors.


This standard establishes minimum requirements for the selection and use of personal fall arrest systems on portable structures in the entertainment industry. The standard establishes minimum requirements for products and portable structures used in the service of PFAAS. Other methods of fall protection, such as safety nets and guard rails, are not within the scope of this standard. This standard does not preclude the use of other standards to promote worker safety.

ANSI E1.4-1-2016, Entertainment Technology - Manual Counterweight Rigging Systems

The existing E1.4 standard is being expanded to include all manually powered systems, and those rigging systems in which scenery, stage lighting, or other theatrical equipment is hung from static battens. The first part of the E1.4 suite, E1.4-1, Manual Counterweight Rigging Systems, applies to permanently installed, manually operated systems of stage rigging hardware for the raising, lowering, and suspension of scenery, lighting, and similar loads.

ANSI E1.40-2016, Recommendations for the Planning of Theatrical Dust Effects

A wide variety of products are used to create dust effects in motion picture and television production, and also in live theatrical productions and theme parks. The use of dust aerosols raises concerns for potential hazards, including combustibility and health effects from inhalation or ingestion, which are well-known in some industrial sectors, but are poorly understood in others. This document would provide recommendations for how to plan the use and assess the safety of such effects.
ANSI E1.41-2016, Recommendations for the Measurement of Entertainment Luminaires Utilizing Solid State Light Sources
This standard is intended to be used for the presentation of photometric data for luminaires employing solid state light sources used in the entertainment and performance industries. This standard defines photometric data that may be presented on documents purporting to accurately describe the photometric performance of these luminaires when producing both white and colored light.

This standard covers the design, construction, operation, inspection, testing, maintenance, alteration, and repair of permanently installed orchestra pit lifts and their associated parts, rooms, spaces, enclosures, and hoistways, where located in a theatre or a similar place of public entertainment.

ANSI E1.43-2016, Entertainment Technology - Performer Flying Systems
This document establishes a minimum level of performance parameters for the design, manufacture, use, and maintenance of performer flying systems used in the production of entertainment events. The purpose of this guidance is to achieve the adequate strength, reliability, and safety of these systems to ensure safety of the performer under all circumstances.

ANSI E1.44-2014, Common Show File Exchange Format For Entertainment Industry Automation Control Systems - Stage Machinery
The standard is to define a common show file format for the exchange of stage machinery control data between control systems made by different manufacturers.

ANSI E1.46-2016, Standard for the Prevention of Falls from Theatrical Stages and Raised Performance Platforms
The users of theatrical stages and raised platforms can suffer debilitating injuries from falls into orchestra pits, open stage lifts, and similar openings in stage floors. Health and safety regulations require action to prevent these falls by employees, but offer little guidance that is suitable for theatrical environments. This document would provide that guidance for all people at risk, including employees.

ANSI E1.47-2017, Entertainment Technology - Recommended Guidelines for Entertainment Rigging System Inspections
These guidelines include recommended inspector qualifications and responsibilities, scope and frequency of inspections, content of the rigging inspection report, and related information concerning the inspection process. Consensus on this document has been achieved, but one change is needed to bring clause 5.1.6 into compliance with the ANSI requirements for commercial terms and conditions in American National Standards.

ANSI E1.48-2014, A Recommended Luminous Efficiency Function for Stage and Studio Luminare Photometry
The standard specifies an energy-based luminous efficiency function $\text{V}(\lambda)$ based on recent research for use when measuring the lumen output for any stage or studio luminaire in which it is known or believed that 20% or more of the output power is at wavelengths shorter than 500 nm.

ANSI E1.5-2009 (R2014), Theatrical Fog Made with Aqueous Solutions of Di- and Trihydric Alcohols
This standard describes the composition of theatrical fogs or artificial mists that are not likely to be harmful to healthy performers, technicians, or audience members of normal working age, which is 18 to 64 years of age, inclusive. It is limited to those fogs and mists made from a solution of water and one or more dihydric or trihydric alcohols, and is intended to be applied in theatres, arenas, and other places of entertainment or public assembly.

ANSI E1.53-2016, Overhead mounting of luminaires, lighting accessories, and other portable devices: specification and practice
The standard covers specifications for the primary and secondary mounting devices for portable stage and studio luminaries and accessories. It also covers these mounting devices for special effects equipment (e.g. fog machines and bubble machines) that are often mounted along with lighting equipment. The standard would give guidance on how to properly affix these mounting devices.

ANSI E1.54-2015, PLASA Standard for Color Communication in Entertainment Lighting
This standard specifies a standardized color space, and defines the locations of the RGB primaries and the White Point for the purpose of facilitating the communications between lighting controllers and color-changing luminaires. It offers a standardized way of specifying color. The method is generic and is neither manufacturer-specific nor color-technology-specific.

ANSI E1.55-2016, Standard for Theatrical Makeup Mirror Lighting
The standard offers recommendations and requirements for makeup mirror lighting in performer dressing rooms and similar locations. It defines a range of acceptable lamp CCTs and color-rendering ratings, and also specifies illumination levels and lighting angles for illuminating the performer's face.

ANSI E1.57-2016, Recommendations to prevent falls on or off movable parade floats, movable stages, and similar moving platforms
BSR E1.57 offers recommendations to prevent falls by anyone (e.g., performers, technicians, politicians) on parade floats, movable stages, and similar moving platforms. Fall protection is needed, but this protection needs to be provided in a way that preserves the artistic intent of the moving float or platform. This document is being written to provide guidance on how to accomplish this.

ANSI E1.6-1-2012, Entertainment Technology - Powered Hoist Systems
This draft standard is part of the BSR E1.6 powered theatrical rigging system project. This part, BSR E1.6-1, deals with powered winches that are not serially manufactured electric chain hoists. It is intended to establish requirements for the design, manufacture, inspection, and maintenance of powered hoist systems for lifting and suspending loads in theatres and other places of public assembly.

ANSI E1.6-2-2013, Entertainment Technology - Design, Inspection, and Maintenance of Electric Chain Hoists for the Entertainment Industry
BSR E1.6-2 is part of the E1.6 powered entertainment rigging project. This draft standard covers the design, inspection, and maintenance of serially manufactured electric link chain hoists having capacity of 2 tons or less and used in the entertainment industry. This standard does not cover attachment to the load or to the overhead structure. Controls used for multiple hoist operation are excluded from the scope of this part of the standard.

ANSI E1.6-3-2012, Selection and Use of Chain Hoists in the Entertainment Industry
This draft standard is part of the BSR E1.6 powered theatrical rigging project system. This part, BSR E1.6-3, establishes minimum safety requirements for the selection and use of serially manufactured electric link chain hoists having capacity of 2 tons or less in the entertainment industry. This part does not address the design or maintenance of these hoists. The purpose of the standard is intended to provide for the protection of life, limb, and property.

ANSI E1.6-4-2013, Portable Control of Fixed-Speed Electric Chain Hoists in the Entertainment Industry
BSR E1.6-4 is part of the 1.6 powered entertainment rigging project. This draft standard covers portable control systems for fixed-speed electric chain hoists used in the entertainment industry.

ANSI E1.8-2012, Entertainment Technology - Loudspeaker Enclosures Intended for Overhead Suspension - Classification, Manufacture and Structural Testing
BSR E1.8-2012x is a revision of the existing standard for the structural integrity of loudspeaker enclosures that are suspended overhead. It is designed to ensure that flown speaker enclosures don’t break and drop debris. The revisions are intended to simplify the standard and to clarify the requirements.

ANSI E1.9-2007 (R2012), Entertainment Technology - Reporting Photometric Performance Data for Luminaires Used in Entertainment Lighting
This standard defines the minimum photometric data to be presented on documents purporting to accurately describe the photometric performance of stage and studio luminaires used in the live entertainment and performance industries.
ANSI/FCI (Fluid Controls Institute)

ANSI/FCI 13-1-2016, Determining Condensate Loads to Size Steam Traps
The standard is intended to assist users in estimating condensate loads using generally accepted formulas. The result is then used to size a steam trap with sufficient safety factor to cover the flow throughout the range without being grossly oversized.

ANSI/FCI 15-1-2015, Standard for Production Testing of Pressure Regulators
This standard establishes minimum guidelines for production testing of pressure regulators for use by manufacturers, specifiers, inspectors, and users to ensure atmospheric leak tightness and seat leakage tests have been completed at the factory before shipment.

ANSI/FCI 4-1-2014, Pressure Regulator Hydrostatic Shell Test Method
This standard establishes a method for conducting production hydrostatic testing of pressure regulator shells having bodies, bonnets, casings, and spring cases manufactured from any materials.

ANSI/FCI 70-2-2013, Control Valve Seat Leakage
This standard establishes a series of seat leakage classes for control valves and defines production test procedures.

ANSI/FCI 70-3-2016, Regulator Seat Leakage
This standard establishes a series of seat leakage classes for regulators and defines the production test procedures.

ANSI/FCI 79-1-2016, Standards for Proof of Pressure Rating of Pressure Regulators and Temperature Regulators
The purpose of this standard is to create common guidelines for establishing pressure ratings for use by manufacturers, users, specifiers and approval bodies in order to provide consistent pressure containment integrity.

ANSI/FCI 85-1-2011, Standard for Production Testing for Steam Traps
This standard specifies production and performance tests that are considered applicable to steam traps.

ANSI/FCI 87-1-2017, Classification and Operating Principles of Steam Traps
This standard is for the purpose of establishing and illustrating various classifications of Steam Traps in accordance with their basic principles of operation. This standard does not attempt to define details of conception or construction.

ANSI/FCI 91-1-2010, Standard for Qualification of Control Stem Seals
This standard classifies control valve stem seals by their ability to withstand mechanical and thermal cycles at a specified set of temperature and pressure conditions. Bellows, diaphragms, and tublar seals are not covered by this standard.

ANSI/FCI 97-1-2013, Standard for Production Testing of Secondary Pressure Drainers
This standard specifies production tests that are considered applicable to secondary pressure drainers.

ANSI/FCI 99-1-2014, Standard for Performance Testing of Secondary Pressure Drainers
This standard specifies performance tests that are considered applicable to secondary pressure drainers. These tests may be conducted to evaluate the performance of a particular design, either currently in production or under consideration for production.

ANSI/FCI 99-2-2004 (R2015), Pressure Reducing Regulator Capacity
This standard creates a guideline for establishing and reporting regular capacities for use by manufacturers, users, specifiers and approval bodies in order to promote consistent presentation of regulator capacities.

ANSI/FCI 99-3-2012, Back Pressure Regulator Capacity
Provides a method for establishing and reporting back pressure regulator capacities for use by manufacturers, users, specifiers and approval bodies in order to promote consistent surplusing valve capacities.

FM (FM Approvals)

ANSI FM 4474-2004 (R2010), Evaluating the Simulated Wind Uplift Resistance of Roof Assemblies Using Static Positive and/or Negative Differential Pressures
This standard presents a test method for determining and categorizing wind uplift resistance of roof assemblies including the structural deck. The objective of this test is to evaluate the comparative resistance of roof assemblies to positive and/or positive and negative pressures. The test evaluates the deck and roof covers including all components for their method of attachment to each other and to their supports.

Provides comprehensive performance requirements for Water Mist Systems for use in fire protection applications. The standard addresses component, system, and fire test requirements for various applications and occupancies.

ANSI/FM 1950-2016, Seismic Sway Braces for Pipe, Tubing and Conduit
This document being considered for adoption of the national standard includes design and performance requirements for seismic sway bracing used to restrain piping, tubing, and conduit. General and performance requirements apply to components that are attached to the structural element and to the piping, tubing, and conduit. Although used in testing the ‘brace member’ attached between the structural attached and piping attached component is not included within the scope of this standard.

ANSI/FM 2510-2014, Flood Abatement Equipment
The FM Approvals 2510 Standard contains performance test requirements for flood barriers, flood abatement pumps, and backwater valves as well as an evaluation of components comprising these systems to assure reliability of the product's performance.

ANSI/FM 3265-2017, Spark Detection and Extinguishing Systems
This standard provides minimum guidelines for the detection of sparks or embers within a predetermined area and the extinguishment via application of a pre-determined amount of water spray within the duct or conveyor. In essence, a detection area or zone is monitored and a short duration extinguishing spray is applied that is intended to minimize damage to the process and production downtime associated with the fire hazard. The system is intended as a process protection system and not a building evacuation system, although it could be tied to one.

This test standard provides a procedure for determining the impact resistance performance of roofing materials. The test uses the impact forces of freezer ice balls propelled to develop free-fall kinetic energies of the same size hail.

ANSI/FM 4476-2014, Flexible Photovoltaic Modules
This test standard provides a procedure for evaluating flexible photovoltaic modules for their performance in regard to fire from above the structural deck, simulated wind uplift and susceptibility from hail storm damage.

ANSI/FM 4477-2016, Vegetative Roof Systems
This test standard provides a procedure for evaluating vegetative roof systems for their performance in regard to fire from above and below the structural deck, foot traffic, puncture resistance and water leakage.

ANSI/FM 4478-2014, Rigid Photovoltaic Modules
This test standard provides a procedure for evaluating rigid photovoltaic modules for their performance in regard to fire from above the structural deck, simulated wind uplift and susceptibility from hail storm damage.

This standard sets the performance requirements for a Class 1 fire rating for building panel assemblies and interior finish materials installed to maximum heights of 30 ft or 50 ft (9.1 or 15.2 m) or unlimited heights.
ANSI/MSE 50028-2016, Superior Energy Performance - Requirements for verification bodies for use in accreditation or other forms of recognition

In response to changes reflected in ISO/IEC 17021-1:2015, this revision to ANSI/MSE 50028 makes substantive changes to technical areas, audit program, and other sections. The Standard provides updated requirements for competence, consistency, and impartiality of the audit and certification of energy management systems and Superior Energy Performance. The Standard also addresses multi-site audits for the EnMS.

ANSI/MSE/ISO 50047-2016, Determination of energy savings in organizations

This Standard provides methods for the determination of energy savings in organizations. This Standard can be utilized by organizations with or without a formal energy management system. The methods covered in the Standard are based on changes in the amount of energy consumed or the combined energy savings from the energy performance improvement actions (EPIAs) measured within the organizational boundary.

HFES (Human Factors & Ergonomics Society)

ANSI/HFES 100-2007, Human Factors Engineering of Computer Workstations

This standard contains hardware design specifications that are based on accepted human factors engineering research and experience for computer workstations, their associated furniture, and the end user’s workplace environment. This standard was developed by the Human Factors and Ergonomics Society (HFES) using the rules and procedures of the American National Standards Institute (ANSI).

ANSI/HFES 200-2008, Human Factors Engineering of Software User Interfaces

The scope of HFES200 is primarily focused on user interaction with software for personal and business use, most commonly implemented on a desktop PC or laptop. Most of the recommendations in this standard also apply to home and mobile computing and to interactive voice response applications. Many of the recommendations may also apply to other interactive software. This standard does not address system or software design processes.

HI (Hydraulic Institute)

ANSI/HI 1.1-1-2-2014, Rotodynamic Centrifugal Pumps for Nomenclature & Definitions

This standard covers rotodynamic pumps with centrifugal (radial), mixed flow, and axial flow impellers, as well as regenerative turbine and Pitot tube type pumps, of all industries/commercial types except vertically suspended diffuser turbine pumps. It contains description of types, nomenclature, and definitions.

ANSI/HI 1.3-2013, Rotodynamic Centrifugal Pumps for Design and Application

This standard provides the reader with information regarding the application of Rotodynamic (centrifugal and regenerative turbine) pumps of all industrial/commercial types except vertical single and multistage diffuser types, for various services. No attempt has been made to cover all phases of centrifugal pump application, but an endeavor has been made to point out some of the principal features of pumps and the precautions which should be taken in their use.

ANSI/HI 1.4-2014, Rotodynamic Centrifugal Pumps for Manuals Describing Installation, Operation, and Maintenance

Limited activity to Rotodynamic (cent.) Pumps to: (A) Overhung impeller, close coupled pumps [OH4], [OH5], [OHSA], [OH6], [OH7], [OH8], [OH8A] & [OH8B]; (B)Overhung impeller, separately coupled pumps [OH9], [OH10], [OH11], [OH12], [OH13], & [OH13A]; (C) Sealless Cent. Pumps [OH9], [OH10], [OH11]; (D) Between bearing, separately coupled, single stage pumps [BB1] & [BB2]; (E) Between bearing, separately coupled, multistage pumps [BB3] & [BB4] & [BB5]; (F) Regenerative turbine pumps [RT1], [RT2], [RT3], [RT4]; and (G) Special effects pumps (Pitot tube, etc.). Excluded are Vert. Diffuser type pumps as described in the scope of the Vert. Pump sectio

ANSI/Hi 10.1-10.5-2010 (R2016), Air-Operated Pumps for Nomenclature, Definitions, Application, and Operation

This standard applies to air-operated diaphragm and bellows pumps.

ANSI/Hi 10.6-2010 (R2016), Air-Operated Pump Tests

This standard applies to test of air-operated diaphragm and bellows pumps only. Unless otherwise stated, all tests are conducted using water at ambient temperature. Air-operated rotodynamic and rotary pumps are not included in this test standard.

ANSI/Hi 11.6-2012, Submersible Pump Tests

This standard applies to acceptance testing Submersible Pumps driven by induction motors, unless otherwise agreed. A submersible pump is defined as a close-coupled pump/motor unit designed to operate submerged in pumped liquid, and includes submersible pumps operating in either a wet-pit or dry-pit environment. This standard does not apply to accessory items, such as discharge elbows, suction fittings, or valves.

ANSI/Hi 12.1-12.6-2016, Rotodynamic Centrifugal Slurry Pumps for Nomenclature, Definitions, Applications, and Operation

This standard is for rotodynamic (centrifugal), single-stage, overhung impeller slurry pumps, horizontal and vertical of industrial types used for abrasive slurries, herein referred to as slurry pumps. It includes types and nomenclature; definitions; design and application; and installation, operation, and maintenance.

ANSI/Hi 14.6-2016, Rotodynamic Pumps for Hydraulic Performance Acceptance Tests

This standard covers hydraulic performance tests for acceptance of rotodynamic pumps (centrifugal, mixed flow, and axial flow pumps), in this document referred to as pumps.

ANSI/Hi 2.1-2.2-2014, Rotodynamic Vertical Pumps of Radial, Mixed and Axial Flow Types for Nomenclature and Definitions

This standard is for types, nomenclature, and definitions of vertical turbine, mixed flow, axial flow vertical diffuser, submersible motor deepwell and short-set pumps, commonly defined as vertically suspended types [VS0], [VS1], [VS2], [VS3], [VS6], [VS7], and [VS8], as well as vertical overhung impeller types [VS4] and [VS5] that are driven by vertical electric motors or horizontal engines with right-angle gears.

ANSI/Hi 2.3-2013, Rotodynamic (Vertical) Pumps of Radial, Mixed, and Axial Flow Types for Design and Application

This standard provides the reader with information regarding the application of centrifugal and regenerative turbine pumps of all industrial/commercial types except vertical single and multistage diffuser types, for various services. No attempt has been made to cover all phases of Rotodynamic (vertical) pump application, but an endeavor has been made to point out some of the principal features of pumps and the precautions which should be taken in their use.

ANSI/Hi 2.4-2014, Rotodynamic Vertical Pumps for Installation, Operation and Maintenance

This committee shall limit its activity to: (A) Vertical, diffuser, deep-well pumps [VS1]; (B) Vertical, diffuser, short-set pumps [VS1] & [VS3]; (C) Vertical, diffuser, can-mounted pumps [VS6]; (D) Vertical, diffuser, submersible, deep-well pumps [VS0]; (E) Vertical, diffuser, submersible, short-set pumps [VS0]; (F) Vertical, diffuser, double-casing, inline, floor-mounted [VS8]; (G) Vertical, volute, double-suction, wet-pit [VS2]; (H) Vertical, volute, double-suction, can-type [VS7]; and (I) Vertical, volute, multi-stage axial split, can-type [VS7-1]. Excluded are vertical in-line pumps, horizontal centrifugal pumps mounted vertically such as sewage pumps, and vertical overhung

ANSI/Hi 3.1-3.5-2015, Rotary Pumps for Nomenclature, Definitions, Application, and Operation

This standard applies to industrial/commercial rotary positive displacement pumps. It includes: types and nomenclature, definitions, design and application, and installation, operation, and maintenance. It does not include standards on magnetic drives for sealless pumps nor rotary pumps primarily used for fluid power applications.

ANSI/Hi 3.6-2016, Rotary Pump Tests

This standard recognizes four types of performance tests for rotary pumps and provides procedures for conducting and reporting test data.
ANSI/HI 4.1-4.6-2017, Sealless, Magnetically Driven Rotary Pumps for Nomenclature, Definitions, Application, Operation, and Test

This standard covers the unique features of sealless, magnetically driven rotary pumps and includes sections on types and nomenclature; definitions; design and applications; installation, operation, and maintenance; and test. Because of the variety of rotary pump configurations available and the broad range of applications, familiarization with Hydraulic Institute Standards ANSI/HI 3.1 - 3.5 Rotary Pumps for Nomenclature, Definitions, Application and Operation and ANSI/HI 3.6 Rotary Pump Tests is recommended.

ANSI/HI 5.1-5.6-2016, Sealless Rotodynamic Pumps for Nomenclature, Definitions, Design, Application, Operation, and Test

This standard covers types and nomenclature, definitions, design and application, installation, operation and maintenance, and test of sealless rotodynamic pumps driven by canned motors or magnetic couplings. Not included are submersible wastewater pumps that do not have external shaft seals and are therefore not susceptible to external shaft leakage. Deep well submersible pumps and circulator pumps are also excluded.

ANSI/HI 6.1-6.5-2015, Standard for Reciprocating Power Pumps for Nomenclature, Definitions, Application and Operation

This standard applies to reciprocating power pumps. It includes types and nomenclature; definitions; design and application; and installation, operation, and maintenance.

ANSI/HI 6.6-2015, Reciprocating Pump Tests

This standard is for reciprocating power pumps, including controlled volume metering pumps, which are driven by power from an outside source applied to the crankshaft. It includes procedures for testing such pumps. These standards apply to test of the pump only, unless stated otherwise. The type of test performed and the auxiliary equipment to be used should be agreed upon by the purchaser and manufacturer prior to the test. It is not the intent to limit or restrict tests to only those described herein. Variations in test procedures may exist without violating the intent of this standard.

ANSI/HI 7.1-7.5-2013, Controlled Volume Metering Pumps for Nomenclature, Definitions, Application, and Operation

The Controlled Volume Metering Pump Section will limit its activity to the above matters to reciprocating positive displacement metering pumps including, but not limited to the following: A) Hydraulic Coupled Disc Diaphragm B) Hydraulic Coupled Tubular Diaphragm C) Mechanical Coupled Disc Diaphragm D) Pack Piston E) Plunger Technical documents developed shall include, but are not limited to: types and nomenclature; definitions; design and application; installation; operation and maintenance and test.
ANSI/HI 9.8-2012, Pump Intake Design
Provides best practices and recommended designs of intakes and sumps for water, waste water, and industrial pump applications including free surface and closed conduit installations, for the purpose of avoiding intake-related problems with pumps. This standard contains criteria for determining the need for model testing of intake structures and closed conduit intakes, as well as acceptance criteria to be used in accepting results from the model testing of intakes.

HIBCC (Health Industry Business Communications Council)
ANSI/HIBC 1.3-2010, The Health Industry Bar Code (HIBC) Provider Applications Standard
Specifies the minimum requirements and optional structures for the machine-readable identification for health industry applications. Provides guidance for the formatting and placement of data presented in linear bar code, two-dimensional symbol or human readable format. Makes recommendations as to label placement, size, material and the inclusion of free text and any appropriate graphics.

This American National Standard: specifies the minimum requirements and optional structures for the machine-readable identification for health industry product;&#894; provides guidance for the formatting and placement of data presented in linear bar code, twodimensional symbol, or human readable form;&#894; makes recommendations as to label placement, size, material and the inclusion of free text and any appropriate graphics.

ANSI/HIBC 4.0-2009 (R2015), HIBC Supplier Standard for RFID Product Indentification
This is a technical advisory for RFID item tagging, and defines the manner in which companies with a registered "UC" can code their item and product identifiers on RFID tags. It specifies the methodology to enable unique identification of items and products for tracking and tracing where RFID is the chosen data carrier.

ANSI/HIBC 5.0-2011, Health Industry Barcode (HIBC) Syntax Standard
The document describes the voluntary HIBC Syntax Standard which defines ASCII character combinations beginning with the ‘&’ character as defined in ANSI MH10.8.2, referenced in ISO/IEC 15418 and used in ISO/IEC 15434. Users of HIBC data formats are encouraged to consider aligning themselves with the data formats defined in 15434 provide global transparency in their facilities and supply chains. Note: this standard allows full use of the 15434 data structures which is in addition to the 255 and 25P examples used in SLS.

ANSI/HIBC 3.1-2010, Positive Identification for Patient Safety; Part 1: Medication Delivery
The scope of this standard is to define the data formats for the data carriers (barcodes, 2-D symbols or RFID Tags) which are used to automatically capture information to positively identify objects in the processes around medication administration and management. The objects include: Employee Badges, Patient Wristbands, Non-IV Medications, IV-Medications and Smart Infusion Pumps and Device License Plate labeling for intelligent devices.

HL7 (Health Level Seven)
ANSI/HL7 Arden V2.10-2014, Health Level Seven Arden Syntax for Medical Logic Systems, Version 2.10
This is the next version of the Arden Syntax, offering incremental improvements over version 2.9. The key substantive changes from version 2.9 will be the update of the XML representation of the Syntax so that it fully reflects all changes through the latest version and its migration from the current non-mandatory appendix to the normative part of the document, thus facilitating representation of MLMs in the original Arden and its XML equivalent.

This is a reaffirmation ballot of the existing CDA R2 standard.

ANSI/HL7 CDAR2 IG CONSENSDTDIR, R1-2017, HL7 CDA R2 Implementation Guide: Privacy Consent Directives, Release 1
This implementation guide is intended to produce a structured document specification to exchange signed Consent Directives. It will make use of the concepts identified in the Composite Privacy Consent Directive - Domain Analysis Model - and the CDA R2 specification. This specification is not only intended to provide a computable representation of a consent directive but the resulting structured documents could be used to generate enforceable assertions or rules (e.g. SAML, XACML). This project is intended to support the management of consent directives and policies.

ANSI/HL7 CDAR2 IG TRAUMAREG R1-2016, HL7 CDA(R) R2 Implementation Guide: Trauma Registry Data Submission, Release 1 - US Realm
This guide provides guidance on the reporting of hospital trauma information to a trauma data repository. The scope of this domain is defined by the American College of Surgeons’ Committee on Trauma’s National Trauma Data Standard and the current ballot is based on the 2012 version.

ANSI/HL7 CDAR2 PHMRPTS, R1-2017, HL7 CDA (R)R2 Implementation Guide: Personal Healthcare Monitoring Reports, Release 1
The Personal Healthcare Monitoring Report (PHMR) is a document that carries personal healthcare monitoring information. The information is transmitted as notes and as raw data. Notes may be supplied by a disease management service provider. The information may have multiple characteristics, including representation of measurements captured by devices, representation of notes, summaries, and other kinds of narrative information that may be added by caregivers or by the users themselves, and representation of graphs that may be added by intermediary devices that represent trends of users’ health.

This implementation guide supports electronic submission of Healthcare Associated Infection data to the National Healthcare Safety Network (NHSN). It includes an informative appendix that covers only the subset of the NHSN HAI CDA IG relevant to specific event types. The CDC provided NHSN developers, vocabulary experts and CDA experts to support this project.

ANSI/HL7 CMS V1.6-2011 (R2016), HL7 Context Management Specification, Version 1.6
This was a reaffirmation ballot of the Version 1.6 release, which extended the standard to include language on the use of SAML Assertions for authenticating users into the CCOW context and for the subsequent re-use of saved SAML Assertions by authorized context participants.

ANSI/HL7 EHR BHFP, R1-2008 (R2014), HL7 EHR Behavioral Health Functional Profile, Release 1
This standard is a definitive list of capabilities/functionalties believed necessary to manage a clinical repository and medical record system for use by behavioral health providers who vary extensively in organizational setting, scope of practice, and legal/regulatory environments. It is believed this will facilitate the acquisition of EHR systems by behavioral health providers and promote their integration with other areas of health, especially primary health care and family practice.
ANSI/HL7 CRFP, R1-2009 (R2014), HL7 EHR Clinical Research Functional Profile, Release 1
The EHR Clinical Research profile identifies EHR functions such that when used to collect source data for clinical research, can supply regulatory authorities with proof that data used to support claims made regarding the safety and efficacy of new medicines can be trace back to a “reliable” data source. Allow new therapies to be available to patients in the shortest time at the lowest cost.

ANSI/HL7 LTCFP, R1-2010 (R2016), HL7 EHR System Long Term Care Functional Profile, Release 1 - US Realm
The LTC EHR-S Functional Profiles serves as a key resource to CCHIT in the development of certification requirements for EHR systems in the Long Term Care -nursing home community. In addition the functional profile will provide the foundation for vendor/provider communication regarding expectations and requirements for EHR systems deployed in this care setting.

ANSI/HL7 PHRSFM, R1-2014, HL7 EHR-System Functional Model, Release 2 - US Realm
The EHR-S Functional Model Release 2 is a more complex and comprehensive model, being revised to incorporate enhancements made through the 1st Normative ballot comments as submitted by CDISC, CEN, HTSDD, ISO, HL7 and GS1. The model has been significantly reworked and expanded to better reflect requirements of the industry including the additions of trust and records management.

ANSI/HL7 IDMP DOSE, R1-2014, Health Informatics - Identification of Medicinal Products - Data Elements and Structures for Unique Identification and Exchange of Regulated Information on Pharmaceutical Dose Forms, Units of Presentation and Routes of Administration, Release 1
There are several approaches for expressing Pharmaceutical Dose Forms in medicinal products. It is necessary to establish a standard that can be used as an international reference for terms, term definitions and term identifiers. The standard should provide data structures for mapping and translations of terms and definitions that are currently being applied. This will help ensure consistency of Pharmaceutical Dose Forms across the drug regulatory, pharmacovigilance and healthcare environments thus helping the adoption of the new standard without impacting on existing approaches.

ANSI/HL7 IDMP UNITSMEASURE, R1-2014, Health Informatics - Identification of Medicinal Products - Data Elements and Structures for Unique Identification and Exchange of Regulated Pharmaceutical Product Information, Release 1
In the context of the regulation of medicinal products, a mechanism is needed to uniquely identify a medicinal product with certainty in any domain. This will enable regulatory, pharmacovigilance and healthcare activities, inter alia, to be undertaken with increased efficiency and certainty, contributing to improved protection of public health. The proposed standard will provide a mechanism to manage and exchange information uniquely identifying a medicinal product, regardless of where the medicinal product is developed, manufactured or authorized. This information can then be made available between regulators and to other stakeholders.

ANSI/HL7 IDMP SUBSTID, R1-2014, Health Informatics - Identification of Medicinal Products - Data Elements and Structures for Unique Identification and Exchange of Regulated Information on Substances, Release 1
In the context of the regulation of medicinal products, it is necessary to have a mechanism to uniquely identify substances and specified substances with certainty in any domain. This will enable regulatory, pharmacovigilance and healthcare activities, inter alia, to be undertaken with increased efficiency and certainty, improving protection of public health. The scope of substances and specified substances goes beyond medicinal products to include dietary supplements, food, cosmetics, and, for purpose of veterinary activities, substances to which animals are exposed. This information can then be made available as between regulators, and to all other stakeholders.

ANSI/HL7 IMTRANS, R2-2016, HL7 Version 3 Standard: Transmission Infrastructure, Release 2
This domain addresses the following aspects about the communications environment that is considered common to all HL7 version 3 messaging implementations: 1) A specification for the composite HL7 version 3 message; 2) A protocol for reliable message delivery; 3) Generic “communication roles” that support the modes of HL7 messaging; 4) Message control events that describe a framework for generic HL7 messaging.
ANSI/HL7 PRIVECLASSSYS, R1-2014, HL7 Healthcare Privacy and Security Classification System, Release 1
The Healthcare Privacy and Security Classification System supports enterprise control of access to protected information as well as access control to metadata appropriate to transport, security, and business envelopes, as well as payload metadata (e.g., in a federated Registry). Use of standard and interoperable metadata in accordance with the Healthcare Privacy and Security Classification System enables access to protected information by intermediaries such as health information exchanges, health information service providers, clearinghouses, and gateways; and access and use by end users within an authorized receiver's system.

ANSI/HL7 RLUS, R1-2013, HL7 Version 3 Standard: Retrieve, Locate, and Update Service (RLUS) Release 1
The Retrieve, Locate, and Updating Service (RLUS) Service Functional Model specification provides a set of capabilities through which information systems can access and manage information resources. RLUS realizes, at its core, a basic set of CRUD capabilities plus location for health information resources management and, simply, standardizes the way in which the resources are exposed and consumed independently from the nature of the resources. HL7 Service Functional Models (SFMs) specify the functional requirements of a service.

The Service Aware Interoperability Framework (SAIF) provides consistency between all artifacts, enables a standardized approach to Enterprise Architecture development and implementation, and a way to measure the consistency. SAIF is the framework that is required to rationalize interoperability of standards. SAIF is an architecture for achieving interoperability, but it is not a whole-solution design for Enterprise architecture management. This document describes a canonical form of Service Aware Interoperability Framework (SAIF) which can be adapted to an organization’s implementation requirements through the production of a SAIF implementation Guide.

ANSI/HL7 V2 XML, R2-2012, HL7 Version 2 XML Encoding Rules, Release 2
This document supersedes Release 1 and contains additional specifications to accommodate new features introduced beginning with HL7 V2.3.1, for example, the use of choice within message structures. This document is valid for all V2.x version which have passed ballot up to and including V2.7

ANSI/HL7 V3 AB, R2-2008 (R2012), HL7 Version 3 Standard: Accounting & Billing, Release 2
The HL7 Financial Management Work Group seeks to reaffirm this standard. The HL7 Version 3 Accounting & Billing Message Standards supports the communication of acquired patient payer information and specific acquired charges for services to a patient/payer billing system. Examples of services facilitated by this standard include the creation and management of patient billing accounts and the posting of financial transactions against patient billing accounts for the purpose of aggregating financial transactions that will be submitted as claims or invoices for reimbursement

ANSI/HL7 V3 CGPED, R1-2007 (R2012), HL7 Version 3 Standard: Clinical Genomics; Pedigree, Release 1
The HL7 Clinical Genomics Pedigree model has been successfully implemented in a number of clinical organizations and adopted by the US Surgeon General's My Family Health Portrait. This model is an ANSI standard and supports the US Department of Health and Human Services Personalized Health Care Use Case. This is a reaffirmation ballot to meet ANSI guidelines.

ANSI/HL7 V3 COMT, R3-2010 (R2015), HL7 Version 3 Standard: Shared Messages, Release 3
The shared message domains contain Message Types and Interactions that are used by various clinical and administrative domains.

ANSI/HL7 V3 CPM CMET, R3-2016, HL7 Version 3 Standard: Common Product Model CMETs, Release 3
Release 3 of this document updates CPM to support SPL Release 7 as the data exchange format to support ISO IDMP Technical Specifications.

ANSI/HL7 V3 CPPV3MODELS, R1-2012, HL7 Version 3 Standard: Core Principles and Properties of Version 3 Models, Release 1
Core Principles has Been Revised and Restructured for this ballot to address issues from prior ballots. It covers the foundations of the core V3 models - Vocabulary, Data Types, RIM - and their relationship to each other.

ANSI/HL7 V3 CR, R4-2008 (R2012), HL7 Version 3 Standard: Claims and Reimbursement, Release 4
The Financial Management Work Group seeks to reaffirm this standard. It provides non-US realm support for generic, pharmacy, preferred accommodation, physician, oral health, vision care and hospital claims for eligibility, authorization, coverage extension, pre-determination, invoice adjudication, payment advice and Statement of Finance Activity (SOFA).

ANSI/HL7 V3 CS CMET, R1-2016, HL7 Version 3 Standard: Clinical Statement CMETs, Release 1
This ballot is for all the CMETs associated with the Clinical Statement domain, both the ones that provide features within the main DMIM domain and the ones that provide the CMET versions of the whole DMIM.

ANSI/HL7 V3 CSP, R1-2014, HL7 Version 3 Standard: Clinical Statement Pattern, Release 1
Clinical Statement provides a model that can be used by various disciplines to propagate commonality in the core clinical modeling space.

ANSI/HL7 V3 CTS, R2-2015, HL7 Version 3 Standard: Common Terminology Services, Release 2
This document describes the requirements for the representation, access, and maintenance of terminology content. This release is now aligned with the terms and definitions present with the Core Principles and Properties of HL7 Version 3 Models. Other enhancements based on implementation experience not impacting the functional scope were added as were clarifications on the minimal requirements to meet various HL7 CT52 conformance profiles. Several sections and appendices were removed or and restructured to reflect that fact that the DSTU was used to issue an RFP to which PIM responded and the recommendations were addressed in the PIM.

ANSI/HL7 V3 DAM DIETORD, R2-2017, HL7 Version 3 Domain Analysis Model: Diet and Nutrition Orders, Release 2
These conceptual models are required to form the foundation for Version 3 diet and nutritional supplement orders that are an important part of the medical nutrition therapy.

ANSI/HL7 V3 DSR, R2-2011 (R2016), HL7 Version 3 Standard: Drug Stability Reporting (eStability), Release 2
This standard provides stability data in a standard electronic format so that it may be viewed as it appears on paper or electronic paper by regulatory agencies and industry.

ANSI/HL7 V3 DSS, R1-2011, HL7 Version 3 Standard: Decision Support Service (DSS), Release 1
The present DSS specification represents one member of a family of healthcare service specifications being jointly developed by HL7 and the Object Management Group (OMG) through the Healthcare Services Specification Project. As per the HSSP process, an HL7 DSS DSTU was adopted in December 2006. Subsequently, an OMG draft standard based on the HL7 DSTU was adopted in 2009, and an OMG normative standard was adopted in December 2010. Both of the OMG standards were developed in consultation with the HL7 Clinical Decision Support Work Group.
The purpose of the HL7 Version 3 Annotated Electrocardiogram (anECG) standard is to provide a means to systematically evaluate the ECG waveforms and measurement locations. Before this initiative, sponsors were submitting ECG findings tabulations (e.g., QT interval measurements) with their applications. However, the FDA could not systematically evaluate the ECG waveforms and the measurement locations the findings came from. Most, if not all, ECGs were collected with paper and not electronically retained. The Annotated ECG (anECG) standard responds to the FDA’s need for more systematic evaluation.

Models used in decision support need to be accurately specified so that decision logic can be written against a precise model. As models are updated over time and vary between execution contexts a language is required to define models and extended data types. This grammar defines models for use in the GELLO environment.

This standard establishes an international framework for data exchange and information sharing by providing a common messaging format for transmission of ICSRs for adverse drug reaction (ADR), adverse events (AE), Product problems, and consumer complaints that may occur upon the administration or use of one or more products. The messaging format is based upon the HL7 Reference Information Model (RIM) and can be extended or constrained to accommodate a variety of reporting use cases described in the storyboard section.

This standard, which contains material drawn from ISO 27593-1 seeks to create a standardized framework for international regulatory reporting and information sharing by providing a common set of data elements and messaging format for transmission of ICSRs for adverse drug reactions (ADR), adverse events (AE), infections, and incidents that may occur upon the administration of one or more human pharmaceutical products to a patient, regardless of source and destination. The standard provides a structure where reports can be exchanged in a clear and unambiguous manner.

This domain describes the communication of information about immunization, the process of inducing immunity to an infectious organism or agent in an individual or animal through vaccination. This standard establishes an international framework for data exchange and information sharing by providing a common messaging format for reporting adverse drug reactions (ADR), adverse events (AE), Product problems, and consumer complaints that may occur upon the administration or use of one or more products. The messaging format is based upon the HL7 Reference Information Model (RIM) and can be extended or constrained to accommodate a variety of reporting use cases described in the storyboard section.

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ANSI/HL7 V3 MFRI, R1-2006 (R2011), HL7 Version 3 Standard: Master File/Registry Infrastructure, Release 1

This domain addresses the communications environment that is considered common to all HL7 Version 3 messaging implementations. It covers the transmission wrapper as well as the transmission interaction patterns.

ANSI/HL7 V3 MRMDCM, R1-2006 (R2014), HL7 Version 3 Standard: Medical Records; Data Access Consent, Release 1

The HL7 Community Based Collaborative Care Work Group seeks to reaffirm the HL7 Version 3 Standard: Medical Records; Data Access Consent, Release 1. The purpose of this standard is to allow the recording of patient consents and overrides, as well as the recording or changing of a Shared Secret associated with all or a part of a patient’s records. The interactions in this standard are crafted to support a "request-based" architecture in which the messages are sent from a point of service (POS), such as a clinic, pharmacy, etc., to a center information system (CIS), such as a patient registry or drug information system.

ANSI/HL7 V3 PA ENCOUNTER, R1-2016, HL7 Version 3 Standard: Patient Administration; Patient Encounter, Release 1

The Patient Administration standard defines the requirements and specifications to support interoperability among clinical and non-clinical systems regarding patient encounters and administrative registries.

ANSI/HL7 V3 PACM, R2-2016, HL7 Version 3 Standard: Patient Administration CMETs, Release 2

This document updates the CMETs that are currently out of sync with the current version of the Patient Administration models.

ANSI/HL7 V3 PAPRNSREG, R1-2015, HL7 Version 3 Standard: Patient Administration; Person Registry, Release 1

The Person Registry defines demographics and visit information about persons who are not patients.


The Service Labeling Service Functional Model is intended to complement existing SOA services and the SAIF Behavioral Framework (BF) for HL7 by providing functional capabilities for the systems and components required for these services to be exposed through well-defined, technology agnostic service interfaces. Refer to the document description on the HL7 ballot website for a complete list of functional capabilities too long to mention here.


The document provides PASS Access Control artifacts associated with the conceptual level of the Services Aware Enterprise Architecture Framework. A significant portion of the Information Viewpoint uses the Security Domain Analysis project work ballooning concomitant to this document. The document includes an Access Control Service Functional Model as well as supporting policy provisioning information and functionality.

ANSI/HL7 V3 PC CAREPLAN, R1-2013, HL7 Version 3 Standard: Care Provision; Care Record Topic, Release 1

The care record allows healthcare professionals or facilities to send part or whole electronic patient care records that contain pertinent information about the treatment and care given to individual patients, or a care plan with future required treatment and care. Healthcare professionals or facilities can use the care record to report a health summary, or report data according to a specific profile to a quality registry, a registry for health care statistics, or for research studies.

ANSI/HL7 V3 PC CAREREC, R1-2013, HL7 Version 3 Standard: Care Provision; Queries Care Record Topic, Release 1

The May 2012 ballot of this document achieved quorum and overall positive voting. The However, there was one negative comment that has been reconciled and cause a normative change to the three query R-MIMs. The scope of this ballot is limited to those changes.

ANSI/HL7 V3 PC CARETRANS, R1-2013, HL7 Version 3 Standard: Care Provision; Care Transfer Topic, Release 1

The Care Transfer messages allow health professionals and/or healthcare facilities to send a request to another health professional or health facility to take over responsibility for the treatment and care for a patient. The receiver of the request can use the reply message to either accept the referral or deny it and explain the reason. It can be used in all health settings.

ANSI/HL7 V3 PCDIM, R1-2013, HL7 Version 3 Standard: Care Provision Domain Information Model, Release 1

The D-MIM was balloted in the May 2012 cycle. A few changes were requested by Patient Administration to allow use of the Care Provision D-MIM for their purposes. This included adding attributes to the encounter class and adding classes for location and transport. Further, some relationships and participations were added. In addition Patient Care and Patient Administration to add some other requests from PA. It are mostly these additions for PA that are ballotted this round.

ANSI/HL7 V3 PM, R1-2005 (R2014), HL7 Version 3 Standard: Personnel Management, Release 1

This document provides support for Provider and Organization messages as determined to support registry messaging. Consumer Product...
The HL7 Reference Information Model is the foundation from which all HL7 V3 information models must be derived. This American National Standard is maintained using the ANSI "continuous maintenance" process, whereby updates to the RIM are balloted annually within HL7. This is the sixth such annual update. Material changes will be noted in the Notes to Balloters of the preface. The Scope of this ballot is limited to those elements of the RIM or its controlling Vocabulary that have been adopted in Harmonization since May 2013, plus the retirement of elements that have been in a deprecated status for more than two RIM releases.

ANSI/HL7 V3 RIM, R7-2016, HL7 Version 3 Standard: Reference Information Model, Release 7

These Common Message Element Types, drawn from the Pharmacy D-MIM, that are used to express pharmacy-related information (e.g. medication orders and dispenses) in both Pharmacy R-MIMs and models created by other work groups.

ANSI/HL7 V3 RXCMET, R1-2014, HL7 Version 3 Standard: Pharmacy CMETs, Release 1

This revision of the initial topic extends existing messaging for Dispense and Supply to cover Institutional settings.

ANSI/HL7 V3 RXMDSERVNT, R2-2014, HL7 Version 3 Standard: Pharmacy; Medication Dispense and Supply Event, Release 2

This document defines a transport for HL7 content, infrastructures that are of general interest to HL7 and receivers.

ANSI/HL7 V3 SPL, R7-2016, HL7 Version 3 Standard: Structured Product Labeling, Release 7

Structured Product Labeling, Release 7 is the data exchange format to support ISO IDMP Technical Specifications. This version encompasses all EU/EMA requirements for EU implementation, utilizing HL7 SPL to support their legislative requirements for product registration and PV. It also includes an updated IDMP and CPM/SPL element mapping and gap analysis.


The Abstract Transports Specification (ATS) describes the functional characteristics of the messaging infrastructures that are of general interest to HL7 applications, such as reliable messaging, delivery assurances, addressing etc., and logical devices, such as gateways and bridges, which participate in the movement of composite messages between senders and receivers.


This document defines a transport for HL7 content, messages and documents using ebXML.


This purpose of the ebXML message transport is to provide a secure, flexible transport for exchanging HL7 messages and other content, and potentially other message formats, between message handling interfaces of ebXML Message Service Handlers (ebXML MSH). This document describes a specific implementation of the ebXML Message Service as described in "Message Service Specification Version 2.0.1 April 2002."


This document contains a description of the Minimum Lower Layer Protocol (MLLP). Release 2 extends the MLLP by providing support for a minimum interpretation of reliable messaging.

ANSI/HL7 V3 XMLTSĐT, R1-2004 (R2013), Health Level Seven Version 3 Standard: XML Implementation Technology Specification - Data Types, Release 1

The xml implementation of HL7 Abstract Data Types R1.


The document is now being published as the second release of the XML Implementation Technology Specification (XML ITS) This builds on the framework of the XML ITS R1, and introduces the following new features: # references the ISO datatypes, that serves as release 2 of the datatypes for the XML Implementation Technology Specification # include the informal extension mechanism that has been introduced in the XML Implementation Technology Specification release 1.1, allowing for the inclusion of informal extensions in the HL7 namespace to support easier version migration # default values for non-structural attributes must be included in the instance

ANSI/HL7 V3IG INFOB, R4-2014, HL7 Version 3 Implementation Guide: Context-Aware Knowledge Retrieval Application (Infobutton), Release 4

The scope of this document is to update the Implementation Guide to address new requirements and to reflect changes made to its 'parent' normative specification entitled 'Context-Aware Knowledge Retrieval, Knowledge Request Standard, Release 2

ANSI/HL7 V3ITSDATA RF, R1-2014, HL7 Version 3 Standard: hData Record Format, Release 1

The hData Record Format defines a machine-readable file format (root.xml) that describes the resources located at an hData service endpoint and the URLs needed to access them through RESTful services. The root file is accessed by clients to determine the capabilities of the service endpoint, and its conformance to one or more predefined profiles. The hData Record Format, together with the OMG hData RESTful Transport, defines an implementable solution for exchanging health resources, including, but not limited to, FHIR resources.
ANSI/HL7 V3PA PATREG, R1-2014, HL7 Version 3 Standard: Patient Administration; Patient Registry, Release 1

The Patient topic defines messages exchanged with Patient Registries. The Patient information model is not limited to persons; any type of living subject can be registered as a patient. The model includes full information about the living subject play the role of patient. The model also includes relationships between the patient and healthcare providers who have primary care and/or preferred care responsibility for the patient.


This ITS structur document includes the wire format compatible release 1 data types that confirms to Abstract Data Types 2.0, but with limited breaking of the wire format backwards compatibility with ITS Data Types Release 1.


This document includes much of the functionality introduced with Data Types R2 in that forms to Abstract Data Type 2, but with limited breaking of the wire format backwards compatibility with ITS Data Types Release 1.


The scope of this project is to produce a normative version of the Infobutton SOA implementation guide, which has been available as a DSTU for a 2-year period. The DSTU expires in March 2013. This document specifies the following: 1) REST implementations for infobutton capabilities. 2) Knowledge response payload based on the Atom Standard.

Home Innovation (NAHB Research Center, Inc.)

ANSI Z765-2003 (R2013), Square Footage - Method For Calculating

This standard describes the procedures to be followed in measuring and calculating the square footage of detached and attached single-family houses.

ANSI/ICC/ASHRAE-700-2015, National Green Building Standard

The provisions of this Standard shall apply to design and construction of the residential portion(s) of any building, not classified as an institutional use, in all climate zones. This Standard shall also apply to subdivisions, building sites, building lots, accessory structures, and the residential portions of alterations, additions, renovations, mixed-use buildings, and historic buildings.

HPS (ASC N13) (Health Physics Society)

ANSI N12.1-2015, Fissile Material Symbol

Note: the original version of this standard was administratively withdrawn many years ago because it was overage. The new/revised standard will include an existing section on shape and proportions of the fissile material symbol, and will also include an updated (electronc) figure of the proportions of the symbol. "Fissionable" material may be added to the scope. An existing section of use of the symbol will be retained and possibly expanded.

ANSI N13.1-2011, Sampling and Monitoring Releases of Airborne Radioactive Substances from the Stacks and Ducts of Nuclear Facilities

This standard sets forth guidelines and performance-based criteria for the design and use of systems for sampling the releases of airborne radioactive substances from the ducts and stacks of nuclear facilities.

ANSI N13.11-2009 (R2015), Personnel Dosimetry Performance–Criteria For Testing

This standard applies to dosimetry systems used to determine personal dose equivalent for occupational conditions and absorbed dose for accident conditions. Tests are conducted under controlled conditions and include irradiation with photons, beta particles, neutrons and selected mixtures of these radiations.

ANSI N13.12-2013, Surface and Volume Radioactivity Standards for Clearance

To provide protective guidance to protect the public and the environment for the clearance of items and materials.

ANSI N13.22-2013, Bioassay Program for Uranium

This standard provides criteria for establishing and managing a bioassay program to monitor and evaluate intakes from uranium, distributions of uranium within the body following intake, and the resulting radiation dose or possible chemical effects. Action levels are also provided in terms of measured bioassay quantities, to ensure for various uranium compounds & isotopic enrichments, that exposure to workers from internally deposited uranium will be maintained below acceptable limits.

ANSI N13.3-2013, Dosimetry for Criticality Accidents

This standard provides requirements and performance criteria for implementation and maintenance of a dosimetry system capable of providing personnel dose estimates in the event of a criticality accident.

ANSI N13.30-2011 (R2017), Performance Criteria for Radiobioassay

This standard provides criteria for radiobioassay service laboratory quality assurance, performance evaluation, and accreditation. Criteria are included for determining bias, precision, and the minimum detectable amount of a measurement procedure. Technical standards for a performance testing program are provided. This standard provides useful and practical information and guidance for users, providers, and regulators of radioassay services.

ANSI N13.32-2008, Performance Testing of Extremity Dosimeters

This standard provides a procedure for testing the performance of extremity personnel dosimetry systems used to monitor the personnel exposure to the extremities from ionizing radiation.

ANSI N13.35-2009, Specifications for the Bottle Manikin Absorption Phantom

This standard provides the specifications for the design, fabrication, and quality of new BOMAB phantoms. It is not intended to be applied to phantoms manufactured prior to the issuance of this standard.

ANSI N13.36-2001 (R2011), Ionizing Radiation Safety Training for Workers

This standard provides criteria for implementing ionizing radiation safety training. This standard applies to all individuals who may be in the course of their work encounter radioactive materials and/or radiation areas. It is not intended to replace regulatory or contractual training requirements nor does it address ionizing radiation safety training as part of an academic program of study.


Provide environmental radiation specialists and state and federal regulatory agencies with guidance to the application, methods of use, and testing of thermoluminescence dosimetry systems.

ANSI N13.39-2001 (R2011), Design of Internal Dosimetry Programs

Contains the essential elements of the internal dosimetry component of a radiation protection program. This standard provides general policies and the framework for the design and implementation of an acceptable internal dosimetry program. The topics included in this standard are definitions, organization, staffing and training, program documentation, quality assurance, personnel participation, internal dose assessment, incident response, and records and reports.

ANSI N13.41-2011, Criteria for Performing Multiple Dosimetry

The criteria in this standard provide guidance for when to monitor with multiple dosimeters and where to place such dosimeters, and the interpretation and recording of results after the dosimeters are processed or evaluated.

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This standard defines the thyroid phantom that is to be used for occupational monitoring of workers exposed to radionuclides. Specifications are given for phantom geometry, construction materials, etc. Optimal use and errors arising from incorrect use will be detailed.

This standard applies to the manufacture, operation of security screening systems using x-ray or gamma radiation. Applies to the manufacture & operation of security screening systems that use x-rays, gamma radiation or both in which individuals are intentionally exposed to this ionizing radiation. Does not address neutron-based systems. The standard provides requirements specific to the ionizing radiation safety aspects of both the design and operation of these systems. It does not include electrical safety guidelines or any other safety, performance or use considerations outside of the realm of radiation safety.

This standard applies to the manufacture & operation of security screening systems that use x-rays, gamma radiation or both in which individuals are intentionally exposed to this ionizing radiation. Does not address neutron-based systems. The standard provides requirements specific to the ionizing radiation safety aspects of both the design and operation of these systems. It does not include electrical safety guidelines or any other safety, performance or use considerations outside of the realm of radiation safety.

This standard applies to panoramic, wet source storage gamma irradiators (Category IV) and dry source storage gamma irradiators (Category II).

This standard applies to panoramic, wet source storage gamma irradiators (Category IV) and dry source storage gamma irradiators (Category II) that contain sealed gamma emitting sources for the irradiation of objects or materials. It establishes the criteria to be used in the proper design, fabrication, installation, use, and maintenance of these irradiators which will ensure a high degree of radiation safety.

This standard applies to incineration of mixed wastes, i.e., radioactive wastes that contain other hazardous components as defined by federal or state agencies, provided consideration is given to additional design features and regulatory permitting required by the hazardous nature of the wastes.

This standard provides guidelines for the usage of the radiation symbol and the size, shape and location of the symbol for the protection of workers in indoor environments. Does not address neutron or gamma exposure or other safety, performance or use considerations.

This standard provides guidance for performing characterizations of land areas and structures in support of decommissioning.

This standard provides guidance for performing characterizations of land areas and structures in support of decommissioning.

This standard applies to self-contained, wet source storage irradiators (Category III) that contain sealed gamma emitting sources for the irradiation of objects or materials. The standard establishes the criteria to be used in the proper design, fabrication, installation, use, and maintenance of these irradiators which will ensure a high degree of radiation safety at all times.

This standard applies to panoramic, wet source storage gamma irradiators (Category IV) and dry source storage gamma irradiators (Category II) that contain sealed gamma emitting sources for the irradiation of objects or materials. It establishes the criteria to be used in the proper design, fabrication, installation, use, and maintenance of these irradiators which will ensure a high degree of radiation safety.
This standard establishes guidance for the design and use of common types of installations that use x-ray generating devices and sealed gamma-ray sources, of energies up to 10 MeV, for non-medical purposes. Its main objectives are to keep the exposure of persons to radiation to levels as low as reasonably achievable (ALARA), and to ensure that no one receives greater than the maximum permissible dose equivalent.

This standard establishes the classification of certain radioactive self-luminous light sources according to radionuclide, type of source, activity and performance requirements. The standard does not attempt to establish design or safety standards, but leaves the design features to the judgment of the supplier and user, provided that the performance requirements are met.

This standard provides guidelines specific to the radiation safety aspects of the design of non-medical x-ray equipment operating at energies below 1 MeV for radiographic and radioscopic applications, wherein the x-rays are generated by electronic means.

This standard establishes a system of classification for sealed radioactive sources based on performance specifications related to radiation safety.

This standard applies to self-contained, direct acting, single contained, dry source storage irradiators (Category I) that contain sealed gamma or beta emitting sources for the irradiation of objects or materials. The standard establishes the criteria to be used in the proper design, fabrication, installation, use, and maintenance of these irradiators which will ensure a high degree of radiation safety. This standard applies to irradiator designs produced after the date of this publication. This standard is not a substitute for regulations. Nothing in this standard relieves persons from complying with applicable Federal and State requirements governing the use of these irradiators or devices.

This standard applies to radiation gauging devices that use sealed radioactive sources or machine-generated sources for the determination or control of thickness, density, level, interface location, particle size distribution or qualitative or quantitative chemical composition. Establishes a system for classification of the gauging devices based on performance specifications relating to radiation safety.

This standard specifies the design, testing and performance requirements for industrial gamma radiography equipment using radiation emitted by a sealed radioactive source.

The standard establishes a system of classification of the gauging devices based on chemical composition. Establishes a system for specification related to radiation safety.

This standard provides a framework to assist organizations to adhere to quality continuing education and training practices. The framework includes the establishment of an appropriate responsibility and control system; the adoption of an analytic approach to establishing learning needs; a plan to establish and execute a quality learning event; the establishment of appropriate assessment criteria based on the learning outcomes; and the need to monitor and improve the learning process to achieve desired learning outcomes.
ANSI/ASSE 1012-2009, Performance Requirements for Backflow Preventer with Intermediate Atmospheric Vent

Backflow Preventers with Intermediate Atmospheric Vent are installed in the plumbing system to prevent backflow into potable water lines due to the creation of back pressure or backsiphonage.

ANSI/ASSE 1013-2011, Performance Requirements for Reduced Pressure Principle Backflow Preventers and Reduced Pressure Principle Fire Protection Backflow Preventers

The purpose of a Reduced Pressure Principle Backflow Preventer and a Reduced Pressure Principle Fire Protection Backflow Preventer (herein referred to as the ‘assembly’) is to keep contaminated water from flowing back into a potable water distribution system when some abnormality in the system causes the pressure to be temporarily higher in the contaminated part of the system than in the potable water supply piping.

ANSI/ASSE 1015-2011, Performance Requirements for Double Check Backflow Prevention Assemblies and Double Check Fire Protection Backflow Prevention Assemblies

The purpose of Double Check Backflow Prevention Assemblies and Double Check Fire Protection Backflow Prevention Assemblies (herein referred to as the ‘assembly’) is to keep polluted water from flowing into a potable water distribution system when some abnormality in the system causes the pressure to be temporarily higher in the polluted part of the system than in the potable water supply piping.

ANSI/ASSE 1016-2016/ASME A112.1016-2016/CSA B125.16-16, Performance Requirements for Automatic Compensating Valves for Individual Showers and Tub/Shower Combinations

This Standard applies to automatic compensating valves intended to be installed at the point of use, where the user has access to flow or final temperature controls, and where no further mixing occurs downstream of the device. This Standard covers automatic compensating valves intended to control the water temperature to wall or ceiling mounted: (a) hand-held showers; (b) shower heads; (c) body sprays either in individual shower or tub/shower combination fittings; and (d) tub spouts when part of tub/shower combination fittings.

ANSI/ASSE 1017-2009, Performance Requirements for Temperature Actuated Mixing Valves for Hot Water Distribution Systems

Temperature actuated mixing valves for hot water distribution systems are used for controlling in-line water temperature in domestic hot water systems and shall be installed at the hot water source. They are not intended for end use applications including emergency eyewash and shower equipment.

ANSI/ASSE 1019-2011 (R2016), Performance Requirements for Wall Hydrant with Backflow Protection and Freeze Resistance

The purpose of a Wall Hydrant with Backflow Protection and Freeze Resistance is to provide protection of the potable water supply from contamination due to backsiphonage or backpressure and to protect the hydrant from damage due to freezing. When emailing, please have “PR1019” in the subject line.

ANSI/ASSE 1022-2017, Performance Requirements for Backflow Preventers for Beverage Dispensing Equipment

Backflow Preventer for Beverage Dispensing Equipment (referred to as ‘device’ in this standard) is engineered for installation in carbonated post-mix dispensing systems. This standard covers a backflow prevention device designed to protect the potable water supply serving beverage dispensing equipment. These devices are intended for use under continuous or intermittent pressure conditions. These devices shall consist of two independently acting check valves biased to a normally closed position. An atmospheric port shall be located between the check valves and shall be biased to a normally open position. The port shall vent liquids, gases, or both, under backflow conditions.

ANSI/ASSE 1030-2016, Performance Requirements for Positive Pressure Reduction Devices for Sanitary Drainage Systems

Positive pressure reduction devices are to be used in building drainage waste and vent (DWV) systems. They are intended to reduce the impact of short duration air pressure transients which arise in DWV networks through use. They are not intended to have any effect on long duration or steady-state offsets in air pressure.

ANSI/ASSE 1032-2011, Performance Requirements for Dual Check Valve Type Backflow Preventers for Carbonated Beverage Dispensers, Post Mix Type

Dual check valve type backflow preventers (for carbonated beverage dispensers - post mix types) prevent carbon dioxide gas and carbonated water from backflowing into the potable water system which supplies the carbonating unit. These devices operate under continuous or intermittent pressure conditions.

ANSI/ASSE 1035-2008, Performance Requirements for Laboratory Faucet Backflow Preventers

Laboratory Faucet Backflow Preventers are designed to protect the potable water supply from pollutants or contaminants which enter the system by backflow due to back siphonage or back pressure.


This Standard covers pressurized flushing devices (PFDs) intended to flush water closets, urinals, and other plumbing fixtures and specifies requirements for materials, design, methods of operation, test methods, and markings.

ANSI/ASSE 1044-2015, Performance Requirements for Trap Seal Primer - Drainage Types and Electric Design Types

Trap Seal Primers are designed primarily to supply water to floor drain traps which have infrequent use and in which water evaporation would allow sewer gas to enter the premises. The trap seal primers covered by this standard are designed to supply water to a drain trap to provide and maintain its water seal using a supply from a fixture drainline, balcock, or flushometer valve tailpiece or an electric trap seal primer. The rate of water flow to the trap shall be permitted to be fixed or adjustable.

ANSI/ASSE 1047-2011, Performance Requirements for Reduced Pressure Detector Fire Protection Backflow Prevention Assemblies

The purpose of a Reduced Pressure Detector Fire Protection Backflow Prevention Assembly (herein referred to as the ‘assembly’) is to keep contaminated water from backflowing into the potable water system due to back siphonage or back pressure. Temporary water distribution systems when some abnormality in the system causes the pressure to be temporarily higher in the contaminated part of the system than in the potable water supply piping. These assemblies are designed to detect low rates of flow up to 2.0 GPM (7.6 L/m) caused by leakage or unauthorized use.

ANSI/ASSE 1048-2011, Performance Requirements for Double Check Detector Fire Protection Backflow Prevention Assemblies

The purpose of a Double Check Detector Fire Protection Backflow Prevention Assembly (herein referred to as the ‘assembly’) is to keep polluted water from fire protection systems from flowing into a potable water distribution system when some abnormality in the system causes the pressure to be temporarily higher in the contaminated part of the system than in the potable water supply piping. These assemblies are designed to detect low rates of flow up to 2.0 GPM (7.6 L/m) caused by leakage or unauthorized use.

ANSI/ASSE 1049-2010, Performance Requirements for Individual and Branch Type Air Admittance Valves (AAV’s) for Chemical Waste Systems

These are individual and branch type AAV’s for chemical waste systems to prevent the siphonage of trap seals for individual and multiple fixtures and prevent sewer gases from entering the building.
ANSI/ASSE 1050-2010, Performance Requirements for Stack Air Admittance Valves (AAV's) for Sanitary Drainage Systems
These stack AAV’s are used in the plumbing drainage system to prevent siphonage of water trap seals and are installed on stacks where branches on multiple floors are connected and prevent sewer gases from entering the building.

ANSI/ASSE 1051-2010, Performance Requirements for Individual and Branch Type Air Admittance Valves (AAV’s) for Sanitary Drainage Systems
These individual and branch type AAV’s are used in the plumbing drainage system to prevent the siphonage of water trap seals for individual fixtures or horizontal branch serving multiple fixtures and to prevent sewer gases from entering the building.

ANSI/ASSE 1052-2016, Performance Requirements for Hose Connection Backflow Preventers
This standard establishes design requirements, basic performance requirements and test procedures for hose connection backflow preventers. This device is designed to be installed on the discharge side of a hose threaded outlet on a potable water system. This two-check device protects against backflow, due to backspimensional or low-head backpressure, and is field testable to certify protection under the high hazard conditions present at a hose threaded outlet. This device shall only be used on systems where there is low-head backpressure which does not exceed that generated by an elevated hose equal to or less than 10 feet (3.0 m) in height.

ANSI/ASSE 1055-2016, Performance Requirements for Chemical Dispensing Systems
Chemical dispensing systems provide a means of mixing potable water with chemicals to provide the user with a chemical solution which is ready for use. The amount of dilution shall be fixed or adjustable. This standard applies to those devices classified as chemical dispensing systems having a self-contained means of backflow protection.

ANSI/ASSE 1056-2013, Performance Requirements for Spill Resistant Vacuum Breaker Assemblies
These assemblies are installed in the potable water supply lines to prevent the backflow of non-potable material into the potable water supply caused by backspimensional and other pressure conditions. They are designed for installation in those portions of the domestic potable water systems that are normally under continuous pressure conditions. The assembly includes one check valve force-loaded closed and an air inlet vent valve force loaded open to atmosphere, positioned downstream of the check valve, and located between and including two tightly closing shut-off valves and two test cocks.

ANSI/ASSE 1057-2012, Performance Requirements for Freeze Resistant Sanitary Yard Hydrants with Backflow Protection
The purpose of freeze resistant sanitary yard hydrants is to supply potable water without danger of damage to the device due to freezing, to provide protection of the potable water supply from contamination due to ground water, and to prevent backflow in accordance with the backflow prevention device selected.

ANSI/ASSE 1060-2017, Performance Requirements for Outdoor Enclosures for Fluid Carrying Components
This standard details the requirements of outdoor enclosures for fluid conveying components for freezing and non-freezing locations. These enclosures are designed to protect backflow prevention assemblies and devices, water/gas meters, control valves, pressure reducing valves, air release valves, pumps, and other components installed outdoors requiring protection from freezing and/or system security. When emailing, please have “PR1060” in the subject line.

ANSI/ASSE 1061-2015, Performance Requirements for Push-Fit Fittings
Establishes the minimum performance requirements for push-fit fittings as an alternative method of connecting fittings with valves and tubing on potable water distribution systems and hydronic heat systems. There are other applications for push-fit fittings, including compressed air systems and gas piping systems, however the performance requirements and tests in this standard were developed for fittings installed in potable water distribution systems and hydronic heat systems only.

ANSI/ASSE 1062-2006, Performance Requirements for Temperature Actuated, Flow Reduction Valves for Individual Supply Fittings
This standard applies to Temperature Actuated, Flow Reduction Valves for Individual Supply Fittings which react to high temperature water. They are operated either mechanically or electrically, and are installed in-line with or integrated into supply fittings. They automatically reduce flow within 5 seconds to 0.25 GPM (0.95 L/m) or less at 80.0 psi (551.6 kPa) in response to outlet temperatures greater than a preset actuation temperature not to exceed 120.0°F &#176;F (48.9 °C) so as to limit exposure to high temperature water discharged from an individual supply fitting.

ANSI/ASSE 1063-2016, Performance Requirements for Air Valve and Vent Inflow Preventers
The purpose of Air Valve and Vent Inflow Preventer Assemblies is to allow the release and admission of high volumes of air through air valves and air vents in potable water distribution systems but prevent the entry of contaminated water when the air valve outlet becomes submerged from flooding or is the target of malicious tampering.

ANSI/ASSE 1064-2006 (R2011), Performance Requirements for Backflow Prevention Assembly Field Test Kits
Covers the performance requirements and accuracy of a BFTK. This standard is confined to analog dial type and digital instrumentation. Duplex gauges are not a part of this standard.

This standard covers water temperature limiting devices intended to limit the hot or tempered water temperature supplied to fittings for fixtures such as sinks, bidets, lavatories, and bathtubs to reduce the risk of scalding. These devices are not designed to address thermal shock.

ANSI/ASSE 1071-2012, Performance Requirements for Temperature Actuated Mixing Valves for Plumbed Emergency Equipment
These devices shall consist of a hot water inlet connection, a cold water inlet connection, a mixed water outlet connection, a temperature controlling element, and a means for adjusting the mixed water outlet temperature while in service. The device shall also have a means to limit the maximum outdoor temperature under normal operating conditions. Provisions shall be made so that the temperature cannot be inadvertently adjusted.

ANSI/ASSE 1079-2012, Performance Requirements for Dielectric Pipe Unions
Dielectric Pipe Unions are used to join dissimilar pipe materials to prevent the flow of galvanic current or to isolate sections of pipe from stray currents which would cause accelerated corrosion and premature failure of plumbing components and associated piping.

ANSI/ASSE 1081-2014, Backflow Preventers with Integral Pressure Reducing Boiler Feed Valve and Intermediate Atmospheric Vent Style for Domestic and Light Commercial Water Distribution Systems
The devices covered by this standard are multi-functional products combined integrally in a single housing or manifold to provide the required features in a compact format that is serviceable and easily installed. These devices are intended to provide the same benefits and features as the products individually manufactured and qualified under ASSE-1003-2009 ‘Water Pressure Reducing Valves for Domestic Water Distribution Systems’; and ASSE 1012-2009 ‘Backflow Preventer with Intermediate Atmospheric Vent’ except where specific limitations have been applied to suit residential and light commercial boiler feed and applications.
ANSI/ASSE Series 10000-2011 (R2015), Professional Qualifications Standard for Green Plumbing Systems Installers
This standard applies to an individual who installs green plumbing systems and provides layout, detail and calculations for such systems. The purpose is to provide minimum performance criteria for green plumbing system installers.

This series sets minimum criteria for the training and certification of employers and pipe trades, and other construction and maintenance personnel, on how to safely work where potentially deadly diseases may be present. The standards provide general knowledge of pathogens, biohazards and infectious diseases for plumbing, piping, and mechanical systems workers who have the potential for exposure to pathogens, biohazards or OPIM. It also provides general knowledge about contamination/infection prevention procedures to protect facility occupants and operations.

ANSI/ASSE Series 13000-2015, Service Plumber and Residential Mechanical Service Technician Professional Qualifications Standard
This standard applies to individuals who service, maintain and repair plumbing systems or who service, maintain, and repair residential mechanical systems.

This standard applies to a qualified individual who provides inspection, testing and maintenance for water-based fire protection systems for compliance with installation, inspection, testing and maintenance standards.

ANSI/ASSE Series 16000-2012, Professional Qualifications Standard for the Plumbing Inspector
Applies to an individual who inspects plumbing systems. The purpose of this standard is to provide minimum performance criteria, identified by industry consensus, for Plumbing Inspectors.

ANSI/ASSE Series 17000-2012, Professional Qualifications Standard for the Mechanical Inspector
This standard provides minimum performance criteria, identified by industry consensus, for Mechanical System Inspectors.

This standard establishes uniform minimum requirements for qualified rainwater catchment systems installers, designers and inspectors.

ANSI/ASSE Series 6000-2015, Professional Qualifications Standard for Medical Gas Systems Personnel
This standard establishes uniform minimum requirements for qualified Medical Gas Systems Installers, Medical Gas Systems Verifiers, Medical Gas Systems Maintenance Personnel, Medical Gas Systems Instructors, Bulk Medical Gas Systems Installers, Bulk Medical Gas Systems Verifiers and Bulk Medical Gas Systems Instructors. In addition, these standards give uniform requirements for third-party certifiers so that individuals can be certified to these standards.

ANSI/ASSE Series 7000-2013, Professional Qualifications Standard for Residential Potable Water Fire Protection System Installers & Inspectors for One and Two Family Dwellings
This standard applies to an individual who provides layout, detail, and calculations for residential potable-water fire-protection systems for one- and two-family dwellings and who installs such systems, and to an individual who inspects residential potable-water fire-protection systems for one- and two-family dwellings.

ANSI/ASSE Series 8000-2011 (R2015), Self-Contained Breathing Apparatus (SCBA) Replenishment Systems Professional Qualifications Standard
This standard applies to any individual who installs and/or inspects Self-Contained Breathing Apparatus (SCBA) Replenishment systems. Installers include anyone who works on or installs piping or components, including welders. Inspectors include anyone who inspects the installation of SCBA replenishment systems. SCBA replenishment systems and equipment covered in this standard include structures within the scope of the IAPMO UPC 2009, Uniform Plumbing Code, Appendix F, Firefighter Breathing Air Replenishment Systems.

This standard applies to any individual who installs and/or inspects firestop systems or smoke-limiting materials. It establishes minimum requirements for the training and qualifications of installers and inspectors of firestop systems or smoke-limiting materials.

ANSI/IAPMO Series 19000-2015, Hydronic Systems Professional Qualifications Standard
These standards establish the uniform minimum requirements for qualified individuals who install and maintain solar water heating systems, install and maintain hydronic based heating and cooling systems, and who design hydronic based heating and cooling systems.

ANSI/IAPMO Series 5000-2015, Cross-Connection Control Professional Qualifications Standard
This standard establishes uniform minimum requirements for qualified backflow prevention assembly testers, cross-connection control surveyors, backflow prevention assembly repairers, fire-protection system cross-connection control testers and backflow prevention program administrators.

IAPMO (International Association of Plumbing & Mechanical Officials)
ANSI/IAPMO UMC 1-2015, Uniform Mechanical Code
Provides minimum standards to safeguard life or limb, health, property and public welfare by regulating and controlling the design, construction, installation, quality of materials, location, operation and maintenance or use of plumbing systems. The provisions of this code apply to the erection, installation, alteration, repair, relocation, replacement, addition to, use or maintenance of mechanical systems.

ANSI/IAPMO UPC 1-2015, Uniform Plumbing Code
This code provides minimum standards and requirements to safeguard life or limb, health, property and public welfare by regulating and controlling the design, construction, installation, quality of materials, location, operation and maintenance or use of plumbing systems. The provisions of this code apply to the erection, installation, alteration, repair, relocation, replacement, addition to, use or maintenance of plumbing systems.

ANSI/IAPMO USEHIC 1-2015, Uniform Solar Energy and Hydronics Code
Applies to the erection, installation, alteration, repair, relocation, replacement, addition to, use, or maintenance of solar energy, geothermal and hydronic systems including but not limited to equipment and appliances intended for space heating or cooling; water heating; swimming pool heating or process heating; and snow and ice melt systems.

The provisions of this code shall apply to the erection, installation, alteration, addition, repair, relocation, replacement, addition to, use or maintenance of swimming pool, spa or hot tub systems.
ANSI (International Association of Plumbing & Mechanical Officials)

ANSI S1001.1-2013, Design and Installation of Solar Water Heating Systems

1.1 This Standard specifies requirements for the design and installation of pre-engineered solar water heating systems intended to be installed as stand-alone systems or in conjunction with auxiliary water heaters, including component selection and sizing criteria. 1.2 This Standard does not cover: (a) existing water heating equipment; (b) systems engineered for discrete or site-specific applications; (c) performance and durability testing of collectors or solar water heating system components; and (d) design and installation of solar photovoltaic systems.


This Standard specifies test methods to determine roof drain systems performance by measuring flow rates based on the water head and the piping configurations specified in this Standard, for drains in sizes NPS-2 to NPS-6.

ANSI/CSA B45.11/IAPMO Z401-2011 (R2017), Glass plumbing fixtures

This Standard covers lavatories and sinks made of glass and specifies test methods, performance requirements, and marking requirements.

ANSI/CSA B45.12/IAPMO Z402-2013, Aluminum and copper plumbing fixtures

This Standard covers aluminum and copper plumbing fixtures and specifies requirements for materials, construction, performance, testing, and markings of these fixtures. This Standard covers the following plumbing fixtures: (a) bathtubs and combination tub/showers; (b) lavatories; (c) shower bases and shower stalls; and (d) sinks: (i) bar sinks; (ii) kitchen sinks; (iii) laundry sinks; (iv) service sinks; and (v) drinking fountains.

ANSI/CSA B45.13/IAPMO Z1700-2014, Vacuum water collection systems

This Standard covers vacuum water collection systems intended to extract and transport water, condensate from refrigerators, sanitary waste, greywater, or grease and specifies requirements for materials, construction, performance testing, and markings.

ANSI/CSA B45.5/IAPMO Z124-2016, Plastic plumbing fixtures

This Standard covers plastic plumbing fixtures and specifies requirements for materials, construction, performance, testing, and markings. 1.2 This Standard covers the following plumbing fixtures: (a) bathtubs and combination tub/showers; (b) lavatories; (c) shower bases and shower stalls; (d) sinks: (i) bar sinks; (ii) kitchen sinks; (iii) laundry sinks; and (iv) service sinks; (e) urinals; and (f) water closets.

ANSI/CSA B45.8/IAPMO Z403-2013, Terrazzo, concrete, and natural stone plumbing fixtures

1.1 This Standard covers terrazzo, concrete, and natural stone plumbing fixtures and specifies requirements for materials, construction, performance, testing, and markings of these fixtures. 1.2 This Standard covers the following plumbing fixtures: (a) bathtubs and combination tub/showers; (b) lavatories; (c) shower bases and shower stalls; and (d) sinks: (i) bar sinks; (ii) kitchen sinks; (iii) laundry sinks; (iv) service sinks; and (v) wash fountains.

ANSI/IAPMO S1001.4-2015, Energy Production Rating of Solar Heating Collectors

This Standard specifies the procedures used to determine energy production ratings of solar heating collectors, which provide a basis for comparing the relative thermal performance of various solar collector technologies when evaluated under identical rating conditions. Ratings help users of solar heating products make an informed decision regarding the choice of collector with respect to thermal performance in a variety of end-use applications.

ANSI/IAPMO Z1000-2013, Prefabricated Septic Tanks

This Standard covers prefabricated septic tanks made of concrete, fiber-reinforced polyester (FRP), thermoplastic, or steel, intended for use in residential or commercial sewage disposal systems, and specifies design, material, performance testing, and marking requirements.

ANSI/IAPMO Z1001-2016, Prefabricated Gravity Grease Interceptors

1.1 This Standard covers prefabricated gravity grease interceptors made of concrete, fiber-reinforced polyester (FRP), thermoplastic, or steel and specifies requirements for design, materials, performance, testing, and markings.

ANSI/IAPMO Z1002-2014, Rainwater Harvesting Tanks

1.1 This Standard covers rainwater harvesting tanks and specifies requirements for design, materials, manufacture, performance testing, and markings. 1.2 Rainwater harvesting tanks covered by this Standard are (a) made of (i) rigid (i.e., concrete, fiber-reinforced polyester, steel, thermoplastics, and wood); or (ii) flexible materials (i.e., vinyl-coated polyester); (b) prefabricated or assembled at the site of final installation; and (c) intended for outdoor use, or for indoor use in accessible locations; or (d) intended for stationary (i.e., fixed) installations only; and (e) for indoor applications; and (f) for atmospheric pressure (i.e., non-pressurized) applications.

ANSI/IAPMO Z1033-2015, Flexible PVC Hoses and Tubing for Pools, Hot Tubs, Spas, and Jetted Bathtubs

This Standard covers flexible PVC hoses and tubing for use on pools, hot tubs, spas, and jetted bathtubs and specifies requirements for materials, physical characteristics, performance tests, and markings. Flexible PVC hoses and tubing covered by this Standard are intended to be used on hot tub, spa, and jetted bathtub (a) water circulation systems; and (b) pneumatic systems.

ANSI/IAPMO Z1088-2013, Pre-Pressurized Water Expansion Tanks

This Standard covers pre-pressurized water expansion tanks intended for use in potable and non-potable water systems and specifies requirements for physical characteristics, performance testing, and markings.

ANSI/IAPMO Z1157-2014, Ball Valves

This Standard covers ball valves in sizes NPS-1/8 to NPS-4, with minimum rated working pressures of 860 kPa (125 psi) at 23 ± 2 ºC (73 ± 4ºF), intended for use in water supply and distribution systems and specifies requirements for materials, physical characteristics, performance, and markings.

ANSI/IAPMO Z124.5-2013, Plastic Toilet Seats

This standard covers plastic toilet seats (including toilet seat covers) and specifies requirements for materials, construction, performance testing, and markings.

ANSI/IAPMO Z124.7-2013, Prefabricated Plastic Spa Shells

This standard covers prefabricated plastic spa shells and specifies requirements for materials, construction, performance testing, and markings.

ANSI/IAPMO Z600/CSA B125.5-2011 (R2017), Flexible water connectors with excess flow shut-off devices

This Standard specifies test methods and markings for flexible water connectors with excess flow shut-off devices. The devices covered by this Standard are intended to be used in water supply systems under (a) continuous pressure in accessible locations; or (b) intermittent pressure in recreational vehicles.

ICC (ASC A117) (International Code Council)


Site design and architectural features affecting the accessibility and usability of buildings and facilities, consideration to be given to all types of physical and sensory disabilities, to publicly used buildings and facilities, and to residential structures.

ICC (International Code Council)

ANSI/ASABE/ICC 802-2014, Standard for Turfgrass and Landscape Irrigation Sprinklers and Emitters

Increased emphasis on water conservation and new product designs have lead to the need for standards to establish criteria for product performance, design, construction, and durability. The development of standards will facilitate the creation of water efficiency specifications for these products from programs such as US EPA’s WaterSense program. Standards will also ensure interoperability of products produced by different manufacturers.
ANSI/ICC 300-2012, Standard for Bleachers, Folding and Telescopic Seating, and Grandstands
Develops appropriate, reasonable, and enforceable model health and safety provisions for new and existing installations of all types of bleachers and bleacher-type seating, including fixed and folding bleachers for indoor, outdoor, temporary and permanent installations. Such provisions would serve as a model for adoption and use by enforcement agencies at all levels of government in the interest of national uniformity.

Provides technical design and performance criteria that will facilitate and promote the design, construction, and installation of safe and reliable structures constructed of log timbers.

The objective of this Standard is to provide technical design and performance criteria that will facilitate and promote the design, construction, and installation of safe, reliable, and economical storm shelters to protect the public. It is intended that this Standard be used by design professionals, storm shelter designers, manufacturers, and constructors, building officials, emergency management personnel, and government officials to insure that storm shelters provide a consistently high level of protection to the sheltered public.

ANSI/ICC 600-2013, Standard for Residential Construction in High-Wind Regions
The Standard for Residential Construction in High-Wind Regions will specify prescriptive methodologies of wind resistant design and construction details for buildings and other structures of wood framed, steel framed, concrete, or masonry construction sited in high-wind areas. This standard will provide prescriptive details for walls, floors, roofs, foundations, windows, doors, and other applicable components of construction.

This standard establishes minimum requirements for the system design, performance evaluation, and installation instructions of solar water heating systems. This standard establishes a methodology for rating the performance of solar water heating systems based on performance projections and solar collector test data. This standard is applicable to residential and commercial solar water heating systems intended for use within swimming pool heating, building space heating, building space cooling, and/or water heating systems. It is applicable to both direct and indirect solar water heating systems.

ANSI/ICC 901/SRCC 100-2015, Standard for Solar Thermal Collectors
This standard establishes minimum requirements for the design, construction, performance and testing of liquid and air heating solar thermal collectors, including those containing distributed assembly and integral concentrating components and integral storage and non-separable thermosiphon units. This standard is applicable to solar collectors intended for use within swimming pool and spa heating, building space heating and cooling, water heating systems, industrial/commercial process heating, and thermal input to electrical power production systems.

ICE (Institute for Credentialing Excellence)
ANSI/NOCA 1100-2009, Assessment Based Certificate Programs
This standard pertains to assessment-based certificate programs defined as a non-degree granting program that: a) provides training to aid participants in acquiring specific knowledge, skills, and/or competencies; b) evaluates participants’ achievement of the intended learning outcomes; and c) awards a certificate only to those participants who meet the performance, proficiency, or passing standard for the assessment(s). This standard is NOT intended to cover classes, courses, programs, or events that award only a certificate of attendance or participation, nor is it intended to apply to professional or personnel certification programs.

IEEE (ASC C2) (Institute of Electrical and Electronics Engineers)
These rules cover supply and communication lines, equipment, and associated work practices employed by a public or private electric supply, communications, railway, or similar utility in the exercise of its function as a utility. They cover similar systems under the control of qualified persons, such as those associated with an industrial complex or utility interactive system.

IEEE (ASC C63) (Institute of Electrical and Electronics Engineers)
ANSI C63.10-2013, Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
This standard provides procedures for testing the compliance of a wide variety of unlicensed wireless devices (transmitters), including but not limited to: remote control and security unlicensed wireless devices, frequency hopping and direct sequence spread spectrum devices, anti-pirferage devices, cordless telephones, wireless medical unlicensed wireless devices, Unlicensed National Information Infrastructure devices, intrusion detectors, unlicensed wireless devices operating on frequencies below 30 MHz, automatic vehicle identification systems, and other unlicensed wireless devices authorized for operation by a radio regulatory authority.

ANSI C63.12-2015, Standard Recommended Practice for Electromagnetic Compatibility Limits and Test Levels
The main purpose of this recommended practice is to aid manufacturers who might need to modify the emissions their products generate (as long as regulatory limits are met) to meet for example intra-system needs for their products. There might also be a need to have different (higher) immunity test levels than what is typically required if the product will be used in severe electromagnetic environments. As the use of electronics is constantly changing (e.g., the Smart Grid [B9]), the test methods, immunity test levels and emission limits likewise need to be periodically reviewed to assure that EMC is maintained.

ANSI C63.14-2014, Standard Dictionary of Electromagnetic Compatibility (EMC) including Electromagnetic Environmental Effects (E3)
This standard provides definitions of terms associated with electromagnetic environmental effects including electromagnetic compatibility (EMC), electromagnetic pulse (EMP), and electrostatic discharge (ESD). In addition to definitions, several symbols and abbreviations are included.

ANSI C63.15-2010, Recommended Practice for Immunity Measurement of Electrical and Electronic Equipment
This document presents alternative methods for making emission measurements for the frequency range of 30 Hz to 10 GHz, which complement the recommended procedures. The combination of these alternative methods and the recommended measurement procedures provides a structured method to ensure electromagnetic compatibility of products in the existing radio frequency environment.

ANSI C63.16-2016, Guide for Electrostatic Discharge Test Methodologies and Criteria for Electronic Equipment
This guide provides electrostatic discharge (ESD) test considerations that a manufacturer should use in assessing the expected ESD effects on products in a range of environments and customer use. The focus is well beyond that used to simply show that a product complies with a local, regional, or international standard or regulation. The following are included: charged peripheral testing, connector pin testing, and details on the use of ESD simulators.

ANSI C63.19-2011, Methods of Measurement of Compatibility between Wireless Communications Devices and Hearing Aids
This standard applies to both wireless communications devices (WDs) and hearing aids...

ANSI C63.2-2016, American National Standard for Electromagnetic Noise and Field Strength Instrumentation, 10 Hz to 40 GHz Specifications
This standard specifies requirements for measuring receivers (i.e., EMI receivers and spectrum analyzers with and without preselection) used for radiated and conducted measurements. Specifications relate to the test equipment itself, not transducers like antennas, LISNs or current probes.
This standard specifies key performance indicators (KPIs) that can be used to assess the ability of the equipment under test (EUT) to coexist with other equipment in its intended operational environment.

This standard provides methods for determining antenna factors (AFs) and associated parameters of antennas used to perform radiated emission measurements in electromagnetic interference (EMI) control from 9 kHz to 40 GHz.

This standard extends the application of the document to use above 1 GHz extending up to 18 GHz and is thus applicable for the use with ANSI C63.4. While there is no site validation method available above 18 GHz, the changes are considered appropriate guidance for use up to 40 GHz. As construction guidance is different in some cases for sites below 1 GHz and for sites above 1 GHz, the material is broken into clauses that apply to these two frequency ranges and the most used test facilities. Where the same guidance holds and is frequency independent, that guidance will also be in an introductory clause to the provisions for both frequency ranges.

This edition of ANSI C63.7 extends the application of the document to use above 1 GHz extending up to 18 GHz and is thus applicable for the use with ANSI C63.4. While there is no site validation method available above 18 GHz, the changes are considered appropriate guidance for use up to 40 GHz. As construction guidance is different in some cases for sites below 1 GHz and for sites above 1 GHz, the material is broken into clauses that apply to these two frequency ranges and the most used test facilities. Where the same guidance holds and is frequency independent, that guidance will also be in an introductory clause to the provisions for both frequency ranges.

IEEE C63.17-2013, Standard Methods of Measurement of the Electromagnetic and Operational Compatibility of Unlicensed Personal Communications Services (UPCS) Devices

Specific test procedures are established for verifying the compliance of unlicensed personal communications services (UPCS) devices with applicable regulatory requirements regarding radio-frequency (RF) emission levels and spectrum access procedures.

IEEE C63.18-2014, Recommended Practice for an Onsite, AdHoc Test Method for Estimating Electromagnetic Immunity of Medical Devices to Radiated Radio-Frequency (RF) Emissions from RF Transmitters

Revision of ad hoc test methods for better practicality, reliability, and to harmonize with other relevant standards and technical reports

IEEE C63.22-2004 (R2012), Standard Guide for Automated Electromagnetic Interference Measurements

The purpose of this document is to provide guidelines for the use of automated test equipment (ATE) for the measurement of electromagnetic emissions of electronic, electrical, and electro-mechanical equipment. It is intended to be a companion document to ANSI C63.2-1996 and ANSI C63.4-2003 for making accurate and repeatable automated emissions measurements from 9 kHz to 1 GHz according to commercial EMI regulations.


This standard is intended to provide measurement laboratories with guidelines and generally accepted laboratory practices in the determination of EMI measurement uncertainties. The primary application of this edition of ANSI C63.23 is for use with ANSI C63.4, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.

IEEE C63.4-2014, Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

This standard specifies consensus standard methods, instrumentation, and facilities for measurement of radio-frequency (RF) signals and noise emitted from electrical and electronic devices in the frequency range 9 kHz to 40 GHz, as usable for example for compliance testing to U.S. (47 CFR Part 15) and Canada (ICES-003) regulatory requirements. It does not include generic nor product-specific emission limits. Where possible, the specifications herein are harmonized with other national and international standards used for similar purposes.
ANSI N42.35-2016, Standard for Evaluation and Performance of Radiation Detection Portal Monitors for Use in Homeland Security
This standard establishes the performance requirements and provides the testing and evaluation criteria for certified radiation portal monitors (RPMs) that detect photon- and neutron-emitting radioactive substances by monitoring people, packages, containers, and vehicles. Performance requirements for portal monitors with radionuclide identification capabilities are addressed by the ANSI/IEEE N42.38 standard. Performance requirements for mobile and portable systems are addressed by the ANSI/IEEE N42.43 standard.

ANSI N42.37-2016, Training for the Radiological/Nuclear Detection Mission
This standard provides training requirements for four levels of training as part of the domestic capabilities to detect, analyze, and report on nuclear and other radioactive materials that are out of regulatory control. This standard describes training requirements applying to these training levels across the range of Federal, State, Tribal, Territorial, and Local governments, and the private sector conducting the preventive Radiological/Nuclear Detection (RND) mission to reduce the risk of terrorists or covert state-sponsored attacks on the United States using radiological or nuclear Weapons of Mass Destruction (WMDs).

ANSI N42.38-2015, Performance Criteria for Spectroscopy Based Portal Monitors Used for Homeland Security
This standard specifies the operational and performance requirements for spectroscopy-based portal monitors (SRPM) used in homeland security applications. Spectroscopy-based portal monitors have the ability to detect radioactivity and identify radionuclides that may be present in or on persons, vehicles, or containers through the use of gamma spectroscopy techniques. Performance requirements for these portal monitors that do not provide information about the specific radionuclide present are addressed by ANSI N42.35.

ANSI N42.41-2007, Minimum Performance Criteria for Active Interrogation Systems used for Homeland Security
This standard specifies the operational and performance requirements for Active Interrogation Systems for use in Homeland Security applications. These systems employ penetrating ionizing radiation (e.g., neutrons, high-energy X-rays, gamma-rays) to detect and identify hidden chemical, nuclear, and explosive agents by detection of stimulated secondary radiations or by nuclear resonance contrast, giving elemental and/or nuclidian identification of the composition of the substances of interest. These inspection systems may be designed for open inspection zones of various sizes or for various sizes of containers such as small packages, briefcases, suitcases, air cargo containers.

ANSI N42.42-2012, Data Format Standard for Radiation Detectors Used for Homeland Security
Specifies the data format that shall be used for both required and optional data available at the output of radiation instruments for homeland security applications. The performance requirements for these types of instruments are described in other standards; such as, ANSI/IEEE N42.32, ANSI/IEEE N42.33, ANSI/IEEE N42.34, ANSI/IEEE N42.35, and ANSI/IEEE N42.38.

ANSI N42.43-2016, Performance Criteria for Mobile and Portable Radiation Monitors Used for Homeland Security
This standard specifies the performance requirements and tests for portable and mobile radiation monitors used for homeland security.

This document establishes standards for the technical performance of cabinet x-ray imaging systems used for screening at security checkpoints and other inspection venues. Hereinafter, systems covered by the scope of this standard are referred to as the systems. This standard applies to x-ray imaging equipment with all of the following characteristics:

- Meet the definition of cabinet x-ray systems as given in 21 CFR 1020.40; 
- Have tunnel nominal dimensions of up to 1.1 m &times; 1.1 m; and
- Provide a single-view direct-projection image as the primary image.

These devices are not primarily intended to detect prohibited items.

ANSI N42.45-2010, Standard for Evaluating the Image Quality of X-ray Computed Tomography (CT) Security-Screening Systems
This standard provides test methods for the evaluation of image quality of computed tomography (CT) security-screening systems. The quality of data automated analysis is the primary concern. This standard does not address the system's ability to use this image data to automatically detect explosives or other threat materials, which is typically verified by an appropriate regulatory body.

ANSI N42.46-2008, Determination of the Imaging Performance of X-ray and Gamma-Ray Systems for Cargo and Vehicle Security Screening
This standard is intended to be used to determine the imaging performance of x-ray and gamma-ray systems utilized to inspect loaded or empty vehicles, including personal and commercial vehicles of any type; marine and air cargo containers of any size; railroad cars; and palletized or unpalleted cargo larger than 1 meter by 1 meter in cross-section. The standard applies to systems that are the following:

- Single or multiple energy, source, or view; and
- Employ primary (i.e., transmission) and/or scatter (e.g., backscatter) radiation detection.

These devices are not primarily intended to detect prohibited and controlled materials and/or to verify manifests.

ANSI N42.47-2010, Measuring the Imaging Performance of X-ray and Gamma-ray Systems for Security Screening of Humans
This standard applies to security screening systems that utilize x-ray or gamma radiation and are used to inspect people who are not inside vehicles, containers, or enclosures. Specifically, this standard applies to systems used to detect objects carried on or within the body of the individual being exposed. The performance requirements contained in this standard are meant to provide a means for verifying the capability of these instruments to reliably detect changes above background levels of radiation, alert the user to these changes, and provide a means to identify the radionuclide(s) that caused the alert to occur. These devices are not primarily intended to provide a sure measure.

ANSI N42.49A-2010, Performance Criteria for Alarming Personal Emergency Radiation Detectors (PERDs) for Exposure Control
The scope of this standard is to establish minimum performance criteria and test requirements for four categories of alarming electronic radiation measurement instruments used to manage exposure by alerting the emergency responders when they are exposed to photon radiation. The standard provides, in an appropriate regulatory body.

ANSI N42.49B-2013, Performance Criteria for Non-alarming Personal Emergency Radiation Detectors (PERDs) for Exposure Control
The scope of this standard is to establish minimum performance criteria and test requirements for non-alarming radiation detectors used to manage the exposure of emergency responders to photon radiation. The detectors shall provide a rapid and clear indication of the level of radiation exposure. Emergency responders include fire and rescue services, law enforcement and medical services. Other possible users include Critical Infrastructure Key Resources (CIKR) such as heavy equipment, transportation, and utilities personnel and members of the public who may be involved in emergency situations.
ANSI N42.55-2013, Standard for the Performance of Transmission X-Ray Systems for Use in Improvised Explosive Device and Hazardous Device Identification

The purpose of this standard is to establish requirements and methods of test for portable transmission x-ray systems for use in improvised explosive device and hazardous device disarming and render safe operations. These systems include those that provide still and/or video images. This standard does not apply to cabinet x-ray systems, such as those used for security screening, and backscatter x-ray systems.

ANSI P-N42.53-2013, Performance Criteria for Backpack Based Radiation Detection Systems Used for Homeland Security

This standard specifies the basic performance requirements for backpack based radiation detection systems (BRDs) used in homeland security applications. BRDs shall detect gamma radiation and may include neutron detection and/or the identification of gamma-ray emitting radionuclides. They are typically worn by the user during operation, but may also be used as temporary area monitors. This standard establishes the radiological performance and testing requirements and those associated with the expected electrical, mechanical, and environmental conditions while in use.

IEEE (Institute of Electrical and Electronics Engineers)

ANSI C37.06: 1971

Standard for AC High-Voltage Circuit Breakers Rated on a Symmetrical Current Basis - Preferred Ratings and Related Required Capabilities for Voltages above 1000 Volts

This standard applies to all indoor and outdoor types of AC high-voltage circuit breakers rated above 1000 volts and rated on a symmetrical current basis.

IEEE 1003.1-2009, Information Technology - Portable Operating System Interface (POSIX)

This standard defines a standard operating system interface and environment, including a command interpreter (or "$8216;shell"), and common utility programs to support applications portability at the source code level.

IEEE 1003.13-2003 (R2010), Standard for Information Technology - Standardized Application Environment Profile (AEP) - POSIX&\#174; - Realtime and Embedded Application Support

This standard is part of the POSIX series of standardized profiles for open systems. It defines environment profiles for portable realtime and embedded applications.

IEEE 1003.26-2003 (R2010), Standard for Information Technology - Portable Operating System Interface (POSIX&\#174;) - Part 26: Device Control Application Program Interface (API) [C Language]

This standard is part of the POSIX series of standards. It defines an application program interface for controlling device drivers. Although it is based on the widely used ioctl() system call, the interface is type-safe and has a fixed number of parameters.

IEEE 1008-2002 (R2009), Standard for Software Unit Testing

This standard de&\#222;nes an integrated approach to systematic and documented unit testing. The approach uses unit design and unit implementation information, in addition to unit requirements, to determine the completeness of the testing.


IEEE 1013-2007, Recommended Practice for Sizing Lead-Acid Batteries for Stand-Alone Photovoltaic (PV) Systems

This recommended practice provides a systematic approach for determining the appropriate energy capacity of a lead-acid battery to satisfy the energy requirements of the electrical loads of a stand-alone photovoltaic (PV) system. Since this capacity determination (sizing) assumes that no power is available from the array, the resulting battery capacity should be more than adequate to meet the PV system’s load requirements during its normal operation.

IEEE 1014-2008, Standard for a Versatile Backplane Bus: VMEbus

This standard specifies a high-performance backplane bus for use in microcomputer systems that employ single or multiple microprocessors. It is based on the VMEbus specification, released by the VME Manufacturers’ Group in August of 1982. The bus includes four subusses: data transfer bus, priority interrupt bus, arbitration bus, and utility bus. The data transfer bus supports 8-, 16-, and 32-bit transfers over a non-multiplexed 32-bit data and address highway.

IEEE 1015-2006, Recommended Practice for Applying Low-Voltage Circuit Breakers Used in Industrial and Commercial Power Systems (Blue Book)

Information is provided for selecting the proper circuit breaker for a particular application. It helps the application engineer specify the type of circuit breaker, ratings, trip functions, accessories, acceptance tests, and maintenance requirements.

IEEE 1015/Cor1-2007, Recommended Practice for Applying Low Voltage Circuit Breakers Used in Industrial and Commercial Power Systems - Corrigendum 1

This Corrigendum implements technical changes to Std 1015.


This standard describes software designs and establishes the information content and organization of a software design description (SDD). An SDD is a representation of a software design to be used for recording design information and communicating that design information to key design stakeholders. This standard is intended for use in design situations in which an explicit software design description is to be prepared.

IEEE 1017-2013, Recommended Practice for Field Testing Electric Submersible Pump Cable

Procedures and test voltage values for acceptance and maintenance testing of ESP cable systems are presented. Installation and handling practices are also covered. This procedure applies to cable systems rated 3 kV and 5 kV (phase to phase).

IEEE 1018-2013, Recommended Practice for Specifying Electric Submersible Pump Cable--Ethylene-Propylene Rubber Insulation

This recommended practice establishes recommendations for three-conductor round and flat oil-well cables used in supplying three-phase ac electric power to submersible pump motors.

IEEE 1019-2013, Recommended Practice for Specifying Electric Submersible Pump Cable--Polypropylene Insulation

This recommended practice establishes requirements for three-conductor round-and-flat-type oil-well cable used in supplying three-phase ac electric power to submersible pump motors. The major cable components are copper conductors, polypropylene insulation, polymeric jacket, and galvanized metallic armor.

IEEE 1023-2004 (R2010), IEEE Recommended Practice for the Application of Human Factors Engineering to Systems, Equipment, and Facilities of Nuclear Power Generating Stations and Other Nuclear Facilities

This document provides recommended practices for applying human factors engineering (HFE) to systems and equipment that have significant human interfaces in nuclear power generating stations and other nuclear facilities.
IEEE 1025-1993 (R2011), IEEE Guide to the Assembly and Erection of Concrete Pole Structures
This guide presents various approaches of good practice that will improve the ability to assemble and erect self-supporting and guyed concrete pole structures. This guide covers construction aspects after foundation installation and up to the conductor stringing operation. Concrete pole structures may have components made of other materials (i.e., steel, wood, aluminum). Though some aspects of construction related to these materials are covered in this document, it should not be considered complete.

IEEE 1028-2008, Standard for Software Reviews and Audits
This standard defines five types of software reviews and audits, together with procedures required for the execution of each type. Types include management reviews, technical reviews, inspections, walk-throughs, and audits.

Documents an approach to preparing a specification for a transmission static var compensator. The document is intended to serve as a base specification with an informative annex provided to allow users to modify or develop specific clauses to meet a particular application.

IEEE 1043-1996 (R2009), Recommended Practice for Voltage-Endurance Testing of Form-Wound Bars and Coils
This recommended practice covers the voltage endurance testing of form-wound bars and coils for use in large rotating machine stator windings. Such testing is defined for machines with a nominal voltage rating up to 30 000 V.

IEEE 1044-2009, Standard Classification for Software Anomalies
This standard provides for the core set of attributes for classification of failures and defects.

IEEE 1057-2007, Standard for Digitizing Waveform Recorders
This standard defines specifications and describes test methods for measuring the performance of electronic digitizing waveform recorders, waveform analyzers, and digitizing oscilloscopes with digital outputs. The standard is directed toward, but not restricted to, general-purpose waveform recorders and analyzers.

IEEE 1062-2015, Recommended Practice for Software Acquisition
This recommended practice describes a set of useful quality considerations that can be selected and applied during one or more steps in a software acquisition process. The recommended practices can be applied to software that runs on any computer system regardless of the size, complexity, or criticality of the software. The software supply chain may include integration of commercial-off-the-shelf (COTS), custom, or Free and Open Source Software (FOSS).

IEEE 1063-2002 (R2007), Standard for Software User Documentation
This standard provides minimum requirements for the structure, information content, and format of user documentation, including both printed and electronic documents used in the work environment by users of systems containing software.

IEEE 1067-2012, Guide for In-Service Use, Care, Maintenance, and Testing of Conductive Clothing for Use on Voltages up to 765 kV ac and ±750 kV dc
This guide provides recommendations for the in-service visual inspection, use, care, maintenance, and elec&R172:rical testing of conductive clothing, including suits, gloves, socks, and boots, for use during linework on voltages up to 765 kV ac and ±750 kV dc.

This document covers general recommendations for the repair of alternating current (ac) electric motors and includes guidelines for both the user and the repair facility. This standard covers reconditioning, repair, and rewind of horizontal and vertical induction motors and of synchronous motors. It applies to all voltages 15 kV and less, and all ratings above 0.75 kW (1 hp). This standard applies only to the repair of motors, and in cases involving modifications to the basic design, care must be taken so as not to negatively affect the safety and reliability of the motor.

Provides the industry with a generic specification, including design and testing, for transmission modular restoration structure components. Can be used by companies for acquisition of transmission modular restoration components.

IEEE 1074-2006, Standard for Developing a Software Project Life Cycle Process
Provides a process for creating a software project life cycle process. It is primarily directed at the process Architect for a given software project.

This standard revises and enhances the VHDL LRM by including a standard C language interface specification; specifications from previously separate, but related, standards IEEE Std 1164, ANSI/IEEE Std 1076.2, and IEEE Std 1076.3; and general language enhancements in the areas of design and verification of electronic systems.

IEEE 1076.1-2007, Standard VHDL Analog and Mixed-Signal Extensions
This standard defines the 1076.1 language, a hardware description language for the description and the simulation of analog, digital, and mixed-signal systems. The language, informally known as VHDL-AMS, is built on the ANSI/IEEE Std 1076-2002 (VHDL) language, and extends it to provide capabilities of writing and simulating analog and mixed-signal models.

This guide provides a structured framework for the incorporation of human/system interactions into probabilistic risk assessments (PRAs).

IEEE 11-2000 (R2006), Standard for Rotating Electric Machinery for Rail and Road Vehicles
Applies to rotating electric machinery which forms part of the propulsion and major auxiliary equipment on internally and externally powered electrically propelled rail and road vehicles and similar large transport and haulage vehicles and their trailers where specified in the contract.

The basic dimensions of a range of modular subracks conforming to IEC 60297-3 (1984-01) and IEC 60297-4 (1995-03) for mounting in equipment according to IEC 60297-1 (1986-09) and ANSI/EIA 310-D-1992, together with the basic dimensions of a compatible range of plug-in units, printed boards, and backplanes, are covered. The dimensions and tolerances necessary to ensure mechanical function compatibility are provided. This standard offers total system integration guidelines (advantages: shorter design and development time, etc.).

A generic standard that may be applied in all fields of electronics where equipment and installations are required to conform to the 482.6 mm (19 in) equipment practice based on IEEE 1101.1-1991, IEC 297-3 (1984), and IEC 297-4 (1995). Dimensions are provided that will ensure mechanical interchangeability of subracks and plug-in units.

IEEE 1101.11-1998 (R2008), Standard for Mechanical Rear Plug-in Units Specifications for Microcomputers Using IEEE 1101.1 and IEEE 1101.10 Equipment Practice
Additional dimensions that will ensure mechanical interchangeability of subracks and plug-in units based on IEEE P1101.1 (D1.0, 1997), IEEE Std 1101.10-1996, and the environmental requirements of IEC 61587-1 (May 1998-Draft) and IEC 61587-3 (May 1998-Draft) are specified.
IEEE 1101.2-1993 (R2008), Mechanical Core Specification for Conduction Cooled Eurocards

Mechanical characteristics of conduction-cooled versions of Eurocard-based circuit card assemblies are described. This specification is applicable to, but not limited to, the VMEbus standard, an internal interconnect (backplane) bus intended for connecting processing elements to their immediate fundamental resources to ensure mechanical interchangeability of conduction-cooled circuit card assemblies in a format suitable for military and rugged applications and compatibility with commercial, double-height, 16 mm Eurocard chassis.

IEEE 1106-2015, Recommended Practice for Installation, Maintenance, Testing, and Replacement of Vented Nickel-Cadmium Batteries for Stationary Applications

This document provides recommendations for installation design and procedures for installation, maintenance, and testing of vented nickel-cadmium batteries (including partially recombinant types) used for standby operation in stationary applications. This recommended practice also provides guidance for determining when these batteries should be replaced. Separate recommendations are provided for renewable energy systems (e.g., wind turbines and photovoltaic systems), which may provide only partial or intermittent charging.


This document provides guidance for using radio-frequency (RF) wireless communication technologies for IEEE 110738482: point-of-care medical devices that exchange vital signs and other medical device 8 information using shared information technology (IT) infrastructure.

IEEE 11073-10102-2012, Health informatics - Point-of-care medical device communication - Part 10102: Nomenclature - Annotated ECG

This standard extends the base ISO/IEEE 11073-10101 Nomenclature to provide support for ECG annotation terminology. Major subject areas addressed by the nomenclature include ECG beat annotations, wave component annotations, rhythm annotations, and noise annotations. It also defines additional ‘global’ and ‘per-lead’ numeric observation identifiers, ECG lead systems and additional ECG lead identifiers.

IEEE 11073-10404-2008, Standard for Health Informatics - Personal Health Device Communication - Device Specialization - Pulse Oximeter

Within the context of the 11073 family of standards for device communication, this standard establishes a normative definition of communication between personal telehealth pulse oximeter devices and compute engines (e.g., cell phones, personal computers, personal health appliances, set top boxes) in a manner that enables plug-and-play interoperability. It is intended to submit this standard to ISO for consideration.

IEEE 11073-10406-2011, Health Informatics - Personal Health Device Communication - Device Specialization - Basic Electrocardiograph (ECG) (1 to 3-lead ECG)

Within the context of the ISO/IEEE 11073 family of standards for device communication, this standard establishes a normative definition of the communication between personal basic electrocardiograph (ECG) devices and managers (e.g., cell phones, personal computers, personal health appliances, set top boxes) in a manner that enables plug-and-play interoperability.

IEEE 11073-10407-2008, Standard for Health Informatics - Personal Health Device Communication - Device Specialization - Blood Pressure Monitor

Within the context of the 11073 family of standards for device communication, this standard establishes a normative definition of communication between personal telehealth blood pressure monitor devices and compute engines (e.g., cell phones, personal computers, personal health appliances, set top boxes) in a manner that enables plug-and-play interoperability. It is intended to submit this standard to ISO for consideration.

IEEE 11073-10408-2008, Standard for Health Informatics - Personal Health Device Communication - Device Specialization - Thermometer

Within the context of the 11073 family of standards for device communication, this standard establishes a normative definition of communication between personal telehealth thermometer devices and compute engines (e.g., cell phones, personal computers, personal health appliances, set top boxes) in a manner that enables plug-and-play interoperability. It is intended to submit this standard to ISO for consideration.

IEEE 11073-10415-2008, Standard for Health Informatics - Personal Health Device Communication - Device Specialization - Weighing Scale

Within the context of the IEEE 11073 family of standards for device communication, this standard establishes a normative definition of communication between personal telehealth weighing scale devices and compute engines (e.g., cell phones, personal computers, personal health appliances, set top boxes) in a manner that enables plug-and-play interoperability. It is intended to submit this standard to ISO for consideration.

IEEE 11073-10417-2015, Health informatics - Personal health device communication - Part 10417: Device Specialization - Glucose Meter

Within the context of the ISO/IEEE 11073 family of standards for device communication, this standard establishes a normative definition of communication between personal telehealth glucose meter devices and compute engines (e.g., cell phones, personal computers, personal health appliances, set top boxes) in a manner that enables plug-and-play interoperability.

IEEE 11073-10418-2011, Health Informatics - Personal Health Device Communication - Device Specialization - International Normalized Ratio (INR) Monitor

The scope of this standard is to establish a normative definition of communication between personal telehealth International Normalized Ratio (INR) devices (agents) and managers (e.g., cell phones, personal computers, personal health appliances, set top boxes) in a manner that enables plug-and-play interoperability.

IEEE 11073-10419-2015, Health informatics - Personal health device communication - Part 10419: Device Specialization - Insulin Pump

The scope of this standard is to establish a normative definition of the communication between personal telehealth insulin pump devices (agents) and managers (e.g., cell phones, personal computers, personal health appliances, and set top boxes) in a manner that enables plug-and-play interoperability.

IEEE 11073-10420-2010, Health Informatics - Personal Health Device Communication - Device Specialization - Body Composition Analyzer

Within the context of the ISO/IEEE 11073 family of standards for device communication, this standard establishes a normative definition of the communication between personal body composition analyzing devices and managers (e.g., cell phones, personal computers, personal health appliances, set top boxes) in a manner that enables plug-and-play interoperability. It specifies the use of specific term codes, formats, and behaviors in telehealth environments restricting optionality in base frameworks in favor of interoperability. This standard defines a common core of communication functionality for personal telehealth body composition analyzer devices.

IEEE 11073-10421-2010, Health Informatics - Personal Health Device Communication - Device Specialization - Peak Expiratory Flow Monitor (Peak Flow)

The scope of this standard is to establish a normative definition of communication between personal telehealth Peak Flow monitoring devices (agents) and managers (e.g., cell phones, personal computers, personal health appliances, set top boxes) in a manner that enables plug-and-play interoperability. It leverages work done in other ISO/IEEE 11073 standards including existing terminology, information profiles, application profile standards, and transport standards.

IEEE 11073-10441-2008, Standard for Health Informatics - Personal Health Device Communication - Device Specialization - Cardiovascular Fitness and Activity Monitor

Within the context of the IEEE 11073 family of standards for device communication, this standard establishes a normative definition of communication between personal telehealth cardiovascular fitness and activity monitor devices and compute engines (e.g., cell phones, personal computers, personal health appliances, set top boxes) in a manner that enables plug-and-play interoperability.

This guide provides cable manufacturers and users with extensive information on the design, testing, application and installation of low, medium and high voltage power cables, as well as communication, control and instrument cables that make use of metal-plastic laminates as radial moisture barriers.

IEEE 1143-2012, Guide on Shielding Practice for Low Voltage Cables

This function of this guide on shielding practice for low voltage cables is to inform and familiarize the reader with shielding practice. Overviews of shielding practice, systems and test methods are provided.

IEEE 1149.1-2013, Standard for Test Access Port and Boundary-Scan Architecture

This Standard defines test logic that can be included in an integrated circuit to provide standardized approaches to: Testing the interconnections between integrated circuits once they have been assembled onto a printed circuit board or other substrate; Testing the integrated circuit itself; and Observing or modifying circuit activity during the component’s normal operation.

IEEE 1149.4-2010, Standard for a Mixed-Signal Test Bus

This standard defines a mixed-signal test bus architecture that provides the means of control and access to both analog and digital test signals such that the testability structure for digital circuits described in IEEE Std 1149.1-2001 has been extended effectively to provide similar facilities for mixed-signal circuits. In addition to testing of interconnections in the conventional sense of IEEE 1149.1-2001, the mixed-signal test bus defined by this standard also provides the means for parametric testing and, optionally, the means to access internal test structures.

IEEE 1149.6-2015, Standard for Boundary-Scan Testing of Advanced Digital Networks

This standard defines extensions to IEEE Std 1149.1TM to standardize the Boundary-Scan structures and methods required to help ensure simple, robust, and minimally intrusive Boundary-Scan testing of advanced digital networks. Such networks are not adequately addressed by existing standards, especially for those networks that are AC-coupled, differential, or both.

IEEE 1149.7-2009, Standard for Reduced-pin and Enhanced-functionality Test Access Port and Boundary Scan Architecture

This standard describes circuitry that may be added to an integrated circuit to provide access to on-chip test access ports (TAPs) specified by ANSI/IEEE Std 1149.1TM-2001. The circuitry uses ANSI/IEEE 1149.1-2001 as its foundation, providing complete backward compatibility, while adding features to support test and applications debug.


This guide contains instructions for conducting generally applicable and accepted tests to determine the performance characteristics of synchronous machines. Although the tests described are applicable in general to synchronous generators, synchronous motors (larger than fractional horsepower), synchronous condensers, and synchronous frequency changers, the descriptions make reference primarily to synchronous generators and synchronous motors.

IEEE 1156.1-1993 (S2009), Standard Microcomputer Environmental Specifications for Computer Modules

This standard contains fundamental information on minimum environmental withstand conditions. It is intended to be used in those cases where a generic or detailed specification for a certain system has been prepared. This standard is intended to achieve uniformity and reproducibility in the test conditions for all systems that are purported to have a rated environmental performance level. This standard is intended to be used as a core specification. It contains the minimum environmental withstand conditions that are applicable to computer modules/circuit boards and all of the components attached to those modules.

IEEE 1156.2-1996 (S2009), Standard for Environmental Specifications for Computer Systems

This standard contains fundamental information on minimum environmental withstand conditions. It is intended to be used in those cases where a generic or detailed specification for a certain system has been prepared. This standard is intended to achieve uniformity and reproducibility in the test conditions for all systems that are purported to have a rated environmental performance level. It is intended to be used as a core specification. It contains minimum environmental withstand conditions applicable to computer systems and all of their associated components.

IEEE 1159-2009, Recommended Practice for Monitoring Electric Power Quality

This recommended practice encompasses the monitoring of electrical characteristics of single-phase and polyphase ac power systems. It includes consistent descriptions of conducted electromagnetic phenomena occurring on power systems. The document presents definitions of nominal conditions and deviations from these nominal conditions that may originate within the source of supply or load equipment, or from interactions between the source and the load.


This guide contains instructions for conducting generally applicable and accepted tests to determine the performance characteristics of synchronous machines. Although the tests described are applicable in general to synchronous generators, synchronous motors (larger than fractional horsepower), synchronous condensers, and synchronous frequency changers, the descriptions make reference primarily to synchronous generators and synchronous motors.

IEEE 1175-2002 (R2007), Guide for CASE Tool Interconnections – Classification and Description

This guide describes the scope of application and interrelationships for the members of the IEEE 1175 family of standards. It points the reader to the appropriate member standard that addresses issues involved in effectively integrating computing system tools into a productive engineering environment.

IEEE 1175.2-2006 (R2011), Recommended Practice for CASE Tool Interconnection - Characterization of Interconnections

This recommended practice presents four contexts for a computing system tool’s interconnections that offer insight into the operational problems of interconnecting computing system tools with their environment. This recommended practice establishes recommended collections of standard contextual attributes describing relationships between a computing system tool and its organizational deployment, its human user, its executable platform, and its peer tools.

IEEE 1175.3-2004 (R2010), Standard for CASE Tool Interconnections - Reference Model for Specifying Software Behavior

Computer-Aided Software Engineering (CASE) tools are used to describe the behavior of software using a variety of different design notations. These may be graphical or textual in nature, or they may be a combination. This standard provides a reference model of fundamental software concepts that form the ‘building blocks’ for a number of these commonly used notations.
IEEE 1175.4-2008, Standard for CASE Tool Interconnections - Reference Model for Specifying System Behavior
This standard provides an explicitly defined meta-model (and meta-meta-model) for specifying system and software behavior. It defines a semantic basis of observables that allows each tool, whatever its own internal ontology, to communicate facts about the behavior of a subject system as precisely as the tool's meta-model allows. Conventional tool model elements are reduced into simpler, directly observable fact statements about system behavior.

IEEE 1178-1991 (R2008), Standard for the Scheme Programming Language
This standard specifies the representation of Scheme programs, their syntax, the semantic rules for interpreting them, and the representation of data to be input or output by them.

Discusses various battery systems so that the user can make informed decisions on selection, installation design, installation, maintenance, and testing of stationary standby batteries used in Uninterruptible Power Supply (UPS) systems.

IEEE 1185-2010, Recommended Practices for Cable Installation in Generating Stations and Industrial Facilities
This recommended practice provides guidance for wire and cable installation practices in generating stations and industrial facilities. This document may also be of benefit for the proper installation of wire and cable in commercial, governmental, and public facilities when similar wire or cable types and raceways are used.

IEEE 1188-2005 (R2010), IEEE Recommended Practice for Maintenance, Testing, and Replacement of Valve-Regulated Lead-Acid (VRLA) Batteries for Stationary Applications
This recommended practice is limited to maintenance, test schedules, and testing procedures that can be used to optimize the life and performance of valve-regulated lead-acid (VRLA) batteries for stationary applications. It also provides guidance to determine when batteries should be replaced.

This guide describes methods for selecting the appropriate type of valve-regulated, immobilized-electrolyte, recombiant lead-acid battery for any of a variety of stationary float applications. The purpose of this document is to ensure that the reader is aware of all significant issues that should be considered when selecting VRLA batteries, so that the user might make an informed decision.

This guide provides instructions for those measurements of electrical quantities that are commonly needed in determining the performance characteristics of electrical machinery and equipment.

IEEE 1202-2006 (R2014), Standard for Flame-Propagation Testing of Wire & Cable
This standard provides a protocol for exposing cable samples to a theoretical 20 kW (70 000 Btu/h) flaming ignition source for a 20-min test duration. The test determines the flame propagation tendency of single-conductor and multi-conductor cables intended for use in cable trays.

IEEE 1205-2000 (R2007), Assessing, Monitoring, and Mitigating Aging Effects on Class 1E Equipment Used in Nuclear Power Generating Sations
This document provides the guidelines for assessing, monitoring, and mitigating aging degradation effects on Class 1E equipment used in nuclear power generating stations. It also includes informative annexes on aging mechanisms, environmental monitoring, condition monitoring, aging program essential attributes, and example assessments for five types of equipment (including electric cable).

IEEE 1207-2011, Guide for the Application of Turbine Governing Systems for Hydroelectric Generating Units
This guide is intended to complement IEEE Std 125TM -1988, providing application details and addressing the impact of plant and system features on hydroelectric unit governing performance. It provides guidance for the design and application of hydroelectric turbine governing systems.

Provides information on what a basic faulted circuit indicator (FCI) is designed to do, and describes methods for selecting FCIs. The application of FCIs to single-phase, 200 A, underground residential distribution (URD) circuits is described.

This guide is intended to provide practical information to be used in conjunction with technical information provided in the AWPA 2001 Book of Standards, ANSI 05.1-1992 (for wood poles), ANSI 05.2-1989 (for wood products such as structural glued laminated timber for utility structures), and ANSI 05.3-1989 (for wood products such as solid sawn wood crossarms and braces). These voluntary product standards are used worldwide and are modified as necessary by users for their specific needs.

This International Standard establishes a common framework for software life cycle processes, with well-defined terminology, that can be referenced by the software industry. It contains processes, activities, and tasks that are to be applied during the acquisition of a software product or service and during the supply, development, operation, maintenance and disposal of software products. It also provides a process that can be employed for defining, controlling, and improving software life cycle processes.

IEEE 1222-2011, Standard for Testing and Performance for All-Dielectric Self Supporting (ADSS) Fiber Optic Cable for Use on Electric Utility Power Lines
This Standard covers the construction, mechanical, electrical, and optical performance, installation guidelines, acceptance criteria, test requirements, environmental considerations, and accessories for an all-dielectric, nonmetallic, self-supporting fiber optic (ADSS) cable. The ADSS cable is designed to be located primarily on overhead utility facilities.

IEEE 1227-1990 (R2010), Guide for the Measurement of DC Electric-Field Strength and Ion Related Quantities
This document provides guidance for the measurement of the electric-field strength, ioncurrent density, conductivity, monopolar space-charge density, and net space-charge density in the vicinity of high-voltage dc (HVDC) power lines, in converter substations, and in apparatus designed to simulate the HVDC power-line environment.

IEEE 1228-1994 (R2010), Standard for Software Safety Plans
This standard applies to the Plan used for the development, procurement, maintenance, and retirement of safety-critical software; for example, software products whose failure could cause loss of life, serious harm, or have widespread negative social impact. This standard requires that the Plan be prepared within the context of the system safety program. The scope of this standard includes only the safety aspects of the software.

IEEE 1232-2010, Standard for Artificial Intelligence Exchange and Service Tie to All Test Environments (AI-ESTATE)
The AI-ESTATE standard defines formal specifications for supporting system diagnosis. These specifications support the exchange and processing of diagnostic information and the control of diagnostic processes. Diagnostic processes include, but are not limited to, testability analysis, diagnosability assessment, diagnostic reasoning, maintenance support, and diagnostic maturation.
IEEE 1233-1996 (R2009), Guide for Developing System Requirements Specifications
This guide provides guidance for the development of a set of requirements that, when realized, will satisfy an expressed need. In this guide that set of requirements will be called the System Requirements Specification (SyRS). Developing an SyRS includes the identification, organization, presentation, and modification of the requirements. This guide addresses conditions for incorporating operational concepts, design constraints, and design configuration requirements into the specification.

IEEE 1234-2007, Guide for Fault Locating Techniques on Shielded Power Cable Systems
This guide describes different tests and measurements to identify fault locations. It provides troubleshooting and testing personnel with information to quickly identify a faulted cable section and/or locate a cable fault with minimum risk of further damaging serviceable cables or equipment. It applies to medium-voltage distribution cables (1kV-34.5kV).

Intended to service high-voltage direct current (HVDC) converter station reliability by suggesting significant objectives, design, operation, monitoring, and specification details. Includes the CIGRE performance protocol and reliability-related mathematical concepts.

IEEE 1241-2010, Standard for Terminology and Test Methods for Analog-to-Digital Converters
The material presented in this standard is intended to provide common terminology and test methods for the testing and evaluation of analog-to-digital converters (ADCs). This standard considers only those ADCs whose output values have discrete values at discrete times, i.e. they are quantized and sampled. In general, this quantization is assumed to be nominally uniform (the input-output transfer curve is approximately a straight line) as discussed further in Subclause 1.3, Analog-to-digital converter background, and the sampling is assumed to be at a nominally uniform rate.

IEEE 1243-2008, Guide for Improving the Lightning Performance of Transmission Lines
This guide discusses the effects of routing, structure type, insulation, shielding, and grounding on transmission lines are discussed. The way these transmission-line choices will improve or degrade lightning performance is also provided.

IEEE 1246-2011, Guide for Temporary Protective Grounding Systems Used in Substations
This guide covers the design, performance, use, testing, and installation of temporary protective grounding (TPG) systems, including the connection points, as used in permanent and mobile substations. This guide does not address series-capacitor compensated systems.

IEEE 125-2007, Recommended Practice for Preparation of Equipment Specifications for Speed-Governing of Hydraulic Turbines Intended to Drive Electric Generators
This document recommends performance characteristics and equipment for electric-hydraulic governors for all types of hydraulic turbines intended to drive electric generators of all sizes. It is intended to assist users with the preparation of procurement specifications for electric-hydraulic speed governors.

IEEE 1250-2011, Guide for Identifying and Improving Voltage Quality in Power Systems
The reader of this Guide will find discussions of ways to identify and improve voltage quality in power systems, and references to publications in this area. More specifically this Guide includes: 1. Voltage quality levels from benchmarking studies. 2. Factors that affect power system performance. 3. Mitigation measures that improve power system performance. 4. References to current relevant in-depth IEEE standards and other documents. This Guide only addresses subjects in depth where no other power quality reference does so. It is a "gateway" document for power quality which points the way to other documents in this field.

IEEE 1255-2000 (R2007), Guide for Evaluation of Torque Pulsations During Starting of Synchronous Motors
A uniform method for calculating and measuring torque pulsations that occur during starting of synchronous motors is provided.

A set of procedures to be followed to cope with reradiation of AM broadcast signals from power lines and other metallic structures is provided.

This guide documents methods and designs to mitigate intrusions, equipment damage and personnel safety issues resulting from animal intrusions into electric power supply substations, thereby improving reliability and safety, and minimizing the associated revenue loss.

IEEE 1277-2010, Standard General Requirements and Test Code for Dry-Type and Oil-Immersed Smoothing Reactors for DC Power Transmission
This standard defines and specifies the requirements and test code for dry-type and oil-immersed smoothing reactors for HVDC (high voltage direct current) power transmission. It only applies to smoothing reactors for dc transmission. It does not apply to other smoothing reactors such as reactors for power converters for variable speed drives, etc.

IEEE 1278.3-1996 (R2010), Recommended Practice for Distributed Interactive Simulation - Exercise Management and Feedback
This recommended practice establishes guidelines for exercise management and feedback in Distributed Interactive Simulation (DIS) exercises. It provides recommended procedures to plan, set up, execute, manage, and assess a DIS exercise. It is one in a series of standards that addresses the interoperability among interconnected simulation applications.

IEEE 1278.4-2002 (R2010), Recommended Practice for Distributed Interactive Simulation - Verification, Validation, and Accreditation
This recommended practice establishes guidelines for the verification, validation, and accreditation (VV&A) of Distributed Interactive Simulation (DIS) exercises. It provides &R210;how-to&R211; procedures for planning and conducting DIS exercise VV&A.

IEEE 1284.1-1997 (S2009), Standard for Information Technology - Transport Independent Printer/System Interface (TIP/SI)
A standard protocol for the control of printers that is independent of the underlying data stream or page description language (PDL) used to create the printed page is defined in this standard. This protocol is usable by all classes of printers. The scope of this standard is limited to management and control of printers and does not include management or control of a printing system or subsystems.

IEEE 1285-2005 (R2010), IEEE Standard for Scalable Storage Interface (S2I)
This standard defines a scalable interface for use with memory-mapped storage units and other devices. The term 'storage unit' can encompass rotating, non-rotating, volatile, and non-volatile storage. Issues of concurrency, latency, bandwidth, extensibility, and negotiation will be addressed. The interface is intended for use with either a single storage unit or with many coordinated storage units.

This guide applies to motors used to drive valve operators in nuclear power generating stations.

The specification and test requirements for a linear, single-axis, nongyroscopic accelerometer for use in inertial navigation, guidance, and leveling systems are defined. A standard specification format guide and a compilation of recommended test procedures for such accelerometers are provided.

Technical corrections to several equations describing modeling and data analysis.

IEEE 1301.3-1993 (S2009), Standard for a Metric Equipment Practice for Microcomputers - Convection-Cooled with a 2.5 mm Connectors

Dimension requirements are presented for subracks, plug-in units, printed boards, and backplanes to be used in conjunction with IEEE Std 1301-1991 and with a 2.5 mm connector as defined in IEC 488 (Central Office) 245.

IEEE 1301.4-1997 (R2008), Metric Equipment Practice for Microcomputers – Coordination Document for Mezzanine Cards

This generic standard may be applied in all fields of electronics where equipment and installations are required to conform to a metric modular order. This standard establishes the metric modular order for parallel mounted, interconnected electronic circuit assemblies, hereafter referred to as mezzanine cards, and may be applied in other applications.


This guide provides manufacturers of gaskets and designers of electronic systems appropriate methods for the characterization of gaskets.

IEEE 1303-2011, Guide for Static Var Compensator Field Tests

This document is a guide for field testing and commissioning of static var compensators (SVCs). As such, the document establishes general guidelines and criteria for field testing to verify the specified performance of SVC systems. Many clauses will be useful for compensator systems using gate turn-off (GTO) thyristor technology (static compensator (STATCOM)) or other semiconductor devices such as insulated gate commutated transistor (IGCT).

IEEE 1308-1994 (R2010), Recommended Practice for Instrumentation: Specifications for Magnetic Flux Density and Electric Field Strength Meters - 10 Hz to 3 kHz

Specifications that should be provided to characterize instrumentation used to measure the steady state rms value of magnetic and electric fields with sinusoidal frequency content in the range 10 Hz to 3 kHz in residential and occupational settings as well as in transportation systems are identified. The instrumentation, recommended calibration methods, and sources of measurement uncertainty are also described.

IEEE 1325-1996 (R2008), Recommended Practice for Reporting Field Failure Data for Power Circuit Breakers

A format is presented that provides a concise and meaningful method for recording pertinent information on power circuit breaker field failures. It is recommended that this format be utilized in record keeping and directing corrective action to improve fi

IEEE 1329-2010, Standard Method for Measuring Transmission Performance of Speakerphones

This standard provides techniques for objective measurement of electroacoustic and voice switching characteristics of speakerphones that connect directly or indirectly to an analog or digital telephone network. Due to the various characteristics of speakerphones and the environments in which they operate, not all of the test procedures in this standard are applicable to all speakerphones. Application of the test procedures to atypical speakerphones should be determined on an individual basis.

IEEE 1332-2012, Standard Reliability Program for the Development and Production of Electronic Products

This document provides a standard set of reliability program objectives for use between customers and producers, or within product development teams, to express reliability program requirements early in the development phase of electronic products and systems.

IEEE 1349-2011, Guide for the Application of Electric Motors in Class I, Division 2 and Class I, Zone 2 Hazardous (Classified) Locations

Three-phase and single-phase AC synchronous and induction electric motors in ratings 0.18 kW (1/4 hp) and larger are covered in this Guide. Primary emphasis is on the use of open or nonexplosionproof or nonflameproof enclosed motors in Class I, Division 2 and Class I, Zone 2 locations as covered in NFPA 70 -2011. Surface temperature test methods and sine wave and non-sine wave applications are covered. Precautions against excessive surface temperatures and sparking are included.


This standard provides specifications of common public-key cryptographic techniques based on hard problems over lattices supplemental to those considered in IEEE 1363 and IEEE P1363a, including mathematical primitives for secret value (key) derivation, public-key encryption, identification and digital signatures, and cryptographic schemes based on those primitives.

IEEE 1363.2-2008, Standard Specification for Password-Based Public-Key Cryptographic Techniques

This standard covers specifications of common public-key cryptographic techniques for performing password-based authentication and key establishment, supplemental to the techniques described in ANSI/IEEE Std 1363-2000 and ANSI/IEEE Std 1363a-2004.

IEEE 1368-2006, Guide for Aerolian Vibration Field Measurements of Overhead Conductors

Recommends testing procedures, general data gathering formats, and general data reduction formats for field monitoring of overhead conductor vibration. Also provides some background information on technical aspects of vibration field measurements for overhead conductors, techniques for evaluating the severity of conductor vibration including amplitude and frequency, and some effects on conductor performance and life.


This guide provides general guidelines for commissioning high-voltage direct-current (HVDC) converter stations and associated transmission systems. These guidelines apply to HVDC systems utilizing 6-pulse or 12-pulse thyristor-valve converter units operat

IEEE 1379-2000 (R2006), Recommended Practice for Data Communications Between Remote Terminal Units and Intelligent Electronic Devices in a Substation

A uniform set of guidelines for communications and interoperations of remote terminal units (RTUs) and intelligent electronic devices (IEDs) in an electric utility substation is provided. A mechanism for adding data elements and message structures to this recommended practice is described.

IEEE 1394-2008, Standard for a High Performance Serial Bus

This standard describes a high-speed, low-cost Serial Bus suitable for use as a peripheral bus, a backup to parallel backplane buses, or a local area network.

IEEE 1394.1-2004 (R2009), Standard for High Performance Serial Bus Bridges

This standard extends the already defined asynchronous and isochronous services of High Performance Serial Bus beyond the local bus by means of a device, the bridge, which consists of two nodes, each connected to a separate bus and both interconnected by implementation-dependent means.

IEEE 1394.3-2003 (R2008), Standard for a High Performance Serial Bus Peer-to-Peer Data Transport Protocol (PPDT)

This standard defines a peer-to-peer data transport (PPDT) protocol between Serial Bus devices that implement Serial Bus Protocol 2 (SBP-2). The facilities specified include device and service discovery, self-configurable (plug and play) binding, and connection management.


This guide identifies and discusses security issues related to human intervention during the construction, operation (except for natural disasters), and maintenance of electric power supply substations. It also documents methods and designs to mitigate intrusions.
This guide provides information on the equipment, cable specimens, test conditions, and measurements to perform accelerated aging tests on medium-voltage cables using water-filled tanks, whether the test be a time to failure test or a test in which samples are aged for fixed times followed by a diagnostic test such as a step ac breakdown test. The guide identifies the critical test parameter and describes techniques for their measurement and control.

IEEE 1410-2010, Guide for Improving the Lightning Performance of Electric Power Overhead Distribution Lines
This guide will identify factors that contribute to lightning-caused faults on overhead distribution lines and 14 suggest improvements to existing and new constructions. This guide is limited to the protection of distribution-line insulation for system voltages 69 kV and below.

This International Standard gives guidelines for the evaluation and selection of CASE tools, covering a partial or full portion of the software engineering life cycle. It establishes processes and activities to be applied for the evaluation of CASE tools and selecting the most appropriate CASE tools from several candidates. These processes are generic, and organisations must tailor them to meet organisational needs. The CASE tool evaluation and selection processes should be viewed in the larger context of the organisation’s technology adoption process.

IEEE 1413-2010, Standard Framework for Reliability Prediction of Hardware
This standard provides the framework for performing and reporting reliability predictions. It applies to hardware products including electronic, electrical, and mechanical devices and assemblies.

IEEE 142-2007, Recommended Practice for Grounding of Industrial and Commercial Power Systems
The problems of system grounding, that is, connection to ground of neutral, of the corner of the delta, or of the midpoint of one phase, are covered. The document covers the grounding of various systems, equipment grounding, static and lightning protection grounding, connection to earth, and electronic equipment grounding.

This guide provides technical information regarding factors that can affect the life of an impregnated paper-insulated transmission cable system, and it reviews available methods to evaluate the remaining life of such systems and preventive maintenance to extend their service life.

IEEE 1427-2006, Guide for Recommended Electrical Clearances and Insulation Levels in Air Insulated Electrical Power Substations
Covering three-phase ac systems from 1kV to 800 kV, provides recommended electrical operating and safety clearances and insulation levels in air-insulated electrical supply substation; addresses insulation coordination procedures; provides design procedures for the selection and coordination of the insulation levels within the station as they relate to substation clearances; and addresses how reduced clearances in high-voltage ac substations will allow for compact bus arrangements and substation voltage uprating applications.

This guide is intended for cables designed for use in power generating stations and industrial facilities, in both the outside plant environment and indoor applications - the latter with adequate consideration for requirements of the National Electrical Code&174; (NEC&174;.)

Specification and test requirements for a single-axis Coriolis vibratory gyro (CVG) for use as a sensor in attitude control systems, angular displacement measuring systems, and angular rate measuring systems are defined. A standard specification format guide for the preparation of a single-axis CVG is provided. A compilation of recommended procedures for testing a CVG, derived from those presently used in the industry, is also provided.

IEEE 1431-2004/Cor 1-2008, Standard Specification Format Guide and Test Procedure for Coriolis Vibratory Gyros - Corrigendum 1: Figure 1 - Gyro Axes and Misalignment Angles
Correction of labeling on a few figures.

IEEE 1445-1998 (R2009), Standard for Digital Test Interchange Format (DTIF)
This standard defines the information content and the data formats for the interchange of digital test program data between DATPGs and automatic test equipment (ATE) for board-level printed circuit assemblies. This information can be broadly grouped into data that defines the following: a) UUT Model; b) Stimulus and Response; c) Fault Dictionary; d) Probe.

IEEE 14471-2010, Information Technology - Software Engineering - Guidelines for the Adoption of CASE Tools
Since CASE adoption is a subject of the broader technology transition problem, this Technical Report addresses the adoption practices appropriate for a wide range of computing organisations. This Technical Report neither dictates nor advocates particular development standards, software processes, design methods, methodologies, techniques, programming languages, or life-cycle paradigms. This Technical Report will: - identify critical success factors (CSF); - propose a set of adoption processes; - guide successful adoption in consideration of organisational and cultural environment.

IEEE 1450-2011, Standard Test Interface Language (STIL) for Digital Test Vector Data
This International Standard defines an interface between digital test generation tools and test equipment. A test description language is defined that: (a) facilitates the transfer of digital test vector data from CAE to ATE environments; (b) specifies pattern, format, and timing information sufficient to define the application of digital test vectors to a DUT; and (c) supports the volume of test vector data generated from structured tests.

Structures are defined in STIL to support usage as semiconductor simulation stimulus, including (1) mapping signal names to equivalent design references, (2) interface between scan and built-in self test (BIST) and the logic simulation, (3) data types to represent unresolved states in a pattern, (4) parallel or asynchronous pattern execution on different design blocks, and (5) expression-based conditional execution of pattern constructs.

Defines structures in STIL: 1. For the specification of resource mapping of ATE hardware architecture. An example of resource mapping is the assignment of tester resources to waveform characters that are used in STIL-vectors. 2. For including ATE specific instructions in-line with the STIL data. 3. That allow for "incremental processing" whereby a set of STIL files may be targeted to multiple ATE systems by allowing separately identified ATE data to co-exist. 4. For defining tester rules checks to ensure that the set of generated STIL files conform to the selected resources on one or more ATE systems. 5. For the specification of the resources required for the execution of a set of STIL files on a given ATE system.
IEEE 1455-1999 (R2006), Standard for Message Sets for Vehicle/Roadside Communications
Those characteristics of a dedicated short-range communications (DSRC) system that are independent of the Physical and Data Link Layers (ISO model Layers 1 and 2) are specified. The required and optional features of the roadside equipment (RSE) and the onboard equipment (OBE) are specified.

IEEE 1458-2010, Recommended Practice for the Selection, Application, Field Testing, and Life Expectancy of Molded Case Circuit Breakers for Industrial Applications
This standard provides a recommended procedure for the selection, application, and determination of the remaining life in molded case circuit breakers. This recommended procedure is safe and easily understood.

This guide provides a listing of possible measurement goals related to characterizing quasi-static magnetic and electric fields and possible methods for their accomplishment.

IEEE 1473-2010, Standard for Communications Protocol Aboard Passenger Trains
This standard defines the protocol for intercar and intracar serial data communications between subsystems aboard passenger trains. It sets forth the minimum acceptable parameters for a network that can simultaneously handle monitoring and control traffic from multiple systems. While the network itself is not vital, it is intended to be capable of carrying vital messages. This standard will be structured with respect to the OSI seven-layer model.

IEEE 1474-1.2-2003 (R2008), Standard for User Interface Requirements in Communications-Based Train Control (CBTC) Systems
This standard establishes user interface requirements in CBTC systems.

IEEE 1474.3-2008, Recommended Practice for Communications-Based Train Control (CBTC) System Design and Functional Allocations
This recommended practice establishes a preferred system design and functional allocation for CBTC systems.

IEEE 1474.4-2011, Recommended Practice for Functional Testing of a Communications-Based Train Control (CBTC) System
This recommended practice establishes a preferred approach for functional testing a CBTC system.

IEEE 1475-2012, Standard for the Functioning of Interfaces Among Propulsion, Friction Brake, and rain-Borne Master Control on Rail Rapid Transit Vehicles
This standard specifies the interface functionality among propulsion, friction brake and train-borne master control. The standard encompasses performance parameters, communication methods and the means for measurement and verification of performance. Third party systems performing functions traditionally carried out in one of the above systems are also covered.

IEEE 1476-2000 (R2008), Standard for Passenger Train Auxiliary Power Systems Interfaces
This standard describes the electrical interfaces among the components comprising the auxiliary power systems and their electrical interface with other train-borne systems.

Prescribes requirements for process, control, and management of the planning, execution, and documentation of software activities.

This standard covers delay and power calculation for integrated circuit design with support for modeling logical behavior and signal integrity.

IEEE 1483-2000 (R2007), Standard for the Verification of Vital Functions in Processor-Based Systems Used in Rail Transit Control
This standard provides a set of standard verification tasks for processor-based equipment used in safety-critical applications on rail and transit systems. The scope of this standard shall encompass, and be limited to, processes that verify the level of safety achieved in the implementation of safety-critical functions that are required to be fail-safe. This standard does not address quality assurance or validation processes, which also affect the level of overall system safety achieved.

IEEE 1484.11.1-2004 (R2010), Standard for Learning Technology - Data Model for Content Object Communication
This Standard describes a data model to support the interchange of agreed upon data elements and their values between a learning-related content object and a runtime service (RTS) used to support learning management. This Standard does not specify the means of communication between a content object and an RTS nor how any component of a learning environment shall behave in response to receiving data in the form specified.
IEEE 1484.11-2003 (R2009), Standard for Learning Technology - ECMAScript Application Programming Interface for Content to Runtime Services Communication

This standard describes an ECMAScript application programming interface (API) for content-to-runtime services communication. This standard is based on an API defined in AICC/CMI Guidelines for Interoperability, Revision 3.4 [B1], defined by the Aviation Industry CBT Committee (AICC). It defines common API services in the ECMAScript language that enable the communication of information between learning-related content and a runtime service (RTS) used to support learning management.


This standard specifies a conceptual data schema that defines the structure of metadata for a learning object.

IEEE 1484.12.1-2002/Cor 1-2010\1, Standard for Learning Object Metadata - Corrigendum 1: Corrigenda for 1484.12.1 LOM (Mearning Object Metadata)


This recommended practice specifies how the elements and attributes defined in the Open Archives Initiative Object Reuse and Exchange (OA1 - ORE) Abstract Model1 and expressed in the OA1-ORE Resource Map Implementation in RDF/XML relate to the components of the conceptual model for resource aggregation defined in IEEE Std 1484.13.1™-2012.


This standard defines a data model for describing, referencing, and sharing competency definitions, primarily in the context of online and distributed learning. It provides a way to represent formally the key characteristics of a competency, independently of its use in any particular context. It enables interoperability among learning systems that deal with competency information by providing a means for them to refer to common definitions with common meanings.

IEEE 149-2003 (R2008), Standard Test Procedures for Antennas

This document comprises test procedures for the measurement of antenna properties.


Some major differences between the Third Edition and the Fourth Edition are summarized below: A standard approach to discussing enterprise environmental factors and organizational process assets was employed. A standard approach for discussing requested changes, preventive actions, corrective actions, and defect repairs was employed. To provide clarity, a distinction was made between the project management plan and project documents used to manage the project. A data flow diagram for each process has been created to show the related processes for the inputs and outputs.

IEEE 1493-2006, Guide for the Evaluation of Solvents Used for Cleaning Electrical Cables and Accessories

Provides test procedures for evaluating the physical characteristics of cable cleaning solvents and their compatibility with extruded dielectric cable components and cable accessories (joints and terminations). Also provides suggested procedures for evaluating the cleaning effectiveness of cable cleaning solvents.

IEEE 1497-2001 (R2010), Standard for Standard Delay Format (SDF) for the Electronic Design Process

The Standard Delay Format (SDF) is defined in this standard. SDF is a textual file format for representing the delay and timing information of electronic systems. While both human and machine readable, in its most common usage it will be machine written and machine read in support of timing analysis and verification tools, and of other tools requiring delay and timing information.


IEEE Std 1500 has developed a standard design-for-testability method for integrated circuits containing embedded nonmergetable cores. This method is independent of the underlying functionality of the IC or its individual embedded cores. The method creates the necessary requirements for the test of such ICs, while allowing for ease of interoperability of cores that may have originated from different sources.

IEEE 1502-2007, Recommended Practice for Radar Cross Section Test Procedures

Describes the process of the measurement of the radar cross section of objects using a test range. The term radar cross section is defined and the characteristics of different types of test ranges are given.

IEEE 15026-1-2011, Trial-Use Standard for Adoption of ISO/IEC TR 15026-1:2010 - Systems and Software Engineering -Systems Defines terms and establishes an extensive and organized set of concepts and their relationships, thereby establishing a basis for shared understanding of the concepts and principles central to ISO/IEC 15026 across its user communities. This standard provides information to users of the subsequent parts of ISO/IEC 15026, including the use of each part and the combined use of multiple parts.


This International Standard specifies minimum requirements for the structure and contents of an assurance case. An assurance case includes a top-level claim for a property of a system or product (or set of claims), systematic argumentation regarding this claim, and the evidence and explicit assumptions that underlie this argumentation. Arguing through multiple levels of subordinate claims, this structured argumentation connects the top-level claim to the evidence and assumptions.

IEEE 1505-2010, Standard for Receiver Fixture Interface

The scope of this standard is the development of a common receiver/fixture interface (RFI) specification that is based upon available commercial standards integrated under a common 'open' architecture. This mechanical/electrical interface is intended to serve government/commercial interest for applications in test, system integration, manufacturing, monitoring, and other functional requirements that demand large contact densities and quick-disconnect mechanical operation.

IEEE 1511-2004 (R2010), Guide for Investigating and Analyzing Power Cable, Joint, and Termination Failures on Systems Rated 5kV Through 46 kV

This guide applies to the process of investigating, evaluating, and analyzing field failures. This guide covers the overall format for failure analysis and subsequent guides will specifically address cables, joints, terminations and separable insulated connectors. Included is a recommended flow charting process that can be used to help guide an individual through the failure analysis process.

IEEE 1511.1-2010, Guide for Investigating and Analyzing Shielded Power Cable Failures on Systems Rated 5 kV Through 46 kV

This guide covers specific methods of failure mode classifications and analysis for shielded power cables rated 5 kV through 46 kV.
IEEE 1512-2006, Standard for Common Incident Management Message Sets for Use by Emergency Management Centers
Addresses the exchange of vital data about public safety and emergency management issues involved in transportation-related events, through common incident management message sets. Message sets specified are consistent with the National Intelligent Transportation Architecture and are described using Abstract Syntax Notation One ("ASN.1" or "ASN") syntax.

Specifies messages, data frames, and data elements for communicating information about traffic and infrastructure management in support of real-time interagency transportation-related incident management.

IEEE 1512.3-2006, Hazardous Material Incident Management Message Sets for Use By Emergency Management Centers
Companion to IEEE 1512. Specifies messages, data frames and data elements for communicating general and cargo information to other responders in support of real-time interagency transportation-related incident management. Addresses the unique disciplines associated with communications dealing with the control and confinement of Hazardous Materials during and following an incident.

This recommended practice is written to provide a standard specification language for common parameters used to characterize the performance of electronic power distribution subsystem elements. Specifically, these are parameters relating to the integration of power supplies into electronic power distribution subsystems.

IEEE 1516-2010, Standard for Modeling and Simulation (M&S) High Level Architecture (HLA) -- Framework and Rules
This document provides an overview of the High Level Architecture (HLA), defines a family of related HLA documents, and defines the principles of HLA in terms of responsibilities that federates (simulations, supporting utilities, or interfaces to live systems) and federations (sets of federates working together) must uphold.

This document defines the interface between federates (simulations, supporting utilities, or interfaces to live systems) and the underlying software services that support inter federate communication in a distributed simulation domain.

IEEE 1516.2-2010, Standard for Modeling and Simulation (M&S) High Level Architecture (HLA) -- Object Model Template (OMT) Specification
This document defines the format and syntax for recording information in High Level Architecture (HLA) object models, to include objects, attributes, interactions, and parameters. It does not define the specific data (e.g., vehicles, unit types) that will appear in the object models.

IEEE 1516.4-2007, Recommended Practice for Verification, Validation, and Accreditation of a Federation — An Overlay to the High Level Architecture Federation Development and Execution Process
This recommended practice defines the processes and procedures that should be followed to implement Verification, Validation, and Accreditation (VV&A) for federations being developed using the High Level Architecture (HLA) Federation Development and Execution Process (FEDEP). It is not intended to replace existing VV&A policies, procedures and guidance, but rather to focus on the unique aspects of VV&A of federations. It is a higher-level framework into which such practices can be integrated and tailored for specific uses. The VV&A overlay provides implementation-level guidance to VV&A practitioners.

IEEE 1517-2010, Standard for Information Technology - System and Software Life Cycle Processes - Reuse Processes
This standard draws on IEEE Std 12207-2008 to describe system and software reuse processes. It describes the relationship of reuse processes to system life cycle processes described in Part 6 (System Life Cycle Processes) of IEEE Std 12207-2008 and software life cycle processes described in Part 7 (Software Specific Processes) of IEEE Std 12207-2008. The standard defines processes and specifies requirements for the processes but does not specify particular techniques.

IEEE 1521-2010, Standard for Measurement of Video Jitter and Wander
This standard allows the creation of instrumentation technology for consistent measurements of video-related time-interval errors (TIEs).

IEEE 1523-2002 (R2008), Guide for the Application, Maintenance, and Evaluation of Room Temperature Vulcanizing (RTV) Silicone Rubber Coatings for Outdoor Ceramic Insulators
This guide presents various important aspects that are needed for satisfactory long term performance of High-Voltage Insulator Coatings (HVIC). It also describes various possible application scenarios, maintenance issues on coated insulators, factors affecting long-term performance, the question of aging, laboratory accelerated tests, and functional outdoor evaluation.

IEEE 1526-2003 (R2009), Commended Practice for Testing the Performance of Stand-Alone Photovoltaic Systems
The test methods and procedures included in this recommended practice cover stand-alone PV systems. Procedures provided are for conducting performance testing of individual components and complete systems. The methodology includes testing the system outdoors in prevailing conditions and indoors under simulated conditions.

This International Standard establishes a common framework of process descriptions for describing the life cycle of systems created by humans. It defines a set of processes and associated terminology from an engineering viewpoint. These processes can be applied at any level in the hierarchy of a system’s structure. Selected sets of these processes can be applied throughout the life cycle for managing and performing the stages of a system’s life cycle.


IEEE 1531-2003 (R2009), Guide for Application and Specification of Harmonic Filters
This guide addresses the selection of the (1) components, (2) protection, and (3) control of harmonic filters. It does not address the engineering required to establish the proper size and configuration of harmonic filters to achieve desired performance.

IEEE 1534-2009, Recommended Practice for Specifying Thyristor-Controlled Series Capacitors
This recommended practice specifies Thyristor-Controlled Series Capacitor (TSCC) installations used in series with transmission lines. The document addresses issues that consider rating for TSC, thyristor valve assemblies, capacitors, and reactors as well as TSC control characteristics, protective features, cooling systems, testing, commissioning, operation, and maintenance.

IEEE 1536-2002 (R2008), Standard for Rail Transit Vehicle Battery Physical Interface
This standard prescribes the maximum dimensional requirements of each battery tray for a specific number of cells and battery capacity or performance rating. The battery hardware requirement and battery compartment are also prescribed in this standard.
IEEE 1541-2002 (R2008), Prefixes for Binary Multiples
This standard defines names and letter symbols for prefixes that denote multiplication of a unit by the binary multiplier 2^10n, where n = 1, 2, 3, 4, 5, or 6. Although the prefixes may be used with all units in all fields where multiplication by a binary multiplier is found to be appropriate, their primary use is in the field of information technology.

IEEE 1542-2007, Guide for Installation, Maintenance, and Operation of Irrigation Equipment Located Near or Under Power Lines
The guide is based on industry practices and presents guidelines for installation, maintenance and operation of irrigation equipment near or under power lines as they pertain to minimum distance to energized conductors and proper grounding to minimize nuisance shocks. It covers a variety of conditions in general terms and makes specific recommendations for the type of irrigation systems and power line parameters most commonly found.

An aid in the understanding and use of digital test interchange format (DTIF) files is provided in this guide. This information will be an aid to users in developing tools such as preprocessors and postprocessors of DTIF data and other utilities.

IEEE 1547-2003 (R2008), Standard for Interconnecting Distributed Resources with Electric Power Systems
This standard provides a uniform standard for interconnection of distributed resources with electric power systems. It provides requirements relevant to the performance, operation, testing, safety considerations, and maintenance of the interconnection.

This standard specifies the type, production, and commissioning tests that shall be performed to demonstrate that the interconnection functions and equipment of the distributed resources (DR) conform to IEEE Std 1547.

IEEE 1547.1a-2015, Standard Conformance Test Procedures for Equipment Interconnecting Distributed Resources with Electric Power Systems - Amendment 1
This amendment was prepared in response to IEEE Std 1547a - Amendment 2 to IEEE 1547-2003 providing revisions to Clause 4.1.1 Voltage regulation, Clause 4.2.4 Frequency, and Clause 4.2.3 Voltage.

IEEE 1547.3-2007, Guide for Monitoring, Information Exchange, and Control of Distributed Resources Interconnected with Electric Power Systems
This document provides guidelines for the monitoring, information exchange, and control of distributed resources (DR) which are interconnected with electric power systems (EPS).

IEEE 1547.4-2011, Guide for Design, Operation, and Integration of Distributed Resource Island Systems with Electric Power Systems
This document provides alternative approaches and good practices for the design, operation, and integration of distributed resource (DR) island systems with electric power systems (EPS). This includes the ability to separate from and reconnect to part of the area EPS while providing power to the islanded EPS. This guide includes the distributed resources, interconnection systems, and participating electric power systems.

IEEE 1547.6-2011, Recommended Practice for Interconnecting Distributed Resources with Electric Power Systems Distribution
Builds upon IEEE Std 1547 for the interconnection of distributed resources (DR) to distribution secondary network systems. This standard establishes recommended criteria, requirements and tests, and provides guidance for interconnection of distribution secondary network system types of area electric power systems (area EPS) with distributed resources (DR) providing electric power generation in local electric power systems (local EPS).

IEEE 1549-2011, Standard for Microwave Filter Definitions
Provides the definitions for standard on microwave filter terms.

IEEE 1553-2007, Standard for Voltage Endurance Testing of Form-Wound Coils and Bars for Hydrogenerators
This standard applies to voltage-endurance testing of form-wound stator winding bars and coils having a mica-based insulation system with thermo-setting polyester and/or epoxy resins used in hydrogenerators and pumped storage generators operating in air with a rated line-to-line voltage between 4 000 to 22 000 V, and a frequency of 50 Hz or 60 Hz.

IEEE 1554-2005 (R2011), Inertial Sensor Test Equipment, Instrumentation, Data Acquisition, and Analysis
Discusses recommended practices for gyroscope and accelerometer testing, ranging from the equipment and instrumentation employed to the way that tests are carried out and data are acquired and analyzed.

The objective is to provide a source of definitions of terminology used in the development, manufacture, and test of aided and unaided inertial systems used for navigation, guidance, orientation, stabilization, and related applications.

IEEE 1561-2007, Guide for Optimizing the Performance and Life of Lead-Acid Batteries in Remote Hybrid Power Systems
This guide provides rationale and guidance for operating lead-acid batteries in remote hybrid power systems, taking into consideration system loads and the capacities of the system’s renewable-energy generator(s), dispatchable generator(s), and battery(s). It also provides guidance for selecting an appropriate lead-acid battery technology for various system operating strategies.

IEEE 1562-2007, Guide for Array and Battery Sizing in Stand-Alone Photovoltaic (PV) Systems
This guide provides information to assist in sizing the array and battery of a stand-alone photovoltaic system. Systems considered in this guide consist of PV as the only power source and a battery for energy storage. These systems also commonly employ controls to protect the battery from being over- or under-charged, and may employ a power conversion subsystem (inverter or converter). This guide is applicable to all stand-alone PV systems where PV is the only charging source, and it covers lead-acid batteries only.

IEEE 1568-2003 (R2010), Recommended Practice for Electrical Sizing of Nickel-Cadmium Batteries for Rail Passenger Vehicles
This recommended practice prescribes a method for electrical sizing of nickel-cadmium batteries for use on passenger rail cars used for battery back up of low voltage dc auxiliary power systems. It encompasses all factors that influence the electrical battery capacity requirements including loads, temperature, cycling, charging and discharging profiles.

IEEE 1570-2002 (R2008), Standard for the Interface Between the Rail Subsystem and the Highway Subsystem at a Highway Rail Intersection
This standard defines the logical and physical interfaces and the performance attributes for the interface between the rail subsystem and the highway subsystem at a highway rail intersection.

IEEE 1578-2007, Recommended Practice for Stationary Battery Electrolyte Spill Containment and Management
This recommended practice describes products, methods, and procedures relating to stationary batteries, battery electrolyte spill mechanisms, electrolyte containment and control methods, and fire fighting considerations.
IEEE 1570-2010, Recommended Practice for Marine Cable for Use on Shipboard and Fixed or Floating Facilities
This recommended practice contains the requirements for single or multicore cables, with or without metal armor and/or jacket, and rated 300 V to 35 kV (RMS phase-to-phase), intended to be installed aboard marine vessels, fixed and floating offshore facilities, and in accordance with industry installation standards and the regulations of the authorities having jurisdiction (AHJ). The recommendations define what is considered good engineering practice with reference to the reliability and durability of the cable.

Defines a low-cost method for testing the interconnection of discrete, complex memory integrated circuits (ICs) where additional pins for testing are not available and implementing boundary scan (IEEE Std 1149.1) is not feasible. This standard describes the implementation rules for the test logic and test mode access/exit methods in compliant ICs. The standard is limited to the behavioral description of the implementation and will not include the technical design for the test logic or test mode control circuitry.

This guide describes an approach to prepare a specification for an electronic device connected in series to compensate voltage fluctuations. It intends to provide a basic specification to allow users to modify specific parts of the document to meet their practical needs.

This standard specifies a protocol enabling precise synchronization of clocks in measurement and control systems implemented with technologies such as network communication, local computing and distributed objects. The protocol is applicable to systems communicating via packet networks. The protocol enables heterogeneous systems that include clocks of various inherent precision, resolution and stability to synchronize.

This recommended practice presents engineering design procedures for the electrical protection of communication facilities serving electric supply locations using optical fiber systems.

IEEE 1591.3-2011, Standard for Qualifying Hardware for Helically-Applied Fiber Optic Cable Systems (WRAP Cable)
This standard covers hardware for use with all-dielectric fiber optic (WRAP) cable designed to be helically wrapped around a conductor or other messenger on overhead power facilities. This covers mechanical, and electrical performance, test requirements, environmental considerations, and acceptance criteria for qualification of the hardware.

This International Standard identifies the activities and tasks that are necessary to successfully identify, define, select, apply and improve measurement within an overall project or organizational measurement structure. It also provides definitions for measurement terms commonly used within the system and software industries.

IEEE 1594-2008, Standard for Helically-Applied Fiber Optic Cable Systems (WRAP Cable) for Use on Overhead Utility Lines
This standard covers an all-dielectric fiber optic (WRAP) cable designed to be helically wrapped around a conductor or other messenger on overhead power facilities. This covers the mechanical, electrical, and optical performance, installation guidelines, acceptance criteria, test requirements, environmental considerations, packaging and shipping guidelines and accessories.

This standard defines a method to validate computational electromagnetics (CEM) computer modeling and simulation (M&S) techniques, codes, and models. It is applicable to a wide variety of electromagnetic (EM) applications including but not limited to the fields of electromagnetic compatibility (EMC), radar cross section (RCS), signal integrity (SI), and antennas.

IEEE 1597.2-2010, Recommended Practice for Validation of Computational Electromagnetics Computer Modeling and Simulations
This recommended practice is a companion document for IEEE Std. 1597.1 & #8482; 2008. It provides examples and problem sets to be used in the validation of computational electromagnetics (CEM) computer modeling and simulation techniques, codes, and models. It is applicable to a wide variety of electromagnetic (EM) applications including but not limited to the fields of antennas, signal integrity (SI), radar cross section (RCS), and electromagnetic compatibility (EMC).

IEEE 1599-2008, Recommended Practice for Definition of a Commonly Acceptable Musical Application Using the XML Language
This recommended practice is aimed at developing an XML-based application which defines a standard language for symbolic music representation. The language is a metarepresentation of music information to describe, link and synchronize music information within a multi-layered environment. It is intended to submit this recommended practice to ISO/IEC JTC1 for consideration.

A process for the management of risk in the life cycle [during systems acquisition, supply, development, operations, and maintenance] is defined. It can be added to the existing set of software life cycle processes defined by the ISO/IEC 12207 or ISO/IEC 15288 series of standards, or it can be used independently.

This standard specifies the application service layer and profile for Payment and Identity authentication, and Payment Data transfer for Dedicated Short Range Communication (DSRC) based applications using IEEE Std 802.11 and IEEE 1609 protocols in Wireless Access in Vehicular Environments. This standard defines a basic level of technical interoperability for electronic payment equipment, i.e. onboard unit (OBU) and roadside unit (RSU).

IEEE 1609.2-2013, Standard for Wireless Access in Vehicular Environments -- Security Services for Applications and Management Messages
This standard defines secure message formats and processing for use by Wireless Access in Vehicular Environments (WAVE) devices, including methods to secure WAVE management messages and methods to secure application messages.

IEEE 1609.3-2010, Standard for Wireless Access in Vehicular Environments (WAVE) - Networking Services
The scope of this standard is the specification of network and transport layer protocols and services that support multi-channel wireless connectivity between IEEE 802.11 Wireless Access in Vehicular Environments (WAVE) devices.

IEEE 1609.4-2011, Standard for Wireless Access in Vehicular Environments (WAVE) - Multi-Channel Operation
The scope of this standard is the specification of medium access control (MAC) sublayer functions and services that support multi-channel wireless connectivity between IEEE 802.11 Wireless Access in Vehicular Environments (WAVE) devices.
This Application Guide provides information on what a Faulted Circuit Indicator (FCI) is designed to do and describes methods for selecting FCIs for three-phase, 200 / 600 amp underground distribution circuits.

IEEE 1613-2009, Standard Environmental and Testing Requirements for Communications Networking Devices Installed in Electric Power Substations
This document specifies standard service conditions, standard ratings, environmental performance requirements, and testing requirements for communications networking devices and communications ports in protective relays installed in electric power substations.

IEEE 1613a-2011, Standard Environmental and Testing Requirements for Communications Networking Devices Installed in Electric Power Substations Amendment: Adding of One Definition, DC Power Supply Requirements (5.1), and Annex E - History
This document specifies standard service conditions, standard ratings, environmental performance requirements, and testing requirements for communications networking devices and communications ports in protective relays installed in electric power substations. It does not cover such equipment designed for operation in other environments, such as office locations.

IEEE 1615-2007, Recommended Practice for Network Communication in Electric Power Substations
Explains recommended practices for communication and interoperation of devices connected on an electric power substation internet protocol (IP) network. For the power engineer new to IP networking, it provides an introduction to the concepts that need to be mastered as well as specific recommendations to follow when deploying the techniques. For equipment manufacturers and system integrators, it provides direction and requirements to facilitate interoperable electric utility information networks.

IEEE 1616-2004 (R2010), Standard for Motor Vehicle Event Data Recorder (MVEDR)
Defines a protocol for the output data compatibility of Motor Vehicle Event Data Recorders (MVEDR) and export protocols of MVEDR data elements. This standard does not prescribe which specific data elements shall be recorded, but instead provides a data dictionary of data attributes. MVEDRs collect, record, store, and export data related to motor-vehicle predefined events.

IEEE 1616a-2010, Standard for Motor Vehicle Event Data Recorders (MVEDRs) - Amendment 1: Motor Vehicle Event Data
This amendment adds information pertaining to Motor Vehicle Event Data Recorder Connector Lockout Apparatus (MVEDRCLA).

IEEE 1617-2007, Guide for Detection, Mitigation, and Control of Concentric Neutral Corrosion in Medium Voltage Underground Cables
This guide focuses primarily on unjacketed, underground distribution cable which has been installed direct buried or in conduit. It also describes causes of corrosion in cable concentric neutral wires and straps, methods to detect this corrosion, and makes recommendations on how to mitigate and control the cable concentric neutral corrosion. It also discusses the consequences of significant loss of concentric neutral.

IEEE 1619-2007, Standard for Cryptographic Protection of Data on Block-Oriented Storage Devices
The purpose of this standard is to describe a method of encryption for data stored in sector-based devices where the threat model includes possible access to stored data by the adversary. The standard specifies the encryption transform and a method for exporting/importing encryption keys for compatibility between different implementations. Encryption of data in transit is not covered by this standard.

This standard specifies cryptographic and data authentication procedures for storage devices that support length-expansion, such as tape drives. Such procedures include the following cryptographic modes of operation for the AES block cipher: CCM, GCM, CBC-HMAC, and XTS-HMAC.

IEEE 1619.2-2010, Standard for Wide-Block Encryption for Shared Storage Media
This standard specifies an architecture for encryption of data in random access storage devices, oriented toward applications which benefit from wide-encryption-block sizes of 512 bytes and above.

This standard describes a method for characterizing organic electronic devices, including measurement techniques, methods of reporting data, and the testing conditions during characterization.

Recommended methods and standardized reporting practices for electrical characterization of printed and organic ring oscillators are covered. Describes the most common sources of measurement errors, particularly for high-impedance electrical measurements commonly required for printed and organic ring oscillators. Also gives recommended practices in order to minimize and/or characterize the effect of measurement artifacts and other sources of error encountered while measuring printed and organic ring oscillators.

IEEE 1621-2004 (R2009), Standard for User Interface Elements in Power Control of Electronic Devices Employed in Office/Consumer Environments
This standard covers the user interface for the power status control of electronic devices that ordinary people commonly interact with in their work and home lives, including, but not limited to, office equipment and consumer electronics. Key elements are terms, symbols, and indicators.

This document provides general guidelines for the preparation of a functional specification for solid-state electronic shunt devices used mainly for compensation of voltage fluctuation. The guide covers devices rated to medium voltage (1 kV - 35 kV). This device contains in general: an inverter, rectifier or dc converter, energy storage device, and coupling transformer. The device typically is connected in parallel with the network using a coupling transformer.

IEEE 1624-2008, Standard for Organizational Reliability Capability
This Standard defines the reliability capability of organizations and identifies the criteria for assessing the reliability capability of an organization. It is intended to be usable by all organizations that design, manufacture or procure electrical/electronics components or products. Although the concepts described in this Standard could be applied to both hardware and software products, it focuses on hardware products.

This standard establishes criteria for design analysis for qualification, quality, and reliability of rechargeable battery systems for multi-cell mobile computing devices. It also provides methods for quantifying the operational performance of these batteries and their associated management and control systems including considerations for end-user notification.

IEEE 1628-2009, Recommended Practice for Maintenance for dc Overhead Contact Systems for Transit Systems
This recommended practice provides overhead contact system maintenance practices and procedures including maintenance techniques, site inspection and test procedures, and maintenance tolerances, for heavy rail, light rail, and trolley bus systems.
IEEE 1631-2008, Recommended Practice for Measurement of 8-VSB Digital Television Transmission Mask Compliance for the USA
This document provides a standardized body of theory, techniques and procedures for measuring the spectral characteristics of 8-VSB transmitters used for terrestrial transmission of digital television (DTV) in the frequency range near their assigned Channels. Essential characteristics are specified and measurement procedures are given that ensure that all parties will obtain comparable results.

IEEE 16326-2009, Standard for Software Engineering - Project management
This International Standard is intended to aid project managers in managing to successful conclusion those projects concerned with software-intensive systems and software products. This International Standard specifies the required content of the project management plan (PMP). This International Standard also quotes the extracted purpose and outcome statements from the project processes of ISO/IEC 12207:2008 (IEEE Std 12207-2008) and ISO/IEC 15288:2008 (IEEE Std 15288-2008), and adds detailed guidance for managing projects that use these processes for software products and software-intensive systems.

IEEE 1633-2008, Recommended Practice on Software Reliability
This recommended practice prescribes the methods for assessing and predicting the reliability of software, based on a life cycle approach to software reliability engineering. It provides information necessary for the application of software reliability measurement to a project, lays a foundation for building consistent methods, and establishes the basic principle for collecting the data needed to assess and predict the reliability of software.

IEEE 1636.2-2010, Standard for Software Interface for Maintenance Information Collection and Analysis (SIMICA): Exchanging Maintenance Action Information via the Extensible Markup Language (XML)
The scope of this standard is the definition of an exchange format, utilizing XML, for exchanging maintenance action information associated with the removal, repair, and replacement of system components to maintain/support an operational system.

IEEE 1641.1-2015, Guide for the Use of IEEE Std 1641, IEEE Standard for Signal and Test Definition Amendment to add Guidelines for producing reusable Test Signal Frameworks (TSFs) for use on platforms utilizing Automatic Test Markup Language (ATML)
This guide provides application information and guidance for users who write, develop, implement, and support test requirements, signal definitions, and signal responses using IEEE Std 1641-2010, the signal and test definition (STD) standard. Examples of the definition and use of signal models in different environments are included.

IEEE 1647-2011, Standard for the Functional Verification Language e
This standard defines the e functional verification language. This standard aims to serve as an authoritative source for the definition of (a) syntax and semantics of e language constructs (b) the e language interaction with standard simulation languages (c) e language libraries.

IEEE 1651-2010, Guide for Reducing Bird-Related Outages
This guide documents proven methods and designs to reduce bird-related outages, such as contamination outages, streamer outages, and electrocution/collision/contact outages on transmission lines, in substations, and on distribution lines, thereby improving reliability and minimizing the associated revenue loss.

IEEE 1652-2008, Standard for the Application of Free Field Acoustic Reference to Telephony Measurements
This standard provides the techniques and rationale for referencing acoustic telephony measurements to the free field. It applies to ear related measurements such as receive, sidetone and overall.

IEEE 1653.2-2009, Standard for Uncontrolled Traction Power Rectifiers for Substation Applications Up to 1500 Volts dc Nominal Output
This standard covers design, manufactured, and testing unique to the application of uncontrolled semiconductor power rectifiers for dc supplied transportation substation applications up to 1500 Volts dc nominal output.

IEEE 1653.3-2012, Guide for Rail Transit Traction Power Systems Modeling
This guide provides a description of the data, techniques and procedures typically used in modeling and analysis of rail transit traction power systems.

IEEE 1653.4-2011, Standard for dc Traction Power System Field Testing and Acceptance Criteria for System Applications up to 1500 Volts dc Nominal
This standard provides field test and acceptance criteria for transportation system applications powered by a dc traction power system up to 1500 volts nominal.

This Guide presents information on establishing an effective safety program to assure compliance with the applicable regulations for radio frequency (RF) protection of electrical workers in the vicinity of wireless communication antennas adjacent or attached to electrical power line structures. The Guide also provides information on power frequency electric and magnetic field immunity of RF personal monitors and RF protective clothing.

IEEE 1656-2010, Guide for Testing the Electrical, Mechanical, and Durability Performance of Wildlife Protective Devices on Overhead Power Distribution Systems Rated up to 38 kV
Applicable to wildlife protective products installed on overhead electrical distribution systems rated up to and including 38 kV. The guide provides test recommendations regarding these products that are in direct contact or in the proximity of energized parts and conductors.

IEEE 1657-2009, Recommended Practice for Personnel Qualifications for Installation and Maintenance of Stationary Batteries
This recommended practice defines the areas of recommended knowledge for installers and maintainers of stationary batteries and related systems to the extent that they affect the battery.

IEEE 1657a-2015, Recommended Practice for Personnel Qualifications for Installation and Maintenance of Stationary Batteries - Amendment 1: Updated Safety Sections
This recommended practice defines the areas of recommended knowledge for installers and maintainers of stationary batteries and related systems to the extent that they affect the battery. Design of the dc system and sizing of the dc battery charger(s) are beyond the scope of this recommended practice. This document covers lead-acid and Nickel-Cadmium battery technologies.

This standard defines terminology and test methods to clearly document prevalent world-wide terms used to describe and test Digital to Analog Converters (DAC's). It is restricted to monolithic, hybrid, and module DAC’s and does not cover systems encompassing DAC’s.

IEEE 1660-2008, Guide for Application and Management of Stationary Batteries Used in Cycling Service
This guide provides information on the differences between stationary standby and stationary cycling applications and appropriate battery management strategies in cycling operations.

This guide contains a field test procedure for lead-acid batteries used in photovoltaic (PV) hybrid power systems. It discusses battery charging parameters and ways for interpreting test results. This guide is applicable to all PV hybrid power systems where PV and an engine generator are the only charging sources (it does not include stand-alone PV only systems).
This document summarizes the current electrical engineering methods and practices for applying power electronics in Electrical Power Systems on Ships.

IEEE 1665-2009, Guide for the Rewind of Synchronous Generators, 50 and 60 Hz, Rated 1 MVA and Above
The general parameters for this Guide apply to 50 or 60 hertz synchronous generators driven by reciprocating engines, steam turbines, combustion turbines, and hydroturbines. The guide generally applies to the stator and rotor of generators with rated outputs of 1 MVA and above.

IEEE 1667-2015, Standard for Discovery, Authentication, and Authorization in Host Attachments of Storage Devices
This standard defines discovery, authentication, and authorization protocols between hosts and storage devices over multiple transports.

IEEE 1671-2010, Standard for Automatic Test Markup Language (ATML) for Exchanging Automatic Test Equipment and Test Information via XML
This document specifies a framework for the ATML family of standards. ATML allows Automatic Test System (ATS) test information to be exchanged in a common format adhering to the XML standard.

IEEE 1671-2.2-2012, Standard for Automatic Test Markup Language (ATML) Instrument Description
This standard specifies an exchange format, using eXtensible Markup Language (XML), for identifying instrumentation that may be integrated in an automatic test system (ATS) that is to be used to test and diagnose a unit under test (UUT).

IEEE 1671-5.2015, Standard for Automatic Test Markup Language (ATML) Test Adapter Description
This standard defines an exchange format, utilizing eXtensible Markup Language (XML), for both the static description of a test adapter by defining the interface between the unit under test (UUT) and the test station, and the specific description of test adapter instance information.

IEEE 1671-6-2015, Standard for Automatic Test Markup Language (ATML) Test Station Description
This standard defines an exchange format, utilizing eXtensible Markup Language (XML), for both the static description of a test station, and the specific description of test station instance information.

IEEE 1672-2006, Standard for Ultrawideband Radar Definitions
Recommends definitions for promoting clarity and consistency in the use of ultrawideband radar terminology.

IEEE 1672-2006/Cor1-2008, IEEE Standard for Ultrawideband Radar Definitions - Corrigendum 1
This replaces a definition from the base document.

IEEE 1673-2015, Standard for Requirements for Conduct and Cable Seals for Field Connected Wiring to Equipment in Petroleum and Chemical Industry Exposed to Pressures above Atmospheric (1.5 kPa, 0.22 psi)
This document provides specific requirements for field installed sealing between a pressurized system (stream) containing flammable or combustible process fluids which is connected directly or indirectly to an electrical system where a failure could allow the migration of process fluids directly into the electrical system.

IEEE 1675-2008, Standard for Broadcom Over Powerline Hardware
The scope of this standard is to provide testing and verification standards for the commonly used hardware, primarily couplers and enclosures, for Broadband over Power Line (BPL) installations, and provide standard installation methods to enable compliance with applicable codes and standards.

The scope of this guide is to define and characterize control architecture for high-power electronics from power semiconductor device level to the power system level. This guide covers the application of power electronics in the areas of Power Quality/Custom Power, Flexible AC Transmission Systems (FACTS), High Voltage DC Transmission (HVDC), Distributed Generation, Energy Storage applications, etc., with a power range from hundreds of kW to thousands of MW, but with emphasis on the 1 MW to hundreds of MW.

IEEE 1679-2010, Recommended Practice for the Characterization and Evaluation of Emerging Energy Storage Technologies in Stationary Applications
This document covers recommended information for an objective evaluation of an emerging energy storage device or system by a potential user for any stationary application. Energy storage technologies are those that provide a means for the reversible storage of electrical energy, i.e., the device receives electrical energy and is able to discharge electrical energy at a later time. The storage medium may be electrochemical (e.g., batteries), kinetic (e.g., flywheels), electrostatic (e.g., double-layer capacitors), thermal, or some other medium. Devices recharged by non-electrical means, such as fuel cells, are beyond the scope of this document.

IEEE 1680-2009, Standard for Environmental Assessment of Electronic Products
The 1680 family of standards defines environmental performance criteria for electronic products. The scope of this document is to provide guidelines and implementation procedures for the standards included in the 1680 family of standards.

This Standard defines environmental performance criteria for personal computer products, including desktop computers, notebook computers, and computer displays.

IEEE 1680.2-2012, Standard for Environmental Assessment of Imaging Equipment
This Standard defines environmental performance standards for imaging equipment (as defined by the U.S. ENERGY STAR® Imaging Equipment Specification) including copiers, digital duplicators, facsimile machines, multifunction devices, printers, mailing machines and scanners, relating to reduction or elimination of environmentally sensitive materials, materials selection, design for end of life, lifecycle extension, energy conservation, end of life management, corporate performance, packaging, consumables and indoor air quality.

IEEE 1680.3-2012, Standard for Environmental Assessment of Televisions
This Standard defines environmental performance for televisions, television combination units, and component television units, relating to reduction or elimination of environmentally sensitive materials, materials selection, design for end of life, lifecycle extension, energy conservation, end of life management, corporate performance, and packaging. This Standard applies to products that are primarily marketed as televisions, and does NOT cover computer displays as defined by IEEE 1680.1TM.

IEEE 1682-2011, Trial-Use Standard for Qualifying Fiber Optic Cables, Connections and Optical Fiber Splices for Use in Computer Displays
This standard provides requirements, directions, and methods for qualifying fiber optic cables, connections and optical fiber splices for use in safety systems of nuclear power generating stations. Cables, connections, optical fibers, and splices within or integral to other devices (e.g., sensors, instruments, panels, etc.) shall be qualified using the requirements in the applicable device standard or IEEE Std. 323-2003, as appropriate. However, this standard’s requirements may be applied to the fiber optic cable, connections and optical fiber splices within these devices.

This standard describes an XML Schema for metadata documenting Intellectual Property (IP) used in the development, implementation and verification of electronic systems and an Application Programming Interface (API) to provide tool access to the metadata.
The standard defines the functions and features to be provided in substation intelligent electronic devices (IEDs) to accommodate critical infrastructure protection programs. The standard addresses security regarding the access, operation, configuration, firmware revision and data retrieval from an IED. Encryption for the secure transmission of data both within and external to the substation is not part of this standard.

IEEE 1692-2011, Guide for the Protection of Communication Installations from Lightning Effects
This document presents engineering design guidelines for the prevention of lightning damage to communications equipment within structures.

IEEE 1698-2009, Guide for the Calculation of Braking Distances for Rail Transit Vehicles
This guide provides methods and assumptions used in calculating the braking distances of rail transit vehicles. The methods encompass automatic train protection and signal system operation, propulsion and brake system operation, environmental conditions, operator interfaces, tolerances, and failure modes.

IEEE 1701-2011, Standard for Optical Port Communication Protocol to Complement the Utility Industry End Device Data Tables
This standard provides multi-source and “plug and play” environment for the millions of metering devices in the field now and the future using the ANSI Type 2 optical port interface. It solves the problems associated with single source systems and with multi-source systems based upon proprietary communications protocols. Electric, Water, and Gas Utilities and corresponding vendors can realize cost savings which ultimately shall benefit the client consumers of the Utilities.

IEEE 1702-2011, Standard for Telephone Modem Communication Protocol to Complement the Utility Industry End Device Data Tables
This standard provides multi-source and “plug and play” environment for the millions of metering devices in the field now and the future using the telephone MODEM communication interface. It solves the problems associated with single source systems and with multi-source systems based upon proprietary communications protocols. Electric, Water, and Gas Utilities and corresponding vendors can realize cost savings which ultimately shall benefit the client consumers of the Utilities.

IEEE 1707-2015, Recommended Practice for the Investigation of Events at Nuclear Facilities
This document provides common terminology and recommended practices for initiating and conducting event investigations, analyzing data, producing results and identifying corrective actions associated with facility personnel, processes, equipment and systems at nuclear facilities.

IEEE 1709-2010, Recommended Practice for 1 to 35kV Medium Voltage DC Power Systems on Ships
This standard recommends guidelines to specify, procure, design, manufacture and develop manuals, safety procedures, practices and procedures for effective maintenance of Medium Voltage DC (MVDC) electrical power systems. Recommendations are made for analytical methods, preferred interconnection interfaces and performance characteristics for reliable integration of MVDC Electrical components into the Ship MVDC electrical power systems.

Provides a template to assist line design engineers in gathering information and organizing it into a coherent Design Criteria Document for use in the design of overhead electric power transmission lines, generally at voltages of 69kV and higher. The guide will also be useful for the design of lower voltage lines.

IEEE 1725-2011, Standard for Rechargeable Batteries for Cellular Telephones
Establishes criteria for design analysis for qualification, quality, and reliability of rechargeable lithium ion and lithium ion polymer batteries for cellular telephone applications.

This guideline establishes induced voltage working procedures for underground transmission circuits. A transmission circuit when de-energized will have an induced voltage when in a common duct bank with an energized circuit. The induced voltage may be a possible safety hazard. The induced voltage may be determined by modeling the circuits and by measurement. This guide addresses the working procedures to follow when performing work where induced voltage is present.

IEEE 1730-2010, Recommended Practice for Distributed Simulation Engineering and Execution Process
This recommended practice defines the processes and procedures that should be followed by users of distributed simulations to develop and execute their simulations; it is intended as a higher-level framework into which low-level management and systems engineering practices native to user organizations can be integrated and tailored for specific uses.

IEEE 1733-2011, Standard for Layer 3 Transport Protocol for Time Sensitive Applications in Local Area Networks
This standard specifies the protocol, data encapulations, connection management and presentation time procedures used to ensure interoperability between audio and video-based end stations that use standard networking services provided by all IEEE 802 networks meeting Quality of Service requirements for time-sensitive applications by leveraging the Real-time Transport Protocol (RTP) family of protocols and family of IEEE 802.1 Audio/Video Bridging (AVB) protocols.

IEEE 1734-2011, Standard for Quality of Electronic and Software Intellectual Property used in System and System on Chip (SoC) Designs
This specification defines a standard XML format for representing electronic IP quality information, based on an information model for electronic IP quality measurement. It includes a schema and the terms that are relevant for measuring electronic IP quality, including software that executes on the system. The schema and information model can be focused to represent particular categories of interest to IP users. In the context of this document, the term “IP” shall be used to mean Intellectual Property electronic design data. Electronic Design Intellectual Property is a term used in the electronic design community.

This scope of this standard is electromagnetic compatibility (EMC) criteria and consensus test and measurements procedures for Broadband Power Line Communication (also known as BPL) equipment and installations. The standard references existing national and international standards for BPL equipment and installations. It does not include the specific emission limits, which are subject to national regulations.

IEEE 1776-2009, Recommended Practice for Thermal Evaluation of Unsealed or Sealed Insulation Systems for AC Electrical Machinery Employing Form-Wound Pre-Insulated Stator Coils for Machines Rated 15000 V and Below
This recommended practice outlines test procedures for comparing two or more unsealed or sealed insulation systems in accordance with their expected life at rated temperature. The procedure is limited to insulation systems for AC electrical machines using form-wound pre-insulated stator coils rated 15000 V and below.

IEEE 1783-2009, Guide for Test Methods and Procedures to Evaluate the Electrical Performance of Insulators in Freezing Conditions
The guide specifies procedures for testing equipment when external insulation of the test object is subjected to combinations of contamination, ice, snow or cold fog. The methods are applicable only to tests on equipment with a rated voltage above 1 kV.
This standard gives specifications for the waveguide (including aperture dimensions, frequency range, cut-off frequency, etc). This standard considers the tolerances of the waveguide aperture dimensions and the effect these have on the electrical properties (in terms of return loss, transmission loss, etc) of the waveguide.

This document provides guidance for the application of Computerized Operating Procedure Systems (COPS). This guidance concerns the design (i.e., form and function) and use of COPS. In general, this guide does not provide guidance for the technical content of the operating procedures being presented except as needed to address unique aspects of procedure implementation on COPS.

IEEE 1788-2015, Standard for Interval Arithmetic
This standard specifies basic interval arithmetic (IA) operations selecting and following one of the commonly used mathematical interval models. This standard supports the IEEE 754 floating-point formats of practical use in interval computations. Exception conditions are defined, and standard handling of these conditions is specified. Consistency with the interval model is tempered with practical considerations based on input from representatives of vendors, developers and maintainers of existing systems.

IEEE 1789-2015, Recommended Practices for Modulating Current in High-Brightness LEDs for Mitigating Health Risks to Viewers
The scope of this standard is to: 1) define the concept of modulation frequencies for LEDs and discuss their applications to LED lighting, 2) describe LED lighting applications in which modulation frequencies pose possible health risks to users, 3) discuss the dimming of LEDs by modulating the frequency of driving currents/voltage, and 4) present recommendations for modulation frequencies (flicker) for LED lighting and dimming applications to help prevent against known potential adverse health effects.

This guide presents factors to be considered in the planning and design of transition facilities between overhead and underground transmission lines. These include the system implications of a hybrid installation as they relate to the transition facility.

IEEE 18-2012, Standard for Shunt Power Capacitors
This standard applies to power capacitors rated 216 V or higher, 2.5 kvar or more, and designed for shunt connection to alternating current transmission and distribution systems operating at a nominal frequency of 50 Hz or 60 Hz.

This standard provides the definition of the language syntax and semantics for System-Verilog, which is a unified hardware design, specification, and verification language. The standard includes support for modeling hardware at the behavioral, register transfer level (RTL), and gatelevel abstraction levels, and for writing testbenches using coverage, assertions, object-oriented programming, and constrained random verification.

This standard defines the syntax and semantics of a format used to express power intent in energy-aware electronic system design. Power intent includes the concepts and information required for specification and validation, implementation and verification, and modeling and analysis of power managed electronic systems. This standard also defines the relationship between the power intent captured in this format and design intent captured via other formats (e.g., standard hardware description languages and cell libraries).

IEEE 1808-2011, Guide for Collecting and Managing Transmission Line Inspection and Maintenance Data
This guide provides reference information to assist electric utilities and their contractors with the development of computer-based means for collecting and managing transmission line inspection and maintenance data and associated asset information including transmission line inventory data. It provides a high level overview of key principles and considerations learned through experience that will help ensure common pitfalls are avoided and enhance the usability of systems.

IEEE 1815-2010, Standard for Electric Power Systems Communications - Distributed Network Protocol (DNP3)
This document specifies the DNP3 protocol structure, functions, and application alternatives. In addition to defining the structure and operation of DNP3, the standard defines three application levels that are interoperable. The simplest application is for low-cost distribution feeder devices, and the most complex is for full-featured master stations. The intermediate application level is for substation and other intermediate devices. The protocol is suitable for operation on a variety of communication media consistent with the makeup of most electric power communication systems.

This document specifies the standard approach for mapping between IEEE Std 1815 (Distributed Network Protocol (DNP3)) and IEC 61850 (Communications Networks and Systems for Power Utility Automation). Two primary use cases are addressed: a) Mapping between an IEEE 1815-based master and an IEC 61850-based server. b) Mapping between an IEC 61850-based client and an IEEE 1815-based outstation.

IEEE 1816-2013, Guide for Preparation Techniques of Extruded Dielectric, Shielded Cables Rated 2.5 kV through 46 kV and the Installation of Mating Accessories
This document defines accepted best industry practices for the preparation of extruded dielectric shielded medium voltage cables rated 2.5 kV through 46 kV and the installation of mating accessories.

IEEE 1823-2015, Standard for Universal Power Adapter for Mobile Devices
The Universal Power Adapter for Mobile Devices (UPAMD) standard defines a power delivery connection between a power adapter and the mobile power device. A communications link between the power adapter and the mobile power device is also defined. The communications may be used to coordinate the power delivery and provide identification between the power adapter and the power using device. While intended for portable computing and entertainment devices, power adapters conforming to this standard may also be used with other devices.

This standard provides a method for subjecting energized cable systems to a standard fire exposure to obtain a time rating. Types of cable include power, control, instrumentation and communication cables. Acceptance criteria are based on the cable maintaining functionality throughout the prescribed test.

IEEE 1850-2010, Standard for Property Specification Language (PSL)
This standard defines the property specification language (PSL), which formally describes electronic system behavior. This standard specifies the syntax and semantics for PSL and also clarifies how PSL interfaces with various standard electronic system design languages.

IEEE 1857-2013, Standard for Advanced Audio and Video Coding
The standard defines a set of tools for efficient video coding and the corresponding decoding procedure, including intra prediction, inter prediction, transform quantization, and coding.
IEEE 1857.5-2015, Draft Standard for Advanced Mobile Speech and Audio
This part of IEEE 1857.5 describes a set of speech and audio compression, decompression and packaging tools and mechanism. This part is applicable to the following areas: - Mobile communication; - Wireless broadband multimedia communication; - Internet broadband streaming media business.

IEEE 187-2003 (R2008), Standard Measurement Methods of Emissions from FM and Television Broadcast Receivers in the Frequency Range of 9 kHz to 40 GHz
This standard describes the potential sources of spurious radiation from receivers intended for the reception of sound and television broadcast, and the measurement methods for them.

IEEE 1872-2016, Standard Ontologies for Robotics and Automation
This standard defines a core ontology that allows for the representation of, reasoning about, and communication of knowledge in the robotics and automation domain. This ontology includes generic concepts as well as their definitions, attributes, constraints, and relationships. These terms can be specialized to capture the detailed semantics for concepts in robotics sub-domains. This standard contains the Core Ontology for Robotics and Automation (CORA) with the representation of fundamental concepts from which the more detailed concepts belonging to other ORA WG ontologies are constructed.

The standard describes a remote control architecture of digital community, intelligent building groups and digital metropolitan networks; specifies interactive data formats between devices and systems; and gives a standardized definition of equipment, service, services, signals, and interactive messages in this digital community network.

This standard provides technically precise definitions and explanations of key concepts in the fields of spectrum management, cognitive radio, policy defined radio, adaptive radio, software defined radio, and related technologies.

IEEE 1900.2-2008, Recommended Practice for the Analysis of In-Band and Adjacent Band Interference and Coexistence Between Radio Systems
This recommended practice provides technical guidelines for analyzing the coexistence or, alternatively, the interference between radio systems, operating in the same spectrum assignment or between different spectrum assignments.

This standard amends the IEEE 1900.4 standard to enable mobile wireless access service in white space frequency bands without any limitation on used radio interface (physical and media access control layers, carrier frequency, etc.) by defining additional components of the IEEE 1900.4 system.

IEEE 1900.6-2011, Standard for Spectrum Sensing Interfaces and Data Structures for Dynamic Spectrum Access and Other Advanced Radio Communication Systems
This standard defines the information exchange between spectrum sensors and their clients in radio communication systems. The logical interface and supporting data structures used for information exchange are defined abstractly without constraining the sensing technology, client design, or data link between sensor and client.

IEEE 1901-2010, Standard for Broadband over Power Line Networks: Medium Access Control and Physical Layer Specifications
The project defines a standard for high speed (>100 Mbps at the physical layer) communication devices via electric power lines, so called Broadband over Power Line (BPL) devices. It uses transmission frequencies below 100 MHz. This standard is usable by all classes of BPL devices, including BPL devices used for the first-mile/last-mile connection (<1500 m to the premise) to broadband services as well as BPL devices used in buildings for LANs, Smart Energy applications, transportation platforms (vehicle) applications, and other data distribution (<100 m between devices).

IEEE 1903-2011, Standard for the Functional Architecture of Next Generation Service Overlay Networks
This Next Generation Service Overlay Network (NGSON) standard describes a framework of Internet Protocol(IP)-based service overlay networks and specifies context-aware (e.g., such as required Quality of Service (QoS) level, type of service such as real-time vs. data, nature of data stream such as I-frame vs. B-frame, and type of terminal such as TV monitor vs. personal digital assistant), dynamically adaptive, and self-organizing networking capabilities, including advanced routing and forwarding schemes, and that are independent of underlying networks.

IEEE 1905.1-2013, Standard for a Convergent Digital Home Network for Heterogeneous Technologies
This standard defines an abstraction layer for multiple home network technologies. The abstraction layer provides a common data and control Service Access Point to the heterogeneous home network technologies described in the following specifications: IEEE 1901, IEEE 802.11, IEEE 802.3 and MoCA 1.1. This standard is extensible to work with other home network technologies.

IEEE 1906.1-2015, Recommended Practice for Nanoscale and Molecular Communication Framework
This recommended practice contains a conceptual model and a standard terminology for ad hoc network communication at the nanoscale. More specifically, this recommended practice contains: a) the definition of nanoscale communication networking b) the conceptual model for ad hoc nanoscale communication networking c) the common terminology for nanoscale communication networking.

IEEE 2030-2011, Guide for Smart Grid Interoperability of Energy Technology and Information Technology Operation with the Electric Power System (EPS), and End-Use Applications and Loads
Provides guidelines for Smart Grid interoperability. This guide provides a knowledge base addressing terminology, characteristics, functional performance and evaluation criteria, and the application of engineering principles for Smart Grid interoperability of the electric power system with end-use applications and loads. The guide discusses alternate approaches to good practices for the Smart Grid.

This document provides guidelines for discrete and hybrid energy storage systems that are integrated with the electric power infrastructure, including end-use applications and loads. This guide builds upon IEEE Standard 2030-2011 Guide for Smart Grid Interoperability of Energy Technology and Information Technology Operation with the Electric Power System (EPS), and End-Use Applications, and Loads.

This part of ISO/IEC/IEEE 21451 defines communication methods and data formats for transducers (sensors and actuators) communicating with RFID tags. This part of ISO/IEC/IEEE 21451 also defines Transducer Electronic Data Sheet (TEDS) formats based on the ISO/IEC/IEEE 21451 family of standards and protocols for accessing TEDS and transducer data. It adopts necessary interfaces and protocols to facilitate the use of technically differentiated, existing technology solutions. It doesn't specify transducer design or signal conditioning.
IEEE 23026-2015, Systems and software engineering - Engineering and management of websites for systems, software, and services information

This International Standard (IS) defines system engineering and management requirements for the lifecycle of websites including strategy, design, engineering, testing and validation, and management and sustainment for Intranet and Extranet environments. This IS applies to those using web technology to present information and communications technology (ICT) information, such as user documentation for systems and software, lifecycle documentation for systems and software engineering projects, and documentation of policies, plans, and procedures for IT service management.


Provides information on life cycle concepts and descriptions of the purposes and outcomes of representative life cycle stages. This standard also illustrates the use of a lifecycle model for systems in the context of ISO/IEC 15288 and provides a corresponding illustration of the use of a lifecycle model for software in the context of ISO/IEC 12207.

IEEE 252-1995 (R2007), Standard Test Procedure for Polyphase Induction Motors Having Liquid in the Magnetic Gap

Instructions for conducting and reporting the more generally applicable and acceptable tests to determine the performance characteristics of polyphase induction motors having liquid in the magnetic gap are given. Constants in several equations and forms apply to three-phase motors only and require modification for application to motors having another number of phases. It is not intended that the procedure cover all possible tests or tests of a research nature.

IEEE 260.1-2004 (R2010), Standard Letter Symbols for Units of Measurement (SI Units, Customary Inch-Pound Units, and Certain Other Units)

Letter symbols for units of measurement are covered in this standard. It does not include abbreviations for technical terms, nor does it cover symbols for physical quantities.

IEEE 260.3-1993 (R2006), Mathematical Signs and Symbols for Use in Physical Sciences and Technology

Signs and symbols used in writing mathematical text are defined.

IEEE 260.4-1996 (R2008), Letter Symbols and Abbreviations for Quantities Used in Acoustics

Letter symbols for physical quantities used in the science and technology of acoustics are covered. Abbreviations for a number of acoustical levels and related measures that are in common use are also given. The symbols given in this standard are intended for all applications.

IEEE 2600-2008, Standard for Information Technology: Hardcopy Device and System Security

This standard defines security requirements (all aspects of security including but not limited to authentication, authorization, privacy, integrity, device management, physical security and information security) for manufacturers, users and others on the selection, installation, configuration and usage of hardcopy devices and systems including printers, copiers, and multifunction devices and the computer systems that support these devices. It identifies security exposures for these hardcopy devices and systems and instructs manufacturers and software developers on appropriate security capabilities to include in their devices and systems and explains usage to users.

IEEE 2600.1-2009, Standard for a Protection Profile in Operational Environment A

The purpose of this standard is to create security protection profiles for hardcopy devices in Operational Environment A as defined in P2600.

IEEE 2600.2-2009, Standard Protection Profile for Hardcopy Devices in IEEE Std. 2600-2008 Operational Environment B

This standard provides requirements for the design of software used in hardcopy devices in operational environments in which a moderate level of document security, network security, and security assurance, are required. Typically, the day-to-day proprietary and nonproprietary information needed to operate an enterprise will be handled by this environment.

IEEE 2600.3-2009, Standard Protection Profile for Hardcopy Devices in IEEE Std. 2600-2008 Operational Environment C

This standard provides requirements for the design of software used in hardcopy devices in a public-facing environment in which document security is not guaranteed, but access control and usage accounting are important to the operator of the environment. A retail copy center, public library, Internet cafe, and hotel business center are typical applications of this environment.


This standard states requirements for efficient development and management of content produced for the provision of user documentation for systems and software, and for the management of IT services. This standard is independent of the tools, protocols, and systems used for content management. It does not address configuration management of software assets.

IEEE 269-2010, Standard Methods for Measuring Transmission Performance of Analog and Digital Telephone Sets, Handsets, and Headsets

This standard provides practical methods for making laboratory measurements of electrotechnical characteristics of analog and digital telephones, handsets, and headsets. The methods may also be applicable to a wide variety of other communications equipment, including cordless, wireless and mobile communications devices. Measurement results may be used to evaluate these devices on a standardized basis. Application is in the frequency range from 100 to 8,500 Hz.

IEEE 26513-2010, Systems and Software Engineering - Requirements for Testers and Reviewers of User Documentation

This standard provides requirements for the test and review of software user documentation as part of the life cycle processes. It defines the documentation process from the viewpoint of the documentation tester and reviewer. It specifies process for use in testing and reviewing of user documentation, and provides the minimum requirements for these activities. It is relevant to roles involved in testing and development of software and user documentation.
IEEE 270-2006 (R2012), Standard Definitions for Selected Quantities, Units, and Related Terms, with Special Attention to the International System of Units (SI)

This standard includes definitions for physical quantities and units commonly used in applied science and technology, and related terms that concern systems of measurement. Particular emphasis is placed on the International System of Units (SI).

IEEE 277-2007, Recommended Practice for Cement Plant Power Distribution

This recommended practice provides guidance for the design, application, installation, and protection of electrical distribution systems in cement plants.

IEEE 286-2000 (R2012), Recommended Practice for Measurement of Power Factor Tip-Up of Electric Machinery Stator Coil Insulation

This recommended practice applies to stator coils or bars (half coils) of electric machinery operating at any voltage level. It usually applies to machines with a voltage rating of 6 kV and higher. Individual stator coils outside a core (uninstalled), individual stator coils installed in a core, and completely wound stators are covered in this recommended practice.

IEEE 287-2007, Standard for Precision Coaxial Connectors (DC to 110 GHz)

This standard specifies coaxial connectors for precision electrical measurements to 110 GHz. It presents minimum performance requirements to standardize both hermaphroditic and pin and socket type connectors. It provides recommended electrical and mechanical test procedures for general and laboratory precision connectors.


This part of ISO/IEC/IEEE 29119 defines test design techniques that can be used during the test design and implementation process that is defined in ISO/IEC/IEEE 29119-8. This part of ISO/IEC/IEEE 29119 is intended for, but not limited to, testers, test managers, and developers, particularly those responsible for managing and implementing software testing.


This International Standard specifies the required processes that are to be implemented for the engineering of requirements for systems and software products (including services) throughout the life cycle, gives guidelines for applying the requirements and requirements-related processes described in ISO/IEC 12207:2008 (IEEE Std 12207 -2008) and ISO/IEC 15288:2008 (IEEE Std 15288 -2008), specifies the required information items that are to be produced through the implementation of the requirements processes, specifies the required contents of the required information items, and gives guidelines for the format of the required and related information items.


This specification defines the requirements for a single-degree-of-freedom spring-restrained rate gyro for [aircraft, missile, spacecraft,_____] applications.

IEEE 293-1969 (R2010), Test Procedure for Single-Degree-of-Freedom Spring-Restrained Rate Gyros

This Test Procedure is a compilation of recommended rate gyro test procedures derived from those currently in use, including test conditions to be considered. In some cases alternate methods for measuring a performance characteristic have been included.

IEEE 295-1969 (R2007), Electronics Power Transformers

This Standard pertains to power transformers and inductors that are used in electronic equipments and supplied by power lines or generators of essentially sine wave or polyphase voltage. Guides to application and test procedures are included. Appendices contain certain precautions, recommended practices, and guidelines for typical values. Provision is made for relating the characteristics of transformers to the associated rectifiers and circuits. Certain pertinent definitions relating to transformers and transformer applications, which have not been found is made for relating the characteristics of transformers to the associated rectifiers and circuits.

IEEE 299-2006, Standard Method for Measuring the Effectiveness of Electromagnetic Shielding Enclosures

Uniform measurement procedures and techniques are provided for determining the effectiveness of electromagnetic shielding enclosures at frequencies from 9 kHz to 18 GHz (extendable to 50 Hz and 100 GHz, respectively) for enclosures having all dimensions equal to or greater than 2.0 m.

IEEE 3001.8-2013, Recommended Practice for the Instrumentation and Metering of Industrial and Commercial Power Systems

This recommended practice covers the instrumentation and metering of industrial and commercial power systems. It describes the importance of metering to achieve a successful energy management process, as well as considerations that must be made when applying the latest metering technology.

IEEE 3004.1-2013, Recommended Practice for the Application of Instrument Transformers in Industrial and Commercial Power Systems

This recommended practice covers the selection and application of instrument transformers used in industrial and commercial power systems.

IEEE 3006.7-2013, Recommended Practice for Determining the Reliability of "24 x 7" Continuous Power Systems in Industrial and Commercial Facilities

This recommended practice describes how to determine the reliability of "7 x 24" continuous power systems in industrial and commercial facilities. The method of reliability analysis by probability methods is described first. This is followed by a discussion of how to evaluate the results and how to implement changes to ensure that the expected degree of reliability is achieved.

IEEE 3006.9-2013, Recommended Practice for Collecting Data for Use in Reliability, Availability, and Maintainability Assessments of Industrial and Commercial Power Systems

This recommended practice describes how to collect data for use in reliability, availability, and maintainability assessments of industrial and commercial power systems. It is likely to be of greatest value to the power-oriented engineer with limited experience in the area of reliability. It can also be an aid to all engineers responsible for the electrical design of industrial and commercial power systems.

IEEE 3007.1-2010, Recommended Practice for Operation and Management of Industrial and Commercial Power Systems

Recommended practices for the numerous personnel who are responsible for safely operating and managing industrial and commercial electric power facilities are provided. This standard provides plant engineers with a reference source for the fundamentals of safe and reliable operation and management of industrial and commercial electric power distribution systems.

IEEE 3007.2-2010, Recommended Practice for the Maintenance of Industrial and Commercial Power Systems

This recommended practice covers the maintenance of industrial and commercial power systems. It covers the fundamentals of electrical equipment maintenance, how to develop successful maintenance strategies, and the common testing methods used as part of an electrical equipment maintenance program.

IEEE 308-2012, Standard Criteria for Class 1E Power Systems for Nuclear Power Generating Stations

This standard applies to the Class 1E portions of the following systems and equipment in single-unit and multunit nuclear power generating stations: Alternating current power systems, Direct current power systems, Instrumentation and control (I&C) power systems.

IEEE 323-2003 (R2008), Standard for Qualifying Class 1E Equipment for Nuclear Power Generating Stations

This standard describes the basic requirements for qualifying Class 1E equipment and interfaces that are to be used in nuclear power generating stations.
IEEE 3333.1-2015, Standard for Quality of Experience (QoE) and Visual-Comfort Assessments of Three-Dimensional (3D) Contents Based on Psychophysical Studies
This standard establishes methods for visual saliency prediction, visual contents analysis, and subjective assessment for quantifying the visual discomfort and quality of experience (QoE) of 3D image and video.

IEEE 334-2006, Standard for Qualifying Continuous Duty Class 1E Motors for Nuclear Power Generating Stations
Establishes criteria for qualification of continuous duty Class 1E Motors, located in mild and harsh environments in Nuclear Power Generating Stations in order to demonstrate their ability to perform their intended safety functions under all required conditions.

Provides criteria for the performance of periodic testing of nuclear power generating station safety systems. The scope of periodic testing consists of functional tests and checks, calibration verification and time response measurements, as required, to verify that the safety system performs its defined safety function.

IEEE 344-2004 (R2009), Recommended Practice for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Stations
This document describes recommended practices for establishing seismic qualification procedures that will yield quantitative data to demonstrate that the Class 1E equipment can meet its performance requirements during and/or following one safe shutdown earthquake (SSE) event preceded by a number of operating basis earthquake (OBE) events.

This guide was prepared to provide the designers and operators of nuclear power plant safety systems and the concerned regulatory groups with the essential methods and procedures of reliability engineering that are applicable to such systems. By applying the principles given, systems may be analyzed, results may be compared with reliability objectives, and the basis for decisions may be suitably documented.

The scope of the project is to cover measurements of the electrical properties of naturally occurring solids. Not covered are methods which rely on mapping earth structure anomalies unless directly related to electrical properties. There is limited coverage of numerical methods for forward/inverse modeling.

IEEE 377-1997 (R2008), Recommended Practice for Measurement of Spurious Emission from Land-Mobile Communication Transmitters
This recommended practice covers definitions of terms, controlled test conditions, test apparatus, test methods and data presentation, all of which form the basis for establishing the energy levels of spurious emissions of mobile communication transmitters designed to generate frequency-modulated (FM) signals in the frequency range of 25 MHz to 1000 MHz.

This standard covers the application of the single-failure criterion to the electrical power, instrumentation, and control portions of nuclear power generating station safety systems.

IEEE 382-2006, Standard for Qualification of Safety-Related Actuators for Nuclear Power Generating Stations
Provides direction for the implementation of the requirements of IEEE Std 323-2003 as they apply to the specific features of safety-related actuator qualification. Establishes criteria for qualification of safety-related actuators, and actuator components, in nuclear power generating stations in order to demonstrate their ability to perform their intended safety functions under all required conditions.

IEEE 383-2015, Standard for Qualifying Electric Cables and Splices for Nuclear Facilities
This standard provides general requirements and methods for qualifying electric cables, and splices for nuclear facilities. Cable, wire, and splices within or integral to other devices (e.g., instruments, panels, motors, etc.) should be qualified using the requirements in the applicable device standard or IEEE Std 323TM. However, this standard’s requirements may be applied to the cable, wire and splices within these devices.

IEEE 384-2008, Standard Criteria for Independence of Class 1E Equipment and Circuits
This standard describes the independence requirements of the circuits and equipment comprising or associated with Class 1E systems. It sets forth criteria for the independence that can be achieved by physical separation and electrical isolation of circuits and equipment that are redundant, but does not address the determination of what is to be considered redundant.

IEEE 386-2006, Separable Insulated Connector Systems for Power Distribution Systems above 600 V
Establishes definitions, service conditions, ratings, interchangeable construction features and tests for loadbreak and deadbreak separable insulated connector systems rated 601 V and above, 600 A or less, for use on power distribution systems.

This standard describes the criteria for the application and testing of diesel-generator units as Class 1E standby power supplies in nuclear power generating stations.

Transformers of both the saturating and nonsaturating type are covered. The power transfer capability of the transformers and inductors covered range from the minimal (less than 1 W) to the multikilowatt level. The purpose is to provide a common basis for the engineers designing the transformers and inductors used in those activities. This standard does not cover apparatus used in equipment for high-voltage power conversion for distribution by electric utilities.

IEEE 390-2007, Standard for Pulse Transformers
This standard pertains to pulse transformers for use in electronic equipment. For the various types of these transformers, the peak power transmitted ranges from a few milliwatts to kilowatts; and the peak voltage transmitted ranges from a few volts to many kilovolts. The purpose of this standard is to provide a common ground between electronic system engineers and pulse transformer design engineers.

IEEE 393-1991 (R2007), Magnetic Cores, Test Procedures for
This standard presents test methods useful in the design, analysis, and operation of magnetic cores in many types of applications. Tests for specifying and/or measuring permeability, core loss, apparent core loss, induction, hysteresis, thermal characteristics, and other properties are given.

IEEE 4-2013, Standard for High-Voltage Testing Techniques
This standard is applicable to: dielectric tests with direct voltages, dielectric tests with alternating voltages, dielectric tests with impulse voltages, tests with impulse currents, tests with combinations of the above, capacitance and dielectric loss measurements. This standard is applicable only to tests on equipment with a rated voltage above 1000 V.

IEEE 400.1-2007, Guide for Field Testing of Laminated Dielectric, Shielded Power Cable Systems Rated 5 kV and Above with High Direct Current Voltage
This guide presents the recommended practices and procedures for acceptance and maintenance testing of shielded, laminated dielectric insulated power cable systems 5 kV and above. It applies to all types of laminated power cable systems such as paper-insulated, lead covered, pipe-type, and pressurized cables that are intended for the transmission or distribution of electric power. The tabulated test levels assume that the cable systems have the usual effectively grounded neutral system or a grounded metallic shield.
IEEE 400.2-2013, Guide for Field Testing of Shielded Power Cable Systems Using Very Low Frequency (VLF) (Less than 1 Hz) This guide describes very low frequency (VLF) withstand and other diagnostic tests and the measurements that are 37 performed in the field on service-aged shielded medium and high voltage cables rated 5 kV through 69 kV with 38 extruded and laminated insulation. VLF test methods utilize ac signals at frequencies less than 1 Hz.

IEEE 400.3-2006, Guide for Partial Discharge Testing of Shielded Power Cable Systems in a Field Environment Covers the diagnostic testing of new or service-aged installed shielded power cable systems, which include cable, joints and terminations, using partial discharge (PD) detection, measurement and location.

IEEE 400.4-2015, Guide for Field Testing of Shielded Power Cable Systems Rated 5 kV and Above with Damped Alternating Current (DAC) Voltage This Guide presents the practices and procedures for testing and diagnosis of shielded power cable systems rated 5 kV and above using damped alternating current (DAC) voltages. It applies to all types of power cable systems that are intended for the transmission or distribution of electric power. The tabulated test levels assume that the cable systems have an effectively grounded neutral system or a grounded metallic shield.

IEEE 404-2007, Standard for Extruded and Laminated Dielectric Shielded Cable Joints Rated 2500 V - 500 000 V Establishes electrical ratings and test requirements of cable joints used with extruded and laminated dielectric shielded cable rated in preferred voltage steps from 2500 to 500 000 V. Also defines test requirements for cable jacket and cable shielded restoration devices; and defines a variety of common joint constructions. Designed to provide uniform testing procedures that can be used by manufacturers and users to evaluate the ability of underground power cable joints, and associated cable shield and cable jacket restoration components, to perform reliably in service.

IEEE 420-2001 (R2008), Standard for the Design and Qualification of Class 1E Control Boards, Panels and Racks Used in Nuclear Power Generating Stations This standard specifies the design requirements for new and/or modified Class 1E control boards, panels, and racks and establishes the methods to verify that these requirements have been satisfied.

IEEE 42010-2011, Systems and Software Engineering - Architecture Description This International Standard specifies the manner in which architecture descriptions of systems are organized and expressed. This International Standard specifies architecture viewpoints, architecture frameworks and architecture description languages for use in architecture descriptions. This International Standard also provides motivations for terms and concepts used; presents guidance on specifying architecture viewpoints; and demonstrates the use of this International Standard with other standards.

IEEE 421.1-2007, Standard Definitions for Excitation Systems for Synchronous Machines Defines elements and commonly used components in excitation control systems and contains definitions for excitation systems as applied to synchronous machines.

IEEE 422-2012, Guide for the Design of Cable Raceway Systems for Electric Generating Facilities This document provides guidance for the design and installation of cable raceway systems for all types of electric generating facilities.

IEEE 432-2012, Guide for the Design of Cable Raceway Systems for Electric Generating Facilities This guide describes a procedure that may be used to evaluate and compare insulation systems used, or proposed for use, in large ac electric machines. The tests outlined herein are applicable to the groundwall insulation systems applied to form-wound, preinsulated armature (stator) winding coils and/or bars of generators, motors, and synchronous condensers rated 2300 V or higher.

IEEE 434-2006 (R2013), Guide for Functional Evaluation of Insulation Systems for AC Electric Machines Rated 2300 V and Above This guide describes a procedure that may be used to evaluate and compare insulation systems used, or proposed for use, in large ac electric machines. The tests outlined herein are applicable to the groundwall insulation systems applied to form-wound, preinsulated armature (stator) winding coils and/or bars of generators, motors, and synchronous condensers rated 2300 V or higher.

IEEE 436-1991 (R2007), Guide for Making Corona (Partial Discharge) Measurements on Electronics Transformers This guide covers the detection of corona (partial discharge) and the measurement of its magnitude in electronics transformers. Test conditions, test apparatus, calibration, and test requirements are included.

IEEE 449-1998 (R2007), Standard for Ferroresonant Voltage Regulators This guide covers ferroresonant transformers used as regulators in electronic power supplies and in other equipment. It provides definitions relating to ferroresonance and ferroresonant regulators and includes guides to application and test procedures are included.

IEEE 452-2011, Recommended Practice for Electrical Installations on Shipboard - Controls and Automation The recommendations for controls, control applications, control apparatus, and automation on shipboards are established by this document. These recommendations reflect the present-day technologies, engineering methods, and engineering practices.

IEEE 453-2015, Recommended Practice for Shipboard Electrical Installations - Systems Engineering This document provides recommendations for systems engineering, design and integration of electric power systems at the total ship level from concept design through the establishment of the design baseline prior to detail design.

IEEE 450-2010, Recommended Practice for Maintenance, Testing, and Replacement of Vented Lead-Acid Batteries for Stationary Applications This document provides recommended maintenance, test schedules, and testing procedures that can be used to optimize the life and performance of permanently-installed, vented lead-acid storage batteries used in standby service. It also provides guidance to determine when batteries should be replaced. This recommended practice is applicable to standby service stationary applications where a battery charger normally maintains the battery fully charged and provides the dc loads.

IEEE 463-2006, Standard for Electrical Safety Practices in Electrolytic Cell Line Working Zones Means for improved safeguarding of personnel while operating or maintaining equipment located in electrolytic cell line working zones are provided. Included are related requirements for equipment and electrical conductor installations.

IEEE 475-2000 (R2006), Standard Measurement Procedure for Field Disturbance Sensors 300 MHz to 40 GHz Test procedures for microwave field disturbance sensors to measure radio frequency (RF) radiated field strength of the fundamental frequency, harmonic frequencies, near field power flux density, and nonharmonic spurious emissions of sensors operating within the frequency range of 300 MHz to 40 GHz are defined.

IEEE 48-2009, Standard for Test Procedures and Requirements for Alternating Current Cable Terminations Used on Shielded Cables Having Laminated Insulation Rated 2.5 kV Through 765 kV or Extruded Insulation Rated 2.5 kV Through 500 kV All indoor and outdoor cable terminations used on alternating-current cables having laminated insulation rated 2.5 kV through 765 kV or extruded insulation rated 2.5 kV through 500 kV are covered, except for separable insulated connectors.
IEEE 484-2002 (R2008), Recommended Practice for Installation Design and Installation of Vented Lead-Acid Batteries for Stationary Applications

This document provides recommended design practices and procedures for storage, location, mounting, ventilation, instrumentation, preassembly, and charging of vented lead-acid batteries. Required safety practices are also included. These recommended practices are applicable to all stationary applications.

IEEE 485-2010, Recommended Practice for Sizing Lead-Acid Batteries for Stationary Applications

Methods for defining the dc load and for sizing a lead-acid battery to supply that load for stationary battery applications in full float operations are described. Some factors relating to cell selection are provided for consideration.


This standard presents general consideration for special high-voltage protection systems intended to protect telecommunication facilities serving electric supply locations. This standard contains material common to all of the family including basic protection theory and fundamental electrical protection concepts and designs.

IEEE 487.4-2013, Standard for the Electrical Protection of Communication Facilities Serving Electric Supply Locations Through the Use of Neutralizing Transformers

This standard presents engineering design procedures for the electrical protection of communication facilities serving electric supply locations through the use of neutralizing transformers.

IEEE 487.5-2013, Standard for the Electrical Protection of Communication Facilities Serving Electric Supply Locations Through the Use of Isolation Transformers

This standard presents engineering design procedures for the electrical protection of communication facilities serving electric supply locations through the use of isolation transformers. Other telecommunication alternatives such as radio and microwave systems are excluded from this document.


This standard applies to interface systems used to interconnect both programmable and nonprogrammable electronic measuring apparatus with other apparatus and accessories necessary to assemble instrument evaluation systems. The basic functional specifications of this standard may be used in digital interface applications that require longer distances, more devices, increased noise immunity, or combinations of these.


This standard specifies a set of codes and formats to be used by devices connected via the IEEE 488.1 bus. This standard also defines communication protocols necessary to effect application independent device-dependent message exchanges and further defines common commands and characteristics useful in instrumentation system applications.


General recommendations for the operation, loading, and maintenance of synchronous hydro-generators and generator/motors are covered. This guide does not apply to synchronous machines having cylindrical rotors. In this guide, the term hydro-generator is used to describe a synchronous machine coupled to a hydraulic turbine or pump-turbine. This guide is not intended to apply in any way to the prime mover.

IEEE 493-2007, Recommended Practice for the Design of Reliable Industrial and Commercial Power Systems

Objective is to present the fundamentals of reliability analysis applied to the planning and design of industrial and commercial electric power distribution systems. Intended audience for this material is primarily consulting engineers and plant electrical engineers and technicians.

IEEE 495-2007, Guide for Testing Faulted Circuit Indicators

This test code establishes definitions, service conditions, test procedures and test conditions for Faulted Circuit Indicators (FCI) for use on power distribution systems.


ANSI/IEEE 497-2003 provides an approach to designing accident monitoring systems for nuclear power plants. The corrigendum incorporates user feedback in order to improve the usefulness of the standard.

IEEE 497-2010, Standard Criteria for Accident Monitoring Instrumentation for Nuclear Power Generating Stations

This standard contains the functional and design criteria for accident monitoring instrumentation for nuclear power generating stations. This standard is intended for new plant designs and for operating nuclear power generating stations desiring to perform design modifications.


Specific testing requirements for qualifying electrical resistance heating cables and heating devices for use in industrial applications, as well as a basis for electrical and thermal design, are included. Applications include unclassified, and explosive atmospheres using both Divisions and Zone methods of classification.


This guide provides the general recommendations for performing maintenance work on energized power lines.


A specification format guide for the preparation of a rate-integrating gyro specification that provides a common meeting ground of terminology and practice for manufacturers and users is presented. A compilation of recommended procedures for testing a rate-integrating gyro is given.

IEEE 521-2002 (R2009), Standard Letter Designations for Radar-Frequency Bands

This standard relates the letter terms in common usage to the frequency ranges that they represent.

IEEE 522-2004 (R2009), Guide for Testing Turn-To-Turn Insulation on Form-Wound Stator Coils for Alternating-Current Rotating Electric Machines

This guide makes suggestions for testing the dielectric strength of the insulation separating the various turns from each other within multturn form-wound coils to determine the acceptance of the coils. Typical ratings of machines employing such coils normally lie within the range of 200 kW to 100 mW (270 to 135 000 hp).

IEEE 525-2007, Design and Installation of Cable Systems in Substations

The document is a guide for the design, installation, and protection of insulated wire and cable systems in substations with the objective of minimizing cable failures and their consequences.

IEEE 525-2008/Cor 1-2008, Guide for the Design and Installation of Cable Systems in Substations - Corrigendum 1

The base standard covers design, installation, and protection of wire and cable systems in substations. This corrigendum corrects the figure for weight correction factor.

IEEE 528-2001 (R2007), Standard for Inertial Sensor Terminology

This standard provides a listing of terms and definitions related to inertial sensors. The criterion for inclusion of terms and definitions in this standard is their general usefulness as related to inertial sensor technology.
A specification format guide for the preparation of a rate-integrating gyroscope specification is presented. Recommended procedures for testing a rate-integrating gyroscope are compiled. This standard, when combined with IEEE Std 517-1974 (R1980), defines the requirements and test procedures in terms of characteristics unique to the gyroscope or those applications in which the dynamic angular inputs are significantly greater than the limitations identified in IEEE Std 517.

This guide covers the selection and testing of jackets and other protective coverings for power, instrumentation, and control cables. It is written for those responsible for optimizing cable designs.

IEEE 535-2006, Standard for Qualification of Class 1E Lead Storage Batteries for Nuclear Power Generating Stations
Describes qualification methods for Class 1E vented lead acid batteries and racks to be used in nuclear power generating stations outside primary containment.

IEEE 539-2005 (R2010), Standard Definitions of Terms Relating to Corona and Field Effects of Overhead Power Lines
The scope of this standard is to define the most widely used terms specific to or associated with overhead power-line corona and field effects.

IEEE 551-2006, Recommended Methods for Calculating AC Short-Circuit Currents in Industrial and Commercial Power Systems
Provides short circuit current information including calculated short circuit current duties for the application in industrial plants and commercial buildings, at all power system voltages, of power system equipment that senses, carries, or interrupts short circuit currents.

Methods for measuring the inherent vibration damping characteristics of overhead conductors are presented. The intent is to obtain information in a compatible and consistent form that will provide a reliable basis for studying the vibration and damping of conductors in the future, and for comparing data of various investigators. The methods and procedures recommended are not intended for quality-control test purposes.

IEEE 572-2006 (R2011), Standard for Qualification of Class 1E Connection Assemblies for Nuclear Power Generating Stations
This standard provides basic requirements, direction, and methods for qualifying Class 1E Connection Assemblies for service in nuclear power generating stations. These include connectors, terminations, and environmental seals in combination with related cables or wires as assemblies.

IEEE 592-2007, Standard for Exposed Semiconducting Shields on High Voltage Cable Joints and Separable Connectors
This standard covers design tests for shield resistance and a simulated fault-current initiation for exposed semiconducting shields used on cable accessories, specifically joints and separable insulated connectors rated 15 kV through 35 kV.

IEEE 60079-30-1-2016, IEC/IEEE International Standard - Explosive atmospheres - Part 30-1: Electrical resistance trace heating - General and testing requirements
This part of IEC 60079 specifies general and testing requirements for electrical resistance trace heaters for application in explosive atmospheres with the exclusion of those for EPL Ga and Da.

This part of IEC 60079 provides guidance for the application of electrical resistance trace heating systems in areas where explosive atmospheres may be present, with the exclusion of those classified as requiring EPL Ga/Da (traditional relationship to Zone 0 and Zone 20 respectively).

IEEE 602-2007, Recommended Practice for Electric Systems in Health Care Facilities
Provides a recommended practice for the design and operation of electric systems in health care facilities. The term “health care facility,” as used here, encompasses buildings or parts of buildings that contain hospitals, nursing homes, residential custodial care facilities, clinics, and medical and dental offices. Buildings or parts of buildings within an industrial or commercial complex, used as medical facilities, logically fall within the scope of this recommended practice.

The criteria contained in this standard establish minimum functional and design requirements for the power, instrumentation, and control portions of safety systems for nuclear power generating stations.

IEEE 620-1997 (R2008), Guide for the Presentation of Thermal Limit Curves for Squirrel Cage Induction Machines
This guide defines thermal limit curves for induction machines, establishes a standard procedure for the presentation of these curves, and provides guidance for the interpretation and use of these curves for machine thermal protection. It applies to three-phase squirrel cage induction machines, 250 hp (200 kW) and above.

IEEE 62582-3-2012, Nuclear Power Plants - Instrumentation and control important to safety - Electrical equipment condition monitoring methods - Part 3: Elongation at break
This International Standard contains methods for condition monitoring of organic and polymeric materials in instrumentation and control systems using tensile elongation techniques in the detail necessary to produce accurate and reproducible measurements. It includes the requirements for selection of samples, the measurement system and conditions, and the reporting of the measurement results.

IEEE 62582-5-2015, Nuclear Power Plants - Instrumentation and control important to safety - Electrical equipment condition monitoring methods - Part 5: Optical time domain reflectometry
This part of IEC/IEEE 62582 contains methods for monitoring the attenuation condition of optical fibres and cables in instrumentation and control systems using optical time domain reflectometry (OTDR) measurements in the detail necessary to produce accurate and reproducible measurements. It includes the requirements for the measurement system and conditions, and the reporting of the measurement results.

IEEE 627-2010, Standard for Qualification of Equipment Used in Nuclear Facilities
This standard provides the basic principles for qualification of equipment used in nuclear facilities.

Criteria for the minimum requirements in the selection, design, installation, and qualification of raceway systems for Class 1E circuits for nuclear power generating stations is provided.

IEEE 634-2004 (R2010), Standard Cable-Penetration Fire Stop Qualification Test
This standard provides two methods for qualifying the performance of cable-penetration fire stops (also referred to as ‘fire stops’) when they are installed in rated fire-resistant barriers. The two methods are the general acceptance qualification (Type I) and a cable-specific qualification (Type II).
IEEE 635-2003 (R2009), Guide for Selection and Design of Aluminum Sheaths for Power Cables
Design guidelines for cables with aluminum sheaths on low-, medium-, and high-voltage cables are provided. The aluminum sheath is an impervious aluminum or aluminum alloy tube applied either smooth or corrugated over the cable core. The sheath provides mechanical or electrical protection to the cable core and may or may not have an overall jacket or plastic over-sheath. Guide provides information on the application, selection, installation, and use parameters of aluminum sheaths.

IEEE 638-1992 (R2006), Standard for Qualification of Class 1E Transformers for Nuclear Power Generating Stations
Procedures for demonstrating the adequacy of new Class 1E transformers, located in a mild environment of a nuclear power generating station, to perform their required safety functions under postulated service conditions are presented. Single and three phase transformers rated 603 V to 15 000 V for the highest voltage winding and up to 2500 kVA (self-cooled rating) are covered.

IEEE 643-2004 (R2010), Guide for Power-Line Carrier Applications
The purpose of this guide is to provide application information to users of carrier equipment as applied on power transmission lines. Since the major applications of the power-line carrier (PLC) is for protective relaying, special consideration for these applications has been included. Information related to the expanding usage of carriers on distribution lines below 69 kV is not specifically covered. Detailed equipment design information is avoided as this is primarily the concern of equipment manufacturers.

The purpose of this standard is to establish uniform procedures for the measurement of power frequency electric and magnetic fields from alternating current (ac) overhead power lines and for the calibration of the meters used in these measurements.

IEEE 649-2006 (R2011), Standard for Qualifying Class 1E Motor Control Centers for Nuclear Power Generating Stations
This standard describes the basic principles, requirements, and methods for qualifying Class 1E motor control centers for both harsh and mild environment applications in nuclear power generating stations.

IEEE 650-2006, Standard for Qualification of Class 1E Static Battery Chargers and Inverters for Nuclear Power Generating Stations
Methods for qualifying static battery chargers and inverters for Class 1E installations outside containment in nuclear power generating stations are described.

Uniform procedures are established for manual and automatic measurement of audible noise from overhead transmission lines. Their purpose is to allow valid evaluation and comparison of the audible noise performance of various overhead lines.

IEEE 661-1979 (R2008), Standard Method for Determining Objective Loudness Ratings of Telephone Connections
The purpose of this standard is to describe a practical and reproducible method of determining the loudness ratings of telephone connections.

This guide describes the current methodologies, including apparatus, procedures, and measurement accuracies, for determining the dynamic characteristics of vibration dampers and damping systems. It provides some basic guidance regarding a given method's strengths and weaknesses. The methodologies and procedures described are applicable to indoor testing only.

IEEE 666-2006, Electric Power Service Systems for Generating Stations, Design Guide for Applies to station service systems that supply electric power to auxiliary loads for electric power generating stations. Provides the practices, criteria, and range of system parameters that relate to the service system requirements and assist in the application of existing engineering documents.

IEEE 67-2005 (R2010), Guide for Operation and Maintenance of Turbine Generators
This guide covers general recommendations for the operation, loading, and maintenance of turbine-driven synchronous generators, termed turbine generators, having cylindrical rotors. It does not apply to generators having salient pole rotors. The generators covered by this guide are to have rated outputs of 10 MVA and above. Cylindrical-rotor, two-pole and four-pole generators below this rating are generally covered by NEMA MG 1.1. This guide is not intended to supplant specific or general instructions contained in the manufacturer's instruction book or in any contractual agreement between a manufacturer and a purchaser of a given machine.

This standard defines the requirements and test procedures for a single, multi-axis nongyroscopic angular [jerk, acceleration, velocity, displacement] sensor. The output is [an analog electrical signal, a digital electrical pulse train] proportional to angular [jerk, acceleration, velocity, displacement].

IEEE 686-2008, Radar Definitions
This standard is devoted to providing radar definitions. The standard includes terms formerly found in IEEE std 172-1971, IEEE Standard Definitions of Navigation Aid Terms, with the exception of a few terms that are common in both fields, and new and updated terms. IEEE Std 172-1983 was withdrawn in 1983. As radar technology and literature evolve, new terms will be added and obsolete terms deleted.

The design of foundations for conventional transmission line structures, which include lattice towers, single or multiple shaft poles, H-frame structures, and anchors for guyed structures is presented in this guide.

IEEE 7-4.3.2-2010, Standard Criteria for Digital Computers in Safety Systems of Nuclear Power Generating Stations
This standard serves to amplify criteria in IEEE Std 603-2009, IEEE Standard Criteria for Safety Systems for Nuclear Power Generating Stations, to address the use of computers as part of safety systems in nuclear power generating stations. The criteria contained herein, in conjunction with criteria in IEEE Std 603-2009, establish minimum functional and design requirements for computers used as components of a safety system.

Defines a high order language for testing; describes tests in terms that are independent of any specific test system. It has been constrained to ensure that it can be implemented on automatic test equipment. Defines an operational standard that was originally based upon the language defined be the reference document for the ATLAS language, IEEE Std 416-1984.

IEEE 738-2006, Standard for Calculating the Current-Temperature of Bare Overhead Conductors
A method of calculating the current-temperature relationship of bare overhead lines, given the weather conditions, is presented. Along with a mathematical method, sources of the values to be used in the calculation are indicated.

This standard prescribes criteria that establish protection requirements for Class 1E power systems and equipment. It describes the purpose of and the means for obtaining protection from electrical and mechanical damage, or failures that can occur within a time period that is shorter than that required for operator action. It includes testing and surveillance requirements. It does not include plant physical design requirements to protect against events such as pipe whip, fire, dropped load, etc.
IEEE 754-2008, Standard for Floating-Point Arithmetic
This standard specifies formats and methods for floating-point arithmetic in computer systems: standard and extended functions with single, double, extended, and extendable precision, and recommends formats for data interchange. It is intended to submit this standard to ISO/IEC JTC1 for consideration.

IEEE 762-2006, Standard Definitions for Use in Reporting Electric Generating Unit Reliability, Availability, and Productivity
Standardizes terminology and indexes for reporting electric generating unit reliability, availability, and productivity performance measures.

IEEE 765-2012, Standard for Preferred Power Supply (PPS) for Nuclear Power Generating Stations (NPGS)
This standard describes the design criteria of the PPS and its interfaces with the Class 1E power system, switchyard, transmission system, and AAC source. Figure 1 is a typical interface diagram of the PPS with related power systems.

This guide has been written as an applications manual for engineers and others who write test requirements in ATLAS.

IEEE 776-1993 (R2008), Recommended Practice for Inductive Coordination of Electric Supply and Communication Lines
This recommended practice addresses the inductive environment that exists in the vicinity of electric power and wire-line telecommunications systems and the interfering effect that may be produced thereby; guidance is offered for the control or modiﬁcation of the environment and the susceptibility of the affected systems in order to maintain an acceptable level of interference.

IEEE 802.11-2007, Standard for Information Technology - Telecommunications and Information Exchange Between Systems - Local and Metropolitan Area Networks - Specific Requirements - Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications
ANSI/IEEE 802.11-1999 (R2003) + 802.11a + 802.11b + 802.11b/Cor1 + 802.11d + 802.11e + 802.11g + 802.11h + 802.11i + 802.11j

This amendment will define Radio Resource Measurement enhancements to provide interfaces to higher layers for radio and network measurements. This amendment is intended to be submitted to ISO/IEC JTC1 for consideration.

IEEE 802.11n-2009, Standard for Local and Metropolitan Area Networks - Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) - Amendment: Enhancements for Higher Throughput
This project improves the ANSI/IEEE 802.11 wireless local area network (LAN) user experience by providing significantly higher throughput for current applications and to enable new applications and market segments.

This amendment specifies the extensions to IEEE Std 802.11i#8482; for Wireless Local Area Networks providing wireless communications while in a vehicular environment.

IEEE 802.11r-2008, Standard for Information Technology - Telecommunications and information exchange between systems - Local and metropolitan area networks - Specific requirements - Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) specifications - Amendment 2: Fast BSS-Transition
This amendment specifies the extensions to ANSI/IEEE 802.11 for Wireless Local Area Networks providing mechanisms for Fast BSS Transition. It is intended to submit this amendment to ISO/IEC/JTC1 for consideration.

IEEE 802.11u-2011, Standard for Information Technology - Telecommunications and Information Exchange Between Systems - Local and Metropolitan Networks - Specific Requirements - Part II: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications - Amendment: IEEE 802.11 Interworking with External Networks
This amendment specifies enhancements to the 802.11 MAC that support WLAN interworking with External Networks. It enables higher layer functionalities to provide overall end-to-end solutions. The main goals of 802.11u are aiding network discovery and selection, enabling information transfer from external networks, enabling emergency services, and interfacing Subscription Service Provider Networks (SSPN) to 802.11 Networks that support interworking with External Networks.

IEEE 802.11v-2011, Standard for Information Technology - Telecommunications and Information Exchange Between Systems - Local and Metropolitan Networks - Specific Requirements - Part II: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications - Amendment: IEEE 802.11 Wireless Network Management
This amendment provides Wireless Network Management enhancements to the IEEE 802.11 MAC and PHY, extending radio measurements to effect a complete and coherent upper layer interface for managing IEEE 802.11 devices in wireless networks.

IEEE 802.11w-2009, Standard for Local and Metropolitan Area Networks - Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Amendment: Protected Management Frames
This project improves the security of some or all ANSI/IEEE 802.11 management frames by defining enhancements such as data integrity, data origin authenticity, replay protection, and data confidentiality.

IEEE 802.11y-2008, Standard for Information Technology - Telecommunications and Information Exchange Between Systems - Local and Metropolitan Networks - Specific Requirements - Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications - Amendment 3: 3650-3700 MHz Operation in USA
This document defines enhancements to the 802.11 PHY and MAC to support operation in the 3650-3700 MHz band in the United States of America. It is intended to submit this standard for consideration to ISO/IEC JTC1.

IEEE 802.11z-2010, Standard for Information Technology - Telecommunications and Information Exchange Between Systems - Local and Metropolitan Area Networks - Specific Requirements - Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications - Amendment 7: Extensions to Direct Link Setup (DLS)
This amendment provides Direct Link Setup enhancements to the IEEE 802.11 MAC and PHY, extending direct link setup to be independent of the access point (AP), and adding power save capabilities. The direct link setup is made independent of the AP by tunneling the protocol messages inside data frames.
IEEE 802.15.1-2005 (R2010), Standard for Information Technology - Telecommunications and Information Exchange Between Systems - Local and Metropolitan Area Networks - Specific Requirements - Part 15.1: Wireless Medium Access Control (MAC) and Physical Layer (PHY) Specifications for Wireless Personal Area Networks (WPANs)

This standard defines physical layer (PHY) and medium access control (MAC) specifications for wireless connectivity with fixed, portable, and moving devices within or entering a personal operating space (POS). A POS is the space about a person or object that typically extends up to 10 m in all directions and envelops the person whether stationary or in motion.

IEEE 802.15.2-2003 (R2009), Recommended Practice for Information Technology - Telecommunications and Information Exchange Between Systems - Local and Metropolitan Area Networks - Specific Requirements - Part 15.2: Coexistence of Wireless Personal Area Networks with Other Wireless Devices Operating in Unlicensed Frequency Bands

This recommended practice addresses the issue of coexistence of wireless local area networks and wireless personal area networks. These wireless networks often operate in the same unlicensed band. This recommended practice describes coexistence mechanisms that can be used to facilitate coexistence of wireless local area networks and wireless personal area networks.

IEEE 802.15.3-2003 (R2008), Standard for Information Technology - Telecommunications and Information Exchange Between Systems - Local and Metropolitan Area Networks - Specific Requirements - Part 15.3: Wireless Medium Access Control (MAC) and Physical Layer (PHY) Specifications for High Rate Wireless Personal Area Networks (WPAN)

The protocol and compatible interconnection of data and multimedia communication equipment via 2.4 GHz radio transmissions in a Wireless Personal Area Network (WPAN) using low power and multiple modulation formats to support scalable data rates is defined in this standard.

IEEE 802.15.3c-2009, Standard for Information Technology - Telecommunications and Information Exchange Between Systems - Local and Metropolitan Area Networks - Specific Requirements - Part 15.3: Wireless Medium Access Control (MAC) and Physical Layer (PHY) Specifications for High Rate Wireless Personal Area Networks (WPANs) - Amendment 2: Millimeter-Wave Based Alternative Physical Layer Extension

This project defines a 25 to 100 GHz (millimeter wave) alternative PHY clause for higher data rate amendment to Standard ANSI/IEEE 802.15.3. This frequency range allows for the USA and Japanese unlicensed allocations and expected unlicensed allocations in other countries.

IEEE 802.15.4-2015, Standard for Low-Rate Wireless Personal Area Networks (WPANs)

This standard defines the physical layer (PHY) and medium access control (MAC) sublayer specifications for low-data-rate wireless connectivity with fixed, portable, and moving devices with no battery or very limited battery consumption requirements. In addition, the standard provides modes that allow for precision ranging. Physical layers (PHYS) are defined for devices operating various license-free bands in a variety of geographic regions.

IEEE 802.15.4a-2007, Standard for Information Technology - Telecommunications and Information Exchange Between Systems – Local and Metropolitan Area Networks - Specific Requirements – Part 15.4: Wireless Medium Access Control (MAC) and Physical Layer (PHY) Specifications for Low-Rate Wireless Personal Area Networks (LR-WPANs): Amendment to add alternate PHY

This amendment defines an alternative PHY clause for a data communication standard with precision ranging, extended range, enhanced robustness, and mobility. Amendment to Std 802.15.4.

IEEE 802.15.4c-2009, Standard for Information Technology - Telecommunications and Information Exchange Between Systems - Local and Metropolitan Area Networks - Specific Requirements - Part 15.4: Wireless Medium Access Control (MAC) and Physical Layer (PHY) Specifications for Low-Rate Wireless Personal Area Networks (WPANs) - Amendment: Alternative Physical Layer Extension to Support One or More of the Chinese 314-316 MHz, 430-434 MHz, and 779-787 MHz Bands

This amendment describes support for sub 1 GHz band in China.

IEEE 802.15.4d-2009, Information Technology - Telecommunications and Information Exchange Between Systems - Local and Metropolitan Area Networks - Specific Requirements - Part 15.4: Wireless Medium Access Control (MAC) and Physical Layer (PHY) Specifications for Low-Rate Wireless Personal Area Networks (WPANs) - Amendment: Alternative Physical Layer Extension to Support the Japanese 950MHz Band

The amendment to 802.15.4 will standardize a new PHY and necessary changes to the existing MAC to support Japanese 950 MHz.

IEEE 802.15.4j-2013, Standard for Local and metropolitan area networks - Part 15.4: Low-Rate Wireless Personal Area Networks (LR-WPANs) - Amendment 4: Alternative Physical Layer Extension to Support Medical Body Area Network (MBAN) Services Operating in the 2360 MHz - 2400 MHz Band

This amendment defines a physical layer for IEEE 802.15.4 in the 2360 to 2400 MHz band which complies with Federal Communications Commission (FCC) MBAN rules. This amendment defines modifications to the MAC needed to support this new physical layer.

IEEE 802.15.5-2009, Recommended Practice for Information Technology - Telecommunications and Information Exchange Between Systems - Local and Metropolitan Area Networks - Specific Requirements - Part 15.5: Mesh Topology Capability in Wireless Personal Area Networks (WPANs)

The scope of this standard is to provide a recommended practice to provide the architectural framework enabling WPAN devices to promote interoperable, stable, and scalable wireless mesh topologies and, if needed, to provide the amendment text to the current WPAN standards that is required to implement this recommended practice.

IEEE 802.15.7-2011, Standard for Short-Range Wireless Optical Communication using Visible Light

This standard defines a PHY and MAC layer for short-range optical wireless communications using visible light in optically transparent media. The visible light spectrum extends from 380 to 780 nm in wavelength. The standard is capable of delivering data rates sufficient to support audio and video multimedia services and also considers mobility of the visible link, compatibility with visible-light infrastructures, impairments due to noise and interference from sources like ambient light and a MAC layer that accommodates visible links.

IEEE 802.16-2009, Standard for Local and Metropolitan Area Networks - Part 16: Air Interface for Fixed and Mobile Broadband Wireless Access Systems

This standard specifies the air interface, including the medium access control layer (MAC) and physical layer (PHY), of combined fixed and mobile point-to-multipoint broadband wireless access (BWA) systems providing multiple services.


This amendment to IEEE Std 802.16.1-2012 specifies protocol enhancements to the WirelessMAN-Advanced Air Interface medium access control layer (MAC) and physical layer (PHY) to support high reliability networks.
This recommended practice specifies extensions and modifications addressing two distinct topics. The first is coexistence between multipoint (MP) systems and PTP systems in the 10 - 66 GHz frequency range. The second is coexistence among FBWA systems and OFDMA systems in the 10 - 11 GHz frequency range. Updates to the existing content are also considered.

IEEE 802.16/Conformance04-2006, Standard for Conformance to IEEE 802.16 - Part 4: Protocol Implementation Conformance Statement (PICS) Proforma for Frequencies below 11 GHz

To evaluate conformance of a particular implementation, it is necessary to have a statement of which capabilities and options have been implemented for a telecommunications specifications. Such a statement is called a Protocol Implementation Conformance Statement (PICS). Represents the PICS Proforma, per ISO/IEC Standard 9646-7 (1995) and ITU-T X.296, for conformance specification of base stations and subscriber stations based upon the air interface specified in IEEE 802.16-2004.

IEEE 802.16h-2010, Standard for Local and Metropolitan Area Networks - Part 16: Air Interface for Fixed Broadband Wireless Access Systems - Improved Coexistence Mechanisms for License-Exempt Operation Amendment

This amendment specifies improved mechanisms, as policies and medium access control enhancements, to enable coexistence among license-exempt systems based on IEEE Standard 802.16 and to facilitate the coexistence of such systems with primary users.

IEEE 802.16j-2009, Standard for Local and Metropolitan Area Networks - Part 16: Air Interface for Fixed and Mobile Broadband This document specifies OFDMA physical layer and medium access control layer enhancements to IEEE Std 802.16 for licensed bands to enable the operation of relay stations. Subscriber station specifications are not changed.

IEEE 802.16m-2011, Standard for Local and metropolitan area networks - Part 16: Air Interface for Fixed and Mobile Broadband Wireless Access Systems - Advanced Air Interface This amendment specifies the WirelessMAN-Advanced Air Interface, an enhanced air interface designed to meet the requirements of the IMT-Advanced standardization activity conducted by the International Telecommunications Union - Radiocommunications Sector (ITU-R). The amendment is based on the WirelessMAN-OFDMA specification and provides continuing support for legacy subscriber stations.

IEEE 802.16n-2013, Standard for Air Interface for Broadband Wireless Access Systems - Amendment 2: Higher Reliability Networks

This amendment to IEEE Std 802.16-2012 specifies protocol enhancements to the medium access control layer (MAC) and WirelessMAN-OFDMA physical layer (PHY) to support high reliability networks.

IEEE 802.16q-2015, Standard for Air Interface for Broadband Wireless Access Systems - Amendment 3: Multi-tier Networks

This amendment specifies MAC/PHY protocol enhancements for cooperation among base stations in multi-tier networks to enhance interference mitigation, mobility management, and base station power management. Enhanced base stations shall support legacy mobile stations. PHY changes to any mobile stations are out of scope.

IEEE 802.17-2011, Standard for Information Technology - Telecommunications and Information Exchange Between Systems - Local

Defines a resilient packet ring access protocol for use in local, metropolitan, and wide area networks, along with appropriate physical layer specifications for transfer of data packets at rates scalable to multiple gigabits per second.

IEEE 802.17b-2007, Standard for Information Technology - Telecommunications and Information Exchange Between Systems - Local and Metropolitan Area Networks - Specific Requirements - Part 17: Resilient Packet Ring (RPR) Access Method and Physical Layer Specifications - Amendment 1 - Spatially Aware Sublayer Enables a Service Provider to use the architecture and protocols of IEEE Std 802.17-2004 to offer improvements in bandwidth utilization, by means of spatial reuse, for applications of resilient packet ring (RPR) that involve bridging clients.

IEEE 802.17c-2010, Information Technology - Telecommunications and Information Exchange Between Systems - Local and Metropolitan Area Networks - Specific Requirements - Part 17: Resilient Packet Ring (RPR) Access Method and Physical Layer Specifications - Amendment 2: Protected Inter-Ring Connection This amendment enables a service provider to use the architecture and protocols of IEEE Std 802.17TM to support ring interconnection through dual station homing, providing 50-ms protection, loop prevention, and load balancing of traffic between rings.

IEEE 802.1AB-2009, Standard for Local and Metropolitan Area Networks - Station and Media Access Control Connectivity Discovery

This standard defines a protocol and management elements, suitable for advertising information to stations attached to the same IEEE 802 LAN, for the purpose of populating physical topology and device discovery management information databases.

IEEE 802.1AE-2006, Standard for Local and Metropolitan Area Networks: Media Access Control (MAC) Security

Specifies how all or part of a network can be secured transparently to peer protocol entities that use the MAC Service provided by IEEE 802 LANs to communicate. MAC security (MACsec) provides connectionless user data confidentiality, frame data integrity, and data origin authenticity.

IEEE 802.1AEbw-2013, Standard for Local and metropolitan area networks - Media Access Control (MAC) Security Amendment 2: Extended Packet Numbering

This amendment specifies the optional use of Cipher Suites that make use of a 64-bit (PN) to allow more than 232 MACsec protected frames to be sent with a single Secure Association Key.

IEEE 802.1ag-2007, Standard for Local and Metropolitan Area Networks - Virtual Bridged Local Area Networks - Amendment 5: Connectivity Fault Management

This amendment specifies protocols, procedures, and managed objects to support connectivity fault management. These allow discovery and verification of the path, through bridges and LANs, taken for frames addressed to and from specified network users. Connectivity faults can be detected and isolated to an individual bridge or LAN.

IEEE 802.1ah-2008, Standard for Local and Metropolitan Area Networks - Virtual Bridged Local Area Networks - Amendment 6: Provider Backbone Bridges

This amendment defines an architecture and bridge protocols for interconnection of multiple Provider Bridged Networks, allowing a Provider to support up to 2^24 service instances.

IEEE 802.1aj-2009, Standard for Local and Metropolitan Area Networks - Virtual Bridged Local Area Networks - Amendment 08: Two-Port Media Access Control (MAC) Relay

This amendment to ANSI/IEEE Std 802.1Q defines the architecture, procedures and protocols associated with relay devices that are able to interconnect two LANs.

IEEE 802.1ak-2007, Standard for Local and Metropolitan Area Networks – Virtual Bridged Local Area Networks - Amendment 07: Multiple Registration Protocol

This amendment to IEEE Std 802.1Q specifies a set of protocols that replaces the GARP, GMRP, and GVRP protocols specified in earlier versions of the IEEE 802.1Q standard.

IEEE 802.1ap-2008, Standard for Local and Metropolitan Area Networks: Virtual Bridged Local Area Networks - Amendment 9: Management Information Base (MIB) Definitions for VLAN Bridges

This amendment includes management information base (MIB) definitions in IEEE Std 802.1Q.
IEEE 802.1AR-2009, Standard for Local and Metropolitan Area Networks - Secure Device Identity
This standard specifies unique per-device identifiers (DevIDs) and the management and cryptographic binding of a device to its identifiers, the relationship between an initially installed identity and subsequent locally significant identities, and interfaces and methods for use of DevIDs with existing and new provisioning and authentication protocols.

IEEE 802.1AX-2008, Standard for Local and Metropolitan Area Networks - Link Aggregation
This standard defines the MAC independent Link Aggregation capability, and general information relevant to specific MAC types that support link aggregation.

IEEE 802.1BA-2011, Standard for Local and Metropolitan Area Networks - Audio Video Bridging (AVB) Systems
This standard defines profiles that select features, options, configurations, defaults, protocols and procedures of bridges, stations and LANs that are necessary to build networks that are capable of transporting time sensitive audio and/or video data streams.

IEEE 802.1D-2004 (R2011), IEEE Standard for Local and Metropolitan Area Networks Media Access Control (MAC) Bridges
An architecture for the interconnection of IEEE 802: Local Area Networks (LANs) below the MAC Service boundary is defined. MAC Bridges, as specified by this standard, allow communications between end stations attached to separate LANs, each with its own separate MAC, to be transparent to logical link control (LLC) and network layer protocols, just as if the stations were attached to the same LAN.

IEEE 802.1Q-2005/Cor 1-2009, Standard for Local and Metropolitan Area Networks - Virtual Bridged Local Area Networks - Amendment 07: Multiple Registration Protocol - Corrigendum 1: Corrections to the Multiple Registration Protocol
This corrigendum contains corrections to the MRP protocol specification.

IEEE 802.1Q-2010, Standard for Local and Metropolitan Area Networks - Media Access Control (MAC) Bridges and Virtual Bridges
Specifies Media Access Control (MAC) Bridges that interconnect individual Local Area Networks (LANs), each supporting the IEEE 802 MAC service using a different or identical media access control method, to provide Bridged Local Area Networks and Virtual LANs (VLANs).

IEEE 802.1Qat-2010, Standard for Local and Metropolitan Area Networks—Virtual Bridged Local Area Networks Amendment: Stream Reservation Protocol (SRP)
This amendment specifies protocols, procedures and managed objects, usable by existing higher layer mechanisms, that allow network resources to be reserved for specific traffic streams traversing a bridged local area network.

IEEE 802.1Qau-2010, Standard for Local and Metropolitan Area Networks - Virtual Bridged Local Area Networks - Amendment: Congestion Notification
This amendment specifies protocols, procedures and managed objects that support congestion management of long-lived data flows within network domains of limited bandwidth-delay product. This is achieved by enabling bridges to signal congestion to end stations capable of transmission rate limiting to avoid frame loss.

IEEE 802.1Qav-2009, Standard for Local and Metropolitan Area Networks - Virtual Bridged Local Area Networks - Amendment XX: Forwarding and Queuing Enhancements for Time-Sensitive Streams
This amendment to ANSI/IEEE Std 802.1Q defines enhancements to the forwarding and queuing functions of a VLAN Bridge to support the transmission of time sensitive data streams.

IEEE 802.1Qaw-2009, Standard for Local and Metropolitan Area Networks - Virtual Bridged Local Area Networks - Amendment: Management of Data Driven and Data Dependent Connectivity Faults
This standard specifies connectivity fault management protocols, procedures, and managed objects that provide confirmation of successful transmission of frames conveying specified data.

IEEE 802.1Qay-2009, Standard for Local and Metropolitan Area Networks - Virtual Bridged Local Area Networks - Amendment: Provider Backbone Bridge Traffic Engineering
This amendment supports provisioning systems that explicitly select traffic engineered paths within Provider Backbone Bridge Networks by allowing a network operator to disable unknown destination address forwarding and source address learning for administratively selected VLAN Identifiers, while allowing other network control protocols to dynamically determine active topologies for other services.

IEEE 802.1Qaz-2011, Standard for Local and Metropolitan Area Networks - Virtual Bridged Local Area Networks - Amendment: Enhanced Transmission Selection for Bandwidth Sharing Between Traffic Classes
This amendment to IEEE Std 802.1Q defines enhancements to transmission selection to support allocation of bandwidth amongst traffic classes, plus a protocol for controlling the application of Data Center Bridging features.

IEEE 802.1Qb-2010, Standard for Local and Metropolitan Area Networks - Virtual Bridged Local Area Networks - Amendment: Priority--based Flow Control
This amendment specifies protocols, procedures and managed objects that enable flow control per traffic class on IEEE 802 point-to-point full duplex links. This is achieved by a mechanism similar to the IEEE 802.3 Annex 31B PAUSE, but operating on individual priorities.

IEEE 802.1Qbc-2011, Standard for Local and Metropolitan Area Networks - Virtual Bridged Local Area Networks - Amendment: Provider Bridging - Remote Customer Service Interfaces
This amendment to IEEE Std. 802.1Q specifies the use of S-VLANs to provide customer service interfaces in one Provider Bridged Network for customer interface LANs attached to another Provider Bridged Network.

IEEE 802.1Qbe-2011, Standard for Local and Metropolitan Area Networks - Virtual Bridged Local Area Networks - Amendment: Multiple Backbone Service Instance Identifier (I-SID) Registration Protocol (MRP)
This standard specifies protocols, procedures, and managed objects to support topology change signaling to alter the binding (held in an I-Component) of Customer addresses to Backbone addresses on a per-i-SID basis. This is accomplished by extending the use of the Multiple Registration Protocol (MRP).

IEEE 802.1Qcd-2016, Standard for Local and metropolitan area networks - Bridges and Bridged Networks - Amendment 23: Application Virtual Local Area Network (VLAN) Type, Length, Value (TLV)
This amendment to IEEE Std 802.1Qaz defines enhancements to the set of TLVs used by the Data Center Bridging exchange (DCBX) protocol for the purpose of simplifying the management of networks utilizing Data Center Bridging features.

This standard specifies the physical and medium access control layers of an air interface for interoperable mobile broadband wireless access systems, operating in licensed bands below 3.5 GHz.

This standard represents the Protocol Implementation Conformance Statement (PICS) Proforma, per ISO/IEC Standard 9646-7 (1995) and ITU-T X.296, for the conformance specification of base stations or access nodes, and access terminals or user terminals, based upon the air interface specified in IEEE 802.20.
IEEE 802.20-2010, Standard for Minimum Performance Characteristics of IEEE 802.20 Terminals and Base Stations/Access Nodes

This standard details definitions, method of measurements and minimum performance characteristics for IEEE 802.20 MBWA terminals and base stations/Access Nodes (AN). The test methods are specified in this document; however, methods other than those specified may suffice for the same purpose.

IEEE 802.20a-2010, Standard for Local and Metropolitan Area Networks - Part 20: Air Interface for Mobile Broadband Wireless Access Systems Supporting Vehicular Mobility - Physical and Media Access Control Layer Specification - Amendment: Management Information Base Enhancements and Corrigenda Items

This chapter defines a Management Information Base (MIB) module for managing the MAC and PHY. Managed objects are accessed via a virtual information store, termed the Management Information Base or MIB. MIB objects are generally accessed through the Simple Network Management Protocol (SNMP).

IEEE 802.20b-2010, Standard for Local and Metropolitan Area Networks - Virtual Bridged Local Area Networks - Amendment: Bridging of 802.20

This amendment specifies the mechanism for the support of bridging of IEEE 802.20 networks.

IEEE 802.21-2009, Standard for Local and Metropolitan Area Networks: Media Independent Handover Services

This standard defines extensible IEEE 802 media access independent mechanisms that enable the optimization of handover between heterogeneous IEEE 802 networks and facilitates handover between IEEE 802 networks and cellular networks.


This standard specifies the air interface, including the cognitive medium access control layer (MAC) and physical layer (PHY), of fixed point-to-multipoint wireless regional area networks comprised of a professional fixed base station with fixed and portable user terminals operating in the VHF/UHF TV broadcast bands between 54 MHz to 862 MHz.

IEEE 802.22.1-2010, Standard to Enhance Harmful Interference Protection for Low Power Licensed Devices Operating in TV Broadcast Bands

This standard defines the protocol and data formats for communication devices forming a beaconing network that are used to protect low-power, licensed devices operating in television broadcast bands from harmful interference generated by license-exempt devices, such as Wireless Regional Area Networks (WRAN), intended to operate in the same bands.

IEEE 802.3-2009, Standard for Information Technology - Telecommunications and Information Exchange Between Systems - Local and Metropolitan Area Networks - Specific Requirements Part 3: Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method and Physical Layer Specifications - This standard defines Ethernet local area, access and metropolitan area networks. Ethernet is specified at selected speeds of operation; and uses a common media access control (MAC) specification and management information base (MIB). The Carrier Sense Multiple Access with Collision Detection (CSMA/CD) MAC protocol specifies shared medium (half duplex) operation, as well as full duplex operation. Speed specific Media Independent Interfaces (MII) provide an architectural and optional implementation interface to selected physical layer entities (PHY).

IEEE 802.3-2009/Cor1-2009, Standard for Information Technology - Telecommunications and Information Exchange Between Systems - Local and Metropolitan Area Networks - Specific Requirements Part 3: Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method and Physical Layer Specifications - Corrigendum 1 Timing Considerations for PAUSE Operation

This Corrigendum corrects the PAUSE reaction timing delay for the 10GBASE-T port type.

IEEE 802.3.1-2011, Standard for Management Information Base (MIB) definitions for Ethernet

Contains the Management Information Base (MIB) module specifications for IEEE Std 802.3, also known as Ethernet. This standard includes the Structure of Management Information Version 2 (SMIV2) MIB module specifications formerly produced and published by the Internet Engineering Task Force (IETF), and the Guidelines for the Definition of Managed Objects (GDOM) MIB modules formerly specified within IEEE Std 802.3, as well as extensions resulting from recent amendments to IEEE Std 802.3. The SMIV2 MIB modules are intended for use with the Simple Network Management Protocol (SNMP), commonly used to manage Ethernet.

IEEE 802.3at-2009, Standard for Information Technology - Telecommunications and Information Exchange Between Systems - Local and Metropolitan Area Networks - Specific Requirements Part 3: Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method and Physical Layer Specifications - Amendment: Data Terminal Equipment (DTE) Power Via the Media Dependent Interface (MDI) Enhancements

This project is to augment the capabilities of the ANSI/IEEE Std 802.3 standard with higher power levels and improved power management information.


The scope of this project is to amend IEEE Std 802.3 to add physical layer specifications and management parameters for symmetric and/or asymmetric operation at 10 Gb/s on point-to-multipoint passive optical networks.


This amendment to IEEE Std 802.3 - 2008 specifies changes to several existing physical layers to enable energy efficient operation of Ethernet. Changes to 10BASE-T include a reduction in transmit voltage requirements. Changes to 100BASE-TX, 1000BASE-T, 10GBASE-T, 1000BASE-KX, 10GBASE-KX4 and 10GBASE-KR include the definition of a Low Power Idle (LPI) mode and mechanisms to communicate and manage the entry and exit into and out of LPI and the operation of this mode. New LLDP TLVs are defined for negotiating system level energy efficiency parameters.

IEEE 802.3ba-2010, LAN/MAN - Specific Requirements Part 3: Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method and Physical Layer Specifications - Amendment: Media Access Control Parameters, Physical Layers and Management Parameters for 40 Gb/s and 100 Gb/s Operation

This amendment includes changes to IEEE Std 802.3 - 2008 and adds Clause 80 through Clause 88, Annex B, Annex 83A through Annex 83C, Annex 85A and Annex 86A. It includes IEEE 802.3 Media Access Control (MAC) parameters, Physical Layer specifications, and management parameters for the transfer of IEEE 802.3 frames at 40 Gb/s and 100 Gb/s.
IEEE 802.3-bc-2009, Standard for Information Technology - Telecommunications and Information Exchange Between Systems - Local and Metropolitan Area Networks - Specific Requirements Part 3: Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method and Physical Layer Specifications Amendment: Ethernet Organizationally Specific Type, Length, Values (TLVs)
This project amends ANSI/IEEE Std 802.3 to add the specification of the IEEE 802.3 organizationally Specific TLVs as currently specified in ANSI/IEEE Std 802.1AB.

IEEE 802.3-bd-2011, Standard for Information Technology - Telecommunications and Information Exchange Between Systems - Local and Metropolitan Area Networks - Specific Requirements Part 3: Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method and Physical Layer Specifications Amendment: MAC Control Frame for Priority-based Flow Control
This amendment defines a MAC Control Frame to support 802.1Q Priority-based Flow Control.

IEEE 802.3bf-2011, Standard for Information Technology - Telecommunications and Information Exchange Between Systems - Local and Metropolitan area networks - Specific requirements Part 3: Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method and Physical Layer Specifications Amendment: Media access Control (MAC) service interface and management parameters to support time synchronization protocols
Includes changes to IEEE Std 802.3-2008 and adds Clause 90. This amendment adds changes required to provide an accurate indication of the transmission and reception initiation times of packets required to support time synchronization protocols, e.g., IEEE P802.1AS or IEEE Std 1588.

This draft is an amendment of IEEE Std 802.3-2008 as amended by IEEE Std 802.3ba-2010. This amendment provides physical layer specifications and management parameters for serial 40 Gb/s Ethernet operation over single-mode fiber.

IEEE 807-2011, Recommended Practice for Unique Identification in Hydroelectric Facilities
This recommended practice provides a unique identification system for hydro facilities that segregates and incorporates plant, unit, system, and component identifiers as a minimum.

Practical test methods and techniques are presented for measuring the electrical characteristics of grounding systems. Topics addressed include safety considerations; measuring earth resistivity; measuring the power system frequency resistance or impedance of the ground system to remote earth; measuring the transient or surge impedance of the ground system to remote earth; measuring step and touch voltages; verifying the integrity of the grounding system; reviewing common methods for performing ground testing; reviewing instrumentation characteristics and limitations; and reviewing various factors that can distort test measurements.

IEEE 810-2015, Standard for Hydraulic Turbine and Generator Shaft Couplings and Shaft Runout Tolerances
This standard applies to the dimensions for all types of shaft couplings and shaft runout tolerances for hydraulic turbines and generators. Shafts and couplings included in this standard are used for both horizontal and vertical connections between generators and turbines in hydroelectric installations.

IEEE 82-2002 (R2009), Standard Test Procedure for Impulse Voltage Tests on Insulated Conductors
A test procedure for impulse testing of insulated conductors (cables) and cables with accessories installed (cable systems) is provided in this standard. This procedure can be used as a design or qualification test for cables or for cable systems.

IEEE 820-2005 (R2010), Standard Telephone Loop Performance Characteristics
This standard covers the general parameters and characteristics associated with telephone loops from the subscriber signaling and analog voice frequency interface to the local Class 5 switch interface. It includes only those business and residential lines in the North American public switched network where no special performance requirements are involved. This standard provides common denominators for subscriber line performance, independent of facility types, construction processes or equipment, and circuit provisioning methods.

This standard applies to outdoor series capacitor banks and to the major components of a bank that are required to form a complete system for the insertion of capacitors in series with a transmission line. These major components include capacitors, varistors, bypass gaps, bypass switches, discharge current limiting reactors, insulated structures, and protection and control systems. This standard defines the major requirements for the bank and these components. Design and production tests for all of the components are outlined. Disconnect switches associated with the series capacitor bank are not discussed in detail.

IEEE 829-2008, Standard for Software and System Test Documentation
This standard applies to all software-based systems. It applies to systems and software being developed, acquired, operated, maintained, and/or reused. When conducting the test process, it is important to examine the software in its interactions with the other parts of the system. This standard identifies the system considerations that test processes and tasks address in determining system and software correctness and other attributes, and the applicable resultant test documentation. This document is intended to for the basis for or be included in a standard by ISO/IEC JTC1.

IEEE 835-1994 (R2012), Standard Power Cable Ampacity Tables
Over 3000 ampacity tables for extruded dielectric power cables rated through 138 kV and laminar dielectric power cables rated through 500 kV are provided.

IEEE 836-2009, Recommended Practice for Precision Centrifuge Testing of Linear Accelerometers
This recommended practice provides a guide to the conduct and analysis of precision centrifuge tests of linear accelerometers, covering each phase of the tests, beginning with the planning.

IEEE 841-2009, Standard for Petroleum and Chemical Industry - Premium Efficiency Severe Duty Totally Enclosed Fan-Cooled (TEFC) Squirrel Cage Induction Motors - Up to and Including 370 kW (500 hp)
The purpose of this standard is to define a specification that deals with mechanical and electrical performance, electrical insulation systems, corrosion protection, and electrical and mechanical testing for severe duty TEFC squirrel cage polyphase induction motors, up to and including 370 kW (500 hp), for petroleum and chemical industry application.
This document provides guidance for evaluating human-system performance related to systems, equipment, and facilities in nuclear power generating stations. It summarizes specific evaluation techniques and presents rationale for their application within the integrated systems approach to plant design, operations, and maintenance described in IEEE Std 1023-1988 [B3].

IEEE 848-2015, Standard Procedure for the Determination of the Ampacity Derating Factor for Fire-Protected Cable Systems
This standard provides a test procedure for determining the ampacity derating factor in the following cable installation configurations: Block-out or sleeve-type cable penetration fire stops, Conduits covered with a protective material, Trays covered with a protective material, Cable directly covered or coated with a fire-retardant material, Free-air drops enclosed with a protective material.

IEEE 859-2002 (R2008), Terms for Reporting and Analyzing Outage Occurrences and Outage States of Electrical Transmission Facilities
This standard defines terminology and indices for reporting and analyzing outage occurrences of transmission facilities.

This standard provides guidance to users of IEEE standards as to how they could apply them to meet the quality management expectations of ISO 9001:2000 clauses and sub-clauses in a software development context by adopting ISO/IEC 90003 software development guidance document for ISO 9001 and adding an informative annex to cross-reference IEEE S2ESC standards to relevant ISO 9001 material.

Electrical insulation systems and materials may be tested using constant stress tests in which times to breakdown are measured for a number of test specimens, and progressive stress tests in which breakdown voltages may be measured. In either case, it will be found that a different result is obtained for each specimen and that, for given test conditions, the data obtained may be represented by a statistical distribution. This guide describes, with examples, statistical methods to analyze such data.

Applies to terminology for tools and equipment used in live line working.

IEEE 937-2007, Recommended Practice for Installation and Maintenance of Lead-Acid Batteries for Photovoltaic (PV) Systems
This recommended practice provides design considerations and procedures for storage, location, mounting, ventilation, assembly, and maintenance of lead-acid storage batteries for photovoltaic power systems. Safety precautions and instrumentation considerations are also included.

IEEE 945-1984 (R2009), Recommended Practice for Preferred Metric Units for Use in Electrical and Electronics Science and Technology
The purpose of this recommended practice is to aid in the selection of metric units so as to promote uniformity in the use of metric units and to limit the number of different metric units that will be used in electrical and electronics science and technology.

IEEE 95-2002 (R2007), Recommended Practice for Insulation Testing of AC Electric Machinery (2300 V and Above) with High Direct Voltage
This recommended practice provides uniform methods for testing insulation with high direct voltage. It applies to stator (armature) windings of ac electric machines rated 2300 V or higher. It covers acceptance testing of new equipment in the factory or in the field after installation, and routine maintenance testing of machines that have been in service.

This standard provides specifications and test requirements for a single-axis interferometric fiber optic gyro (IFOG) for use as a sensor in attitude control systems, angular displacement measuring systems, and angular rate measuring systems. A standard specification format guide for the preparation of a single-axis IFOG is provided.

IEEE 977-2010, Guide to Installation of Foundations for Transmission Line Structures
This guide presents various approaches to good practice that could improve the installation of transmission line structure foundations. This guide covers only the construction aspects of the installation of the foundations.

This standard gives principles for the development of test procedures to evaluate the thermal endurance of solid electrical insulating materials in air. The results of accelerated thermal endurance tests, which are conducted according to prescribed procedures, shall be used to establish temperature indexes (TIs) for insulating materials.

This recommended practice provides criteria for the preparation of test procedures for accelerated thermal aging of insulation systems and for the specification of tests based on conditions of use. The objective of these test procedures is to provide for the functional evaluation, by test, of insulation systems for electrical equipment. It includes a form and guidelines for the preparation of test procedures.

IEEE C135.61-2006, Standard for the Testing of Overhead Transmission and Distribution Line Hardware
Requirements for mechanically testing load-rated line hardware for use on transmission and distribution facilities are described. Items specifically addressed include clevis and eye fittings, Y-clevis fittings, socket fittings, ball fittings, chain links, shackles, triangular and rectangular yoke plates, suspension clamps, and strain clamps.

This Standard covers the dimensional, strength, and testing requirements for zinc coated forged anchor shackles used in overhead transmission and distribution line construction.

Dimensions and strength requirements for shoulder live line extension links used in overhead transmission and distribution hardware are covered.

IEEE C37.011-2011, Guide for the Application of Transient Recovery Voltage for AC High-Voltage Circuit Breakers
This application guide covers procedures and calculations necessary to apply the standard transient recovery voltage (TRV) ratings for ac high-voltage circuit breakers rated above 1000 V. The breaking capability limits of these circuit breakers are determined to a great degree by the TRV. This application guide is not included in other existing circuit breaker standards. In this document, the TRV ratings are compared with typical system TRV duties. Examples of TRV calculation are given with suggested options if the TRV duty exceeds the TRV ratings of the circuit breaker.

Applies to ac high-voltage circuit breakers rated in accordance with IEEE Std C37.04-1 and listed in ANSI Std C37.06. It is intended to supplement IEEE Std C37.010. Circuit breakers rated and manufactured to meet other standards should be applied in accordance with application procedures adapted to their specific ratings.
IEEE C37.013-1997 (R2008), Standard for AC High-Voltage Generator Circuit Breakers Rated on a Symmetrical Current Basis
This standard provides ratings, performance requirements, and compliance test methods for AC high-voltage generator circuit breakers rated on a symmetrical current basis that are installed between the generator and the transformer terminals. Guidance for applying generator circuit breakers is also given.

IEEE C37.015-2009, Guide for the Application of Shunt Reactor Switching
This application guide applies to ac high-voltage circuit breakers rated for shunt reactor switching. The guide covers the specific cases of switching directly grounded shunt reactors, ungrounded shunt reactors and shunt reactors grounded through a neutral reactor.

IEEE C37.016-2006, Standard for AC High-Voltage Circuit Switchers rated 15.5 kV through 245 kV
Applicable to AC circuit switchers designed for outdoor installation and for rated power frequencies of 50 and 60 Hz and rated maximum voltages of 15.5 kV through 245 kV. Only applicable to three-pole circuit switchers for use in three-phase systems. To be used as an aid to both manufacturers and users in the design and selection process. Establishes the rating basis, preferred ratings, and test procedures.

IEEE C37.017-2010, Standard for Bushings for High Voltage (Over 1000 Volts AC) Circuit Breakers and Gas Insulated Switchgear
This standard is applicable to bushings intended for use in high voltage circuit breakers and gas insulated switchgear. These bushings are intended for indoor and outdoor use, operating on alternating current with a rated voltage greater than 1000 V and a frequency of 50 or 60 Hz. These bushings are usually a part of an apparatus and tested according to the apparatus of which they form part. It defines the special terms used, service conditions, ratings, general requirements, test procedure and acceptance criteria for these bushings.

IEEE C37.04-1999 (R2006), Standard Rating Structure for AC High-Voltage Circuit Breakers
Covers the rating structure for all high-voltage circuit breakers, which include all voltage ratings above 1000 V ac and comprise both indoor and outdoor types having the preferred ratings as listed in ANSI/IEEE C37.06.

IEEE C37.04-1999/Cor 1-2009, Standard Rating Structure for AC High-Voltage Circuit Breakers - Corrigendum 1
This corrigendum corrects technical and other non-editorial errors made during the preparation of C37.04-1999 latest version.

IEEE C37.04b-2009, IEEE Standard for Rating Structure for AC High-Voltage Circuit Breakers Rated on a Symmetrical Current Basis - Amendment to Change the Description of Transient Recovery Voltage for Harmonization with IEC 62271-100
This standard is revised to change the descriptions of the standard transient recovery voltage (TRV) envelope and ratings.

Establishes uniform guidelines for measurement and reporting of sound produced by ac power circuit breakers. Intended for use in measurement of the sound produced by outdoor circuit breakers in a free-field environment. Methods may be used indoors or in restricted field, provided that precautions are observed in measurement and interpretation of results. Three types of tests are described: design tests, conformance tests, and field tests.

This guide provides a basis for synthetic capacitive current switching tests (see IEEE Std C37.04-1999) and for establishing guidelines for testing to demonstrate the capacitive switching rating of circuit breakers on a single phase basis. The guide contains typical circuits for demonstrating capacitive current switching capability.

IEEE C37.09-1999 (R2007), Standard Test Procedure for AC High-Voltage Circuit Breakers Rated on a Symmetrical Current Basis [Also C37.09a-2005 and C37.09-1999/Cor1-2007]
The testing procedures for all high-voltage circuit breakers that include all voltage ratings above 1000 V ac and comprise both indoor and outdoor types, having the preferred ratings as listed in ANSI C37.06 -1997 are covered. The test procedures verify all assigned ratings, including continuous current, dielectric withstand voltages, short-circuit current, transient recovery voltage, and capacitor switching, plus associated capabilities such as mechanical endurance, load current, and out-of-phase switching. Production test procedures are also included.

IEEE C37.09-1999/Cor1-2007, Standard Test Procedure for AC High-Voltage Circuit Breakers Rated on a Symmetrical Current Basis - Corrigendum 1
Corrects technical and other non-editorial errors made during the preparation of IEEE Std C37.09-1999, which covers test procedure for all high-voltage circuit breakers rated over 1000 Vac.

IEEE C37.09b-2010, Standard Test Procedure for AC High-Voltage Circuit Breakers Rated on a Symmetrical Current Basis - Amendment 2: To Change the Description of Transient Recovery Voltage for Harmonization with IEC 62271-100
This test procedure summarizes the various tests that are made on ac high-voltage indoor and outdoor circuit breakers, except for generator circuit breakers, which are covered in IEEE Std C37.013-1997. It describes accepted methods used in making the tests and specifies the tests that will verify assigned ratings under ANSI/IEEE standards. This procedure does not preclude the use of other equivalent or more effective methods of demonstrating ratings.

This standard applies to, and provides the basis for, the definition, specification, performance analysis, and application of SCADA and automation systems in electric substations, including those associated with generating stations and power utilization and conversion facilities.

This guide provides practices and processes to perform, analyze, and report failure investigations of power circuit breakers.

IEEE C37.100.1-2007, Standard of Common Requirements for High Voltage Power Switchgear Rated Above 1000 V
This new standard collects into one document the requirements that are common in many switchgear standards in an effort to reduce minor inconsistencies between switchgear standards and capture the relevant exceptions among them.

IEEE C37.101-2006, Guide for Generator Ground Protection
Intended to assist protection engineers in applying and relaying schemes for protection against stator ground faults on various generator grounding schemes.

Some equations in Annex A.2 (Phasor diagram analysis) are corrected in this document.

IEEE C37.102-2006 (R2012), Guide for AC Generator Protection
This application guide for the relay protection of synchronous generators presents a review of the generally accepted forms of protection for the synchronous generator and its excitation system. It summarizes the use of relays and devices and serves as a guide for the selection of equipment to obtain adequate protection.
This guide covers tests required to help ensure correct connections of differential relays and polarizing circuits of phase and ground relays. Although other preparatory tests are mentioned in this guide, these tests are not discussed in detail.

This guide describes current automatic reclosing practices for ac distribution and transmission lines. Included within this description are application considerations and coordination practices for reclosing.

IEEE C37.105-2010, Standard for Qualifying Class 1E Protective Relays and Auxiliaries for Nuclear Power Generating Stations
This standard covers qualification of Class 1E Protective Relays and Auxiliaries to be used outside the primary containment in the Nuclear Power Generating Stations. Protective relays and auxiliaries located inside the primary containment in a nuclear power generating station present special conditions beyond the scope of this document.

IEEE C37.106-2003 (R2009), Guide for Abnormal Frequency Protection for Power Generating Plants
This guide assists the protection engineer in applying relays for the protection of generating plant equipment from damage caused by operation at abnormal frequencies including overexcitation.

Guidelines for the application of network protectors are established. The use of network transformers and protectors with distributed resources is addressed.

IEEE C37.109-2006, Guide for the Protection of Shunt Reactors
Provides a comprehensive guide to the methods and configurations for the protection of power system shunt reactors. Included are the protection of oil-immersed reactors equipped with auxiliary power windings, improved turn-to-turn protection, and use of digital (microprocessor-based) protection for shunt reactors.

IEEE C37.110-2007, Guide for the Application of Current Transformers Used for Protective Relaying Purpose
This standard guide describes the characteristics and classification of current transformers (cTcTcTs) used for protective relaying. It also describes the conditions which cause the cT output to be distorted and the effects on relaying systems of this distortion. The selection and application of cTcTcTs for the more common protection schemes are also addressed.

IEEE C37.110-2007/Cor 1-2010, IEEE Guide for the Application of Current Transformers Used for Protective Relaying Purposes - Corrigendum 1: Corrections to Equation 18 and Equation 19
This guide describes the characteristics and classification of current transformers (cTcTs) used for protective relaying. It also describes the conditions that cause the CT output to be distorted and the effects on relaying systems of this distortion. The selection and application of CcTs for the more common protection schemes are also addressed.

IEEE C37.111-2013, Measuring relays and protection equipment - Part 24: Common format for transient data exchange (COMTRADE) for power systems
This standard defines a format for files containing transient waveform and event data collected from power systems or power system models. The standard is for files stored on currently used physical media such as portable external hard drives, USB drives, flash drives, CD, and DVD.

IEEE C37.112-1996 (R2007), Standard Inverse-Time Characteristic for Overcurrent Relays
The inverse-time characteristics of overcurrent relays are defined. Reviews various existing analytic techniques used to represent relay operating characteristic curve shapes and proposes analytical formula representation of typical operating characteristic curve shapes to foster some standardization of available inverse-time relay characteristics provided in microprocessor or computer relay applications.

IEEE C37.113-2015, Guide for Protective Relay Applications to Transmission Lines
Concepts of transmission line protection are discussed in this guide. Applications of these concepts to various system configurations and line termination arrangements are presented. Many important issues, such as coordination of settings, operating times, characteristics of relays, impact of mutual coupling of lines on the protection systems, automatic reclosing and use of communication channels are examined.

Application of protective relays on transmission-line series capacitor banks is covered. Purpose is to provide the reader with ample discussion of the protection and control issues related to series capacitor bank installations.

IEEE C37.117-2007, Guide for the Application of Protective Relays Used for Abnormal Frequency Load Shedding and Restoration
Compiles information on the application of underfrequency load shedding and restoration to ac power systems. Describes various system conditions that may require the use of underfrequency load shedding, and the application of protective relays to various methods of performing underfrequency load shedding.

This guide compiles information on the application considerations for breaker failure protection. The reasons for local backup protection are described. Breaker failure schemes are discussed. Issues relating to the settings of current detectors and timers are discussed for various applications.

This document is intended as a guide for use in developing specifications for ac high-voltage circuit breakers. This guide is for specifications that apply to all indoor and outdoor types of ac high-voltage circuit breakers rated above 1000 volts.

This guide identifies and summarizes circuit breaker manufacturer's information that knowledgeable users will find useful for the receipt, installation, commissioning, operation and maintenance, and decommissioning of high-voltage (>1000V) circuit breakers. This guide recommends categories and an arrangement for the presentation of information in circuit breaker instruction manuals.

IEEE C37.121-2012, Guide for Switchgear - Unit Substation - Requirements
This guide covers three-phase unit substations for step-down operation in the range of 112.5 kVA or greater at primary voltages of 601 V through 38 kV.

IEEE C37.122-2010, Standard for High Voltage Gas-Insulated Substations Rated Above 52 kV
This standard establishes ratings and requirements for planning, design, testing, installation, and operation of gas-insulated substations for alternating-current applications for above 52 kV. Typical installations are assemblies of specialized devices such as circuit breakers, switches, bushings, buses, instrument transformers, cable terminations, instrumentation and controls, and the gas-insulating system. It does not include certain items that may be directly connected to gas-insulated substations, such as power transformers and protective relaying. This standard does not apply to gas-insulated transmission lines.

This guide provides information of special relevance to the planning, design, testing, installation, operation, and maintenance of gas-insulated substations (GIS) and equipment.

IEEE C37.122.3-2011, Guide for Sulphur Hexafluoride (SF6) Gas Handling for High Voltage (over 1000 Vac) Equipment
This guide describes significant aspects of handling SF6 gas used in electric power equipment, such as gas recovery, reclamation, and recycling, in order to keep the gas permanently in a closed cycle and to avoid any deliberate release into the environment.
This guide covers the technical requirements for the design, fabrication, testing, and installation of a gasinsulated substation (GIS).

IEEE C37.13-2015, Standard for Low-Voltage AC Power Circuit Breakers Used in Enclosures
This standard covers the following types and preferred ratings for enclosed low-voltage ac power circuit breakers: a) Stationary or drawout type of two-, three-, or four-pole construction with one or more rated maximum voltages of 1058 V, 730 V, 635 V (600 V for units incorporating fuses), 508 V, or 254 V for application on systems having nominal voltages of 1000 V, 690 V, 600 V, 480 V, or 240 V respectively b) Unfused or fused type c) Manually operated or power operated, with or without a trip system d) Fused drawout assemblies consisting of current-limiting fuses in a drawout assembly

Covers definite purpose switching devices for use in metal-enclosed low-voltage power circuit breaker switchgear. The switching devices shall be fused, drawout type, three-pole construction, with one or more rated maximum ac voltages of 600 V, 508 V, and 254 V for application on systems having nominal ac voltages of 600 V, 480 V, and 240 V. Addresses service conditions, ratings, functional components, temperature limitations and classifications of insulating materials, insulation (dielectric) withstand voltage requirements, test procedures, and application.

IEEE C37.13.1a-2010, Standard for Definite Purpose Switching Devices for Use in Metal-Enclosed Low-Voltage Power Circuit Breaker Switchgear - Amendment: Revise Short-Circuit Rating and Test Requirement
This amendment to the standard revises the short-circuit rating and test requirements for definite purpose switching devices for use in metal-enclosed low-voltage power circuit breaker switchgear

IEEE C37.14-2015, Standard for DC (3200 V and below) Power Circuit Breakers Used in Enclosures
This standard covers the following types, preferred ratings, and testing requirements of enclosed dc power circuit breakers: a) Stationary or drawout type of one- or two-pole functional construction, b) Having rated maximum voltages of up to 3200 V, c) Manually operated or power operated, d) With or without overcurrent trip devices

IEEE C37.16-2009, Standard for Preferred Ratings, Related Requirements, and Application Recommendations for Low-Voltage AC (635V and Below) and DC (3200V and Below) Power Circuit Breakers
This standard defines the preferred ratings for low-voltage ac (635V and below) power circuit breakers, general purpose dc (325V and below) power circuit breakers, heavy duty lowvoltage dc (3200V and below) power circuit breakers, and fused (integrated or non-integrated) lowvoltage ac (600V and below) power circuit breakers.

IEEE C37.2-2008, Standard Electrical Power System Device Function Numbers, Acronyms and Contact Designations
This standard applies to the definition and application of function numbers and acronyms for devices and functions used in electrical substations and generating plants and in installations of power utilization and conversion apparatus. It may be submitted to IEC for consideration.

IEEE C37.20.1-2015, Standard for Metal-Enclosed Low-Voltage (1000 Vac and below, 3200 Vdc and below) Power Circuit Breaker Switchgear
This standard covers metal-enclosed low-voltage power circuit breaker switchgear assemblies containing, but not limited to, such devices as lowvoltage power circuit breakers (fused or unfused); other interrupting devices; switches, control, instrumentation, and metering; and protective and regulating equipment. This standard is concerned with enclosed, rather than open, indoor and outdoor switchgear assemblies. It includes types of equipment that are part of secondary unit substations.

IEEE C37.20.1a-2005 (R2008), Standard for Metal-Enclosed Low-Voltage Power Circuit Breaker Switchgear - Amendment 1: Short-Time and Short-Circuit Withstand Current Tests; Minimum Areas for Multiple Cable Connections
Corrects errors in the base document with respect to dummy elements and metrization of Table 10.

IEEE C37.20.1b-2006 (R2008), Standard for Metal-Enclosed Low-Voltage Power Circuit Breaker Switchgear - Amendment 2: Additional Requirements for Control and Auxiliary Power Wiring in DC Traction Power Switchgear
This amendment addresses additional requirements of auxiliary power wiring and control wiring within dc switchgear of traction power substations with rated maximum voltage up to 3200 volts dc. Provides control and power wiring methods for dc traction power switchgear intended to increase reliability of the operation of the equipment, improve protection, reduce maintenance cost and initial cost, and improve overall performance of the dc traction power switchgear.

IEEE C37.20.2-2015, Standard for Metal-Clad Switchgear
This standard covers metal-clad (MC) switchgear containing, but not limited to, devices such as power circuit breakers, other interrupting devices, switches, control, instrumentation and metering, and protective and regulating equipment. It includes, but is not specifically limited to, equipment for the control and protection of apparatus used for power generation, conversion, and transmission and distribution

IEEE C37.20.3-2001 (R2006), Standard for Metal-Enclosed Interrupter Switchgear
Covers metal-enclosed interrupter (MEI) switchgear assemblies containing, but not limited to, such devices as interrupter switches; selector switches; power fuses; control, instrumentation, and metering devices; and protective equipment. It includes, but is not specifically limited to, equipment for the control and protection of apparatus used for distribution of electrical power.

IEEE C37.20.4-2013, Standard for Indoor AC Switches (1 kV to 38 kV) for Use in Metal-Enclosed Switchgear
This standard covers indoor ac switches rated above 1 kV through 38 kV for use in metal-enclosed switchgear as follows: a) Stationary or drawout 17 b) Manual or power operation 18 c) Fused or unfused

IEEE C37.20.6-2015, Standard for 4.76 kV to 38 kV Rated Ground and Test Devices Used in Enclosures
This standard covers drawout-type, indoor, medium-voltage ground and test (G&T) devices for use in drawout metal-clad switchgear rated 4.76 kV through 38 kV as described in IEEE Std C37.20.2™-1 Four G&T device types are generally supplied for temporary circuit maintenance procedures for insertion in place of the circuit breaker as follows: a) Simple manual devices, b) Complex manual devices, c) Simple electrical devices, d) Complex electrical devices

IEEE C37.20.7-2007, Guide for Testing Metal-Enclosed Switchgear Rated Up to 38kV for Internal Arcing Faults
This guide establishes methods by which metal-enclosed switchgear may be tested for resistance to the effects of arcing due to an internal fault. It also discusses service conditions, installation, and application of equipment. This guide applies only to equipment utilizing air as the primary insulating medium and rated up to 38kV ac.
IEEE C37.21-2005 (R2010), IEEE Standard for Control Switchboards
This standard covers ratings, construction, and testing of dead-front control switchboards containing, but not limited to, devices such as switches, control devices, instrumentation, metering, monitoring, alarms, annunciators, protective and auxiliary relays, and regulating devices and accessories. It includes, but is not specifically limited to, switchboards for the control and protection of apparatus used for or associated with power generation, conversion, transmission, and distribution. Types of switchboards may include control, vertical, dead-front, enclosed, dual, or duplex switchboards.

IEEE C37.23-2015, Standard for Metal-Enclosed Bus
This standard covers assemblies of metal-enclosed conductors along with associated interconnections, enclosures, and supporting structures. The types of assemblies covered are nonsegregated-phase bus, segregated-phase bus, isolated-phase bus, and cable bus. When switches and disconnecting links are included, they shall conform to this standard. This standard encompasses the performance characteristics of indoor and outdoor conductor assemblies with rated maximum operating voltages through 38 kV.

IEEE C37.230-2007, Guide for Protective Relay Applications to Distribution Lines
This guide presents a review of generally accepted applications and coordination of protection for radial power system distribution lines. It examines the advantages and disadvantages of schemes presently being used in protecting distribution lines. In addition, it identifies problems with the methods used in distribution line protection and solutions for those problems.

IEEE C37.231-2006, Recommended Practice for Microprocessor-Based Protection Equipment Firmware Control
Deals with the implications surrounding the use and administration of firmware revisions for protection-related equipment. Attempts to provide guidelines for producers, distributors, and users or protection related equipment utilizing firmware with the intent of helping to maximize the security and reliability of the power system.

IEEE C37.232-2011, Standard for Common Format for Naming Time Sequence Data Files (COMNAME)
This standard defines a procedure for naming time sequence data (TSD) files that originate from digital protection and measurement devices, such as transient data records, event sequences, and periodic data logs. The filename includes, among other features, key portions of the information contained in the file, including, but not limited to, the names of the circuit, substation and recording device, and the date and time of event occurrence.

This guide covers suggested test requirements for Power System Protection Scheme Testing. System Application Tests, the scope and level of tests based on the application, and benefits of the overall protective schemes testing. This guide encompasses overall system testing procedures (generators, line, line reactors, transformer, capacitors, Special protection schemes, end-to-end testing, distributed application within substation, etc.), data collection requirements, as well as the test procedure definitions. The Guide describes the methods, extent, and types of system tests for protection applications, at various voltage levels. Control functions which are inherent to the protective systems are included. Importance of line testing, indirect trip applications, and open / closed loop tests (dynamic / non-linear tests) are also covered.

IEEE C37.234-2009, Guide for Protective Relay Applications to Power System Buses
Concepts of power bus protection are discussed in this guide. Consideration is given to availability and location of breakers, current transformers and disconnectors as well as bus switching scenarios, and their impact on the selection and application of bus protection.

IEEE C37.235-2007, Guide for the Application of Rogowski Coils used for Protective Relaying Purposes
This Guide establishes criteria and requirements for application of Rogowski Coils (RC) (air-core current sensor) used for protective relaying in electric power systems. The selection and application of RCs for the more common protection schemes are addressed.

This standard specifies a common profile for use of IEEE 1588-2008 Precision Time Protocol (PTP) in power system protection, control, automation and data communication applications utilizing an Ethernet communications architecture. The profile specifies a well-defined subset of IEEE 1588-2008 mechanisms and settings aimed at enabling device interoperability, robust response to network failures, and deterministic control of delivered time quality. It specifies the preferred physical layer (Ethernet), higher level protocol used for PTP message exchange and the PTP protocol configuration parameters.

IEEE C37.239-2010, Standard for Common Format for Event Data Exchange (COMFEDE) for Power Systems
This standard defines a format for files containing event data such as sequence of events or fault summary reports collected from power systems or power system models. The format is intended to provide an easily interpretable form for use in exchanging data.

This guide provides information to assist in evaluating the effect of solar radiation on outdoor metal-enclosed switchgear, including metal-enclosed bus and control switchboards.

IEEE C37.242-2013, Guide for Synchronization, Calibration, Testing, and Installation of Phasor Measurement Units (PMUs) for Power System Protection and Control
The document provides guidance for synchronization, calibration, testing, and installation of Phasor Measurement Units (PMU) applied in power system protection and control.

This guide presents practical line current differential schemes using digital communications. Operating principles, synchronization methods, channel requirements, current transformer requirements, external time reference requirements, backup considerations, testing considerations and troubleshooting are included. It also provides specific guidelines for various application aspects including multi-terminal lines, series compensated lines, mutually coupled lines, line charging current, in-zone transformers and reactors, single-phase tripping and reclosing, as well as communications channel requirements.

IEEE C37.244-2013, Guide for Phasor Data Concentrator Requirements for Power System Protection, Control, and Monitoring
This guide describes performance, functional and communication needs of phasor data concentrators (PDC) for power system protection, control and monitoring applications. The guide covers synchronophase system needs and testing procedures for PDCs. It includes functional requirements for associated interfaces with phasor measurement units (PMU) to a PDC and PDC systems.

This guide provides methods for determining the value of power factor for inductive lowvoltage (1000 volts ac and below) test circuits. These methods are used in determining power factor during short-circuit current tests in high power laboratories.

This guide applies to unfused low-voltage ac power circuit breakers of the 635 V maximum voltage class with separately-mounted current-limiting fuses for use on ac circuits with available short-circuit currents of 200 000 A (rms symmetrical) or less. Low-voltage ac fused power circuit breakers and combinations of fuses and molded-case circuit breakers are not covered by this guide.

This guide provides evaluation methods and application considerations for high voltage (>1000 V) switches, as covered in IEEE Std C37.30.1TM-2011, under wind loading conditions. This guide includes testing methods to meet both usual and unusual wind conditions.


This guide describes the testing of fault current limiters (FCLs) operating on condition-based impedance increase for AC systems 1000 V and above. This guide does not include constant impedance series reactors and single fuses.

IEEE C37.40-2003 (R2009), Standard Service Conditions and Definitions for High-Voltage Fuses, Distribution Enclosed Single-Pole Air Switches, Fuse Disconnecting Switches, and Accessories

Service conditions and definitions for high-voltage fuses (above 1000 V), distribution enclosed single-pole air switches, fuse disconnecting switches, and accessories for ac distribution systems are covered.


This standard specifies design test requirements for high-voltage (above 1000 V) fuses, distribution enclosed single-pole air switches, disconnecting cutouts, fuse disconnecting switches, and accessories for use on ac power and distribution systems. Devices with rated maximum voltages to 170 kV are covered.

IEEE C37.42-2009, Standard for Specifications for High Voltage (>1000 Volts) Explosion Type Distribution Class Fuses, Fuse and Disconnecting Cutouts, Fuse Disconnecting Switches and Fuse Links and Accessories Used with These Devices

This standard establishes specifications for high voltage (above 1000 volts) explosion type distribution class fuses, cutouts, fuse disconnecting switches, fuse links and associated accessories. All of these devices are intended for use on alternating current distribution systems.

IEEE C37.43-2008, Standard Specifications for High-Voltage Expulsion, Current-Limiting and Combination Type Distribution and Power Class External Fuses, with Rated Voltages from 1 kV through 38 kV, Used for the Protection of Shunt Capacitors

This standard establishes specifications for high voltage (above 1000 volts) distribution and power class expulsion, current-limiting and combination type external capacitor fuses and accessories, with rated voltages from 1 kV through 38 kV, for protecting shunt capacitors complying with ANSI/IEEE 18-2002 and NEMA CP 1.

IEEE C37.45-2007, Standard Specifications for High Voltage Distribution Class Enclosed Single-Pole Air Switches with Rated Voltages from 1 through 8.3 kV

This standard establishes specifications for high voltage (above 1000 V) distribution class enclosed single-pole air switches and associated accessories with rated voltages from 1 through 8.3 kV. All of these devices are intended for use on alternating current distribution systems.

IEEE C37.46-2010, Standard Specifications for High Voltage (>1000 V) Expulsion and Current-Limiting Power Class Fuses and Fuse Disconnecting Switches

This standard establishes specifications for high voltage (above 1000 V) expulsion and current-limiting type power class fuses, and accessories. All of these devices are intended for use on alternating current systems.

IEEE C37.47-2011, Standard Specifications For High Voltage (> 1000 V) Current-Limiting Type Distribution Class Fuses and Fuse Disconnecting Switches

This standard establishes specifications for high voltage (above 1000 volts) distribution class current limiting type fuses and associated accessories. All of these devices are intended for use on alternating current systems.


This guide presents information on the application, operation, and maintenance of high-voltage fuses (above 1000 V), distribution enclosed single-pole air switches, fuse disconnecting switches, and accessories for use on ac distribution systems. Devices with rated maximum voltages to 169 kV are covered.

IEEE C37.48.1-2002 (R2008), Guide for the Operation, Classification, Application, and Coordination of Current-Limiting Fuses with Rated Voltages 1-38 kV

This guide provides additional guidelines for application and coordination of high-voltage power-and-distribution-class current-limiting fuses.

IEEE C37.59-2007, Standard Requirements for Conversion of Power Switchgear Equipment

This standard covers power switchgear equipment that is converted from a qualified design. It provides direction and guidance in those conversions and specifies required design verification in accordance with applicable American National Standards Institute (ANSI), National Electrical Manufacturers Association (NEMA), Underwriters Laboratories Inc. (UL), or IEEE standards. This standard also recognizes that production/field testing does not provide design verification. This can only be accomplished by means of design testing and technical evaluation.

IEEE C37.63-2013, Standard Requirements for Overhead, Pad-Mounted, Dry-Vault, and Submersible Automatic Line Sectionalizers for Alternating Current Systems Up to 38 kV

This standard applies to all overhead, pad-mounted, dry-vault, and submersible single-pole or multi-pole alternating-current automatic line sectionalizers for rated maximum voltages from 1000 V to 38 000 V. Voltages above 38 000 V shall be considered special applications.

IEEE C37.74-2014, Standard Requirements for Subsurface, Vault, and Padmounted Load-Interrupter Switchgear and Fused Load-Interrupter Switchgear for Alternating Current Systems up to 38 kV

This standard applies to enclosed assemblies of single-phase and three-phase, dead-front and live-front, subsurface, vault, and pad-mounted, load-interrupter switches with or without protective devices such as fuses or fault interrupters, up to 38 kV rated maximum voltage.

IEEE C37.81-1989 (R2009), Guide for Seismic Qualification of Class 1E Metal-Enclosed Power Switchgear Assemblies

This guide provides requirements and guidance for the seismic qualification of metal-enclosed power switchgear assemblies including switching, interrupting, control, instrumentation, metering, and protective and regulating devices mounted therein.

IEEE C37.82-1987 (R2009), Standard for the Qualification of Switchgear Assemblies for Class 1E Applications in Nuclear Power Generating Stations

This document describes the methods and requirements for qualifying switchgear assemblies for indoor areas outside of the containment in nuclear power generating stations. These assemblies include 1) Metal-enclosed low-voltage power circuit breaker switchgear assemblies, as defined in ANSI/IEEE C37.20.1-1987, 2) Metal-clad switchgear assemblies, as defined in ANSI/IEEE C37.20.2-1987, 3) Metal-enclosed bus, as defined in ANSI/IEEE C37.23-1987, and 4) Metal-enclosed interrupter switchgear assemblies, as defined in ANSI/IEEE C37.20.3-1987.

IEEE C37.90-2011, Relays and Relay Systems Associated with Electric Power Apparatus

Specifies standard service conditions, standard ratings, performance requirements, and testing requirements for relays and relay systems used to protect and control power apparatus. A relay system may include computer interface equipment and/or communications interface equipment, such as a carrier transmitter/receiver or audio tone equipment.
IEEE C37.90.2-2004 (R2010), Standard for Withstand Capability of Relay Systems to Radiated Electromagnetic Interference from Transceivers

This standard defines a required withstand level and establishes a test method to evaluate the susceptibility of protective relays to single-frequency electromagnetic fields in the radio frequency domain, such as those generated by portable or mobile radio transceivers and wireless communication devices. This publication includes test requirements, signal levels, and setups.

IEEE C37.90.3-2001 (R2006), Standard Electrostatic Discharge Tests for Protective Relays

Describes test procedure, test point selection, test level, and acceptance criteria for repeatable electrostatic discharge immunity evaluations for tabletop and floor-standing protective relay equipment. Simulator characteristics for hand/metal ESD testing are specified for both the air and contact discharge methods.

IEEE C37.91-2008, Guide for Protecting Power Transformers

This guide emphasizes practical applications, and also provides a review of general philosophy and economic considerations involved in power transformer protection. It describes types of faults in transformers. It also discusses technical problems with the protection systems, including the behavior of current transformers (CTs) during system faults, and associated problems, such as fault clearing and re-energization.

IEEE C37.92-2005 (R2011), Analog Inputs to Protective Relays from Electronic Voltage and Current Transducers

Defines the interface between voltage or current transducer systems or sensing systems with analog electronic outputs, and suitably designed protective relays or other substation measuring equipment. These transducer systems reproduce the power system waveforms as scaled values. This standard also defines requirements for optional intermediate summing or ratio-adjusting amplifiers required to add or subtract the outputs of more than one sensing system for measurement by a single relay or measuring device.

IEEE C37.93-2004 (R2010), Guide for Power System Protective Relay Applications of Audio Tones Over Voice Grade Channels

This guide contains information and recommendations for applying audio tones over voice grade channels for power system relaying, including transmitting and receiving equipment, leased voice grade channels, application principles, installation, and testing. Reflected in this guide is the knowledge and experience of equipment manufacturers and telephone companies as well as that of power utility users.

IEEE C37.94-2002 (R2008), N times 64 kilobit per second Optical Fiber Interfaces Between Teleprotection and Multiplexer Equipment

This standard describes the interconnection details for N, where N = 1, 2, 4, 8, 12, 16, or 32. This standard covers the requirements of optical fiber interfaces for use in teleprotection systems, including single- and multi-channel multiplexers. The standard also defines requirements for optional intermediate interconnections.

IEEE C37.95-2002 (R2007), Guide for Protective Relaying of Utility-Consumer Interconnections

This guide covers protective relay applications involving electric service to consumers that requires a transformation between the utility’s supply voltage and the consumer’s utilization voltage. It describes the factors that need to be considered in the design of adequate protection facilities, outlines modern relay practices, and provides several examples of the protection of typical utility-consumer interconnections.

IEEE C37.96-2012, Guide for AC Motor Protection

This application guide presents generally accepted methods of protection for ac motors. It identifies and summarizes the functions necessary for adequate protection of motors based on type, size, and application. The recommendations in this guide are based on typical installations. Information relating to protection requirements, including microprocessor based protection systems, applications, and setting philosophy is provided to enable the reader to determine required protective functions for motor installations.


This guide applies to the protection of shunt power capacitor banks and filter capacitor banks. Included are guidelines for reliable applications of protection methods intended for use in many shunt capacitor applications and design

IEEE C50.12-2005 (R2010), Standard for Salient-Pole 50 Hz and 60 Hz Synchronous Generators and Generator/Motors for Hydraulic Turbine Applications Rated 5 MVA and Above

The requirements in this standard apply to all types of 50 Hz and 60 Hz salient-pole synchronous generators and generator/motors rated 5 MVA and above to be used for hydraulic turbine or hydraulic pump/turbine applications.

IEEE C50.13-2005 (R2010), Standard for Cylindrical-Rotor 50 Hz and 60 Hz Synchronous Generators Rated 10 MVA and Above

The requirements in this standard apply to all 50 Hz and 60 Hz, two-pole and four-pole, cylindrical-rotor synchronous generators driven by steam turbines and/or by combustion gas turbines. The drive may be direct or through a gearbox or other device that permits different speeds for the turbine and the generator. The generators covered by this standard are to have rated outputs of 10 MVA and above. Cylindrical-rotor, two-pole and four-pole generators below this rating are generally covered by NEMA MG 1-2003 [B18].1

IEEE C57.104-2009, Guide for the Interpretation of Gases Generated in Oil-Immersed Transformers

Detailed procedures for analyzing gas from gas spaces or gas-collecting devices as well as gas dissolved in oil are described. The intent is to provide the operator with positive and useful information concerning the serviceability of the equipment.

IEEE C57.105-1992 (R2008), Guide for Application of Transformer Connections in Three-Phase Distribution Systems

This guide applies to transformer connections in 3-phase distribution systems. This guide emphasizes practical applications and design considerations involved in power transformer protection. It describes types of faults in transformers. It also discusses technical problems with the protection systems, including the behavior of current transformers (CTs) during system faults, and associated problems, such as fault clearing and re-energization.


This guide applies to mineral oil used in transformers, load tap changers, voltage regulators, and reactors. The guide discusses the following: a) Analytical tests and their significance for the evaluation of mineral insulating oil. b) The evaluation of new, unused mineral insulating oil before and after filling into equipment. c) The evaluation of in-service mineral insulating oil. d) Health and environmental care procedures for mineral insulating oil. e) Methods of handling and storage of mineral insulating oil.


This guide sets forth recommendations believed essential for the application of overcurrent protective devices applied to limit the exposure time of transformers to short circuit current. Transformer coordination curves are presented for four categories of transformers. There is no intent to imply overload capability.
IEEE C57.110-2008, Recommended Practice for Establishing Liquid-Filled and Dry-Type Power and Distribution Transformer Capability When Supplying Nonsinusoidal Load Currents

This Recommended Practice provides calculation methods to conservatively evaluate the feasibility for an existing dry-type or liquid-filled transformer, to supply nonsinusoidal load currents as a portion of the total load. It also provides necessary application information to assist in properly specifying a new transformer expected to carry a load, a portion of which is composed of nonsinusoidal load currents. It includes examples and reference annexes.


This guide recommends standard tests and evaluation procedures for silicone transformer fluid. Criteria for maintenance and methods of reconditioning of silicone fluid are described.

IEEE C57.113-2010, Recommended Practice for Partial Discharge Measurement in Liquid-Filled Power Transformers and Shunt Reactors

Partial discharge measurements in transformers and shunt reactors should preferably be made on the basis of measurement of the apparent charge. Relevant measuring systems are classified as narrow-band or wide-band systems. Both systems are recognized and widely used. Without giving preference to one or the other, it is the object of this document to describe the wide-band method.

IEEE C57.119-2002 (R2008), Recommended Practice for Performing Temperature Rise Tests on Oil Immersed Power Transformers at Loads Beyond Nameplate Ratings

This recommended practice covers temperature rise test procedures for determining those thermal characteristics of power transformers needed to appraise the transformer’s load carrying capabilities at specific loading conditions other than rated load.

IEEE C57.12.00-2015, Standard for General Requirements for Liquid-Immersed Distribution, Power, and Regulating Transformers

This standard describes electrical and mechanical requirements of liquid-immersed distribution and power transformers, and autotransformers and regulating transformers, single-phase and polyphase, with voltages of 601 V or higher in the highest voltage winding.

IEEE C57.12.01-2015, Standard for General Requirements for Dry-Type Distribution and Power Transformers

This standard describes electrical and mechanical requirements of single and polyphase ventilated, non-ventilated, and sealed dry-type distribution and power transformers or autotransformers, with a voltage of 601 V or higher in the highest voltage winding.

IEEE C57.12.10-2011, Standard Requirements for Liquid-Immersed Power Transformers

This standard sets forth the requirements for power transformer application. This standard is intended for use as a basis for performance, interchangeability, and safety of equipment covered, and to assist in the proper selection of such equipment. This is a product standard which covers certain electrical, dimensional, and mechanical characteristics of 50 and 60 Hz, liquid-immersed power and auto-transformers.

IEEE C57.12.20-2011, Standard for Overhead Type Distribution Transformers, 500 kVA and Smaller: High Voltage, 34 500 Volts and Below; Low Voltage, 7970/13 800Y Volts and Below

This standard covers certain electrical, dimensional, and mechanical characteristics and safety features of single- and three-phase, 60 Hz, mineral-oil-immersed, self-cooled, overhead-type distribution transformers 500 kVA and smaller, high voltages 34 500 V and below and low voltages 7970/13 800Y V and below.

IEEE C57.12.23-2009, Standard for Submersible Single-Phase Transformers: 167 kVA and Smaller; High Voltage 25 000 V and Below; Low Voltage 600 V and Below

This standard covers certain electrical, dimensional, and mechanical characteristics and takes into consideration certain safety features of single-phase, 60 Hz, liquid-immersed, self-cooled, submersible distribution transformers with separable insulated high-voltage connectors. It is intended for use as a basis for determining performance, interchangeability, and safety of the equipment covered, and to assist in the proper selection of such equipment.

IEEE C57.12.24-2009, Standard for Submersible, Three-Phase Transformers, 3750 kVA and Smaller: High Voltage, 34 500 GrdY/19 920 Volts and Below; Low Voltage, 600 Volts and Below

This standard is intended for use as a basis for establishing the performance, electrical and mechanical interchangeability, and safety of the equipment covered, and to assist in the proper selection of such equipment.

IEEE C57.12.30-2010, Standard for Pole-Mounted Equipment - Enclosure Integrity for Coastal Environments

This standard covers conformance tests and requirements for the enclosure integrity of pole-mounted equipment for installations in coastal environments, containing apparatus energized in excess of 600V, typically not accessible to the general public, such as but not limited to the following types of equipment: pole-mounted transformers, pole-mounted switches, pole-mounted regulators, pole-mounted metering equipment, pole-mounted reclosers/sectionalizers, pole-mounted capacitors.

IEEE C57.12.31-2010, Standard for Pole-Mounted Equipment - Enclosure Integrity

This standard covers conformance tests and requirements for the enclosure integrity of pole-mounted equipment containing apparatus energized in excess of 600V, typically not accessible to the general public, such as but not limited to the following types of equipment: pole-mounted distribution transformers, pole-mounted switches, pole-mounted regulators, pole-mounted metering equipment, pole-mounted reclosers/sectionalizers, pole-mounted capacitors.

IEEE C57.12.32-2002 (R2008), Submersible Equipment – Enclosure Integrity

This standard covers conformance tests and requirements for the integrity of carbon steel and copper bearing steel submersible electrical enclosures intended for installation in submerged or partially submerged environments.

IEEE C57.12.34-2015, Standard Requirements for Pad-Mounted, Compartmental-Type, Self-Cooled, Three-Phase Distribution Transformers, 10 MVA and Smaller; High-Voltage, 34.5 kV Nominal System Voltage and Below; Low-Voltage, 15 kV Nominal System Voltage and Below

This standard covers certain electrical, dimensional, and mechanical characteristics and takes into consideration certain safety features of three-phase, 60 Hz., liquid filled, self-cooled, pad-mounted, compartmental-type distribution transformers. These transformers are rated 5 10 MVA and smaller, with the high voltage limit of 34.5 kV system nominal voltage and below, and with low voltage limit of 15 kV system nominal voltage and below. These transformers are generally used for step-down purposes from an underground primary cable supply.

IEEE C57.12.35-2007, Standard Bar Coding for Distribution Transformers

This standard covers bar code label requirements for specific types of distribution transformers and step-voltage regulators. Data content for temporary and permanent bar code labeling is described as well as bar code label print quality and durability requirements.

IEEE C57.12.36-2007, Standard Requirements for Liquid-Immersed Distribution Substation Transformers

This standard sets forth the requirements for indoor/outdoor distribution substation transformer application that is not covered by ANSI/IEEE distribution and power transformer standards. This standard is intended for use as a basis for performance, interchangeability, and to assist in the proper selection of such equipment.


Provides a basis for the electronic reporting of transformer test data on liquid immersed distribution transformers.
IEEE C57.12.38-2009, Standard for Padmounted Type, Self-Cooled, Single Phase Distribution Transformers; High Voltage, 34500 GrdY/19920 Volts and below, Low voltage, 480 Volts and below; 167 KVA and smaller
This standard covers certain electrical, dimensional, mechanical characteristics and safety requirements of single-phase, 60 Hz, liquid filled, self-cooled, padmounted, compartmental-type distribution transformers. These transformers are rated 167 KVA and smaller, with the higher voltage limit of 34.5 kV system nominal voltage and below, and low voltage of 480 volts & below. These transformers are generally used for step-down purposes from an underground primary cable supply. This standard covers the connector, bushing and terminal arrangements for radial or loop feed systems. This standard does not cover the electrical and mechanical requirements of any accessory devices that may be supplied with the transformer.

IEEE C57.12.40-2006, Standard Requirements for Secondary Network Transformers, Subway and Vault Types (Liquid-Immersed)
Covers certain electrical, dimensional, and mechanical characteristics and takes into consideration certain safety features of three-phase, 60 Hz, liquid-immersed, secondary network transformers with a three position grounding switch, subway and vault types, rated 2500 kVA and smaller; primary 34 400 volts and below; secondary 216Y/125 volts and 480Y/277 volts.

IEEE C57.12.51-2008, Standard for Ventilated Dry-Type Power Transformers, 501 kVA and Larger, Three-Phase, with High-Voltage 601 to 34500 Volts; Low-Voltage 208Y/120 to 4160 Volts - General Requirements
This standard is intended to set forth characteristics relating to performance, limited electrical and mechanical interchangeability, and safety of the equipment described, and to assist in the proper selection of such equipment.

IEEE C57.12.58-1991 (R2008), Guide for Conducting a Transient Voltage Analysis of a Dry-Type Transformer Coil
This guide covers general recommendations for measuring voltage transients in dry-type distribution and power transformers are provide. Recurrent surge voltage generator circuitry, instrumentation, test sample, test point location, mounting the test coil, conducting the test, and reporting results are also covered.

IEEE C57.12.59-2015, Guide for Dry-Type Transformer Through-Fault Current Duration
This guide for dry-type transformer through-fault current duration applies to dry-type distribution and power transformers built in accordance with IEEE Std C57.12.01™ Standard General Requirements for Dry-Type Distribution and Power Transformers.

This Test Procedure for the thermal evaluation of insulation systems of dry type power and distribution transformers, including both open-wound technology and solid-cast / encapsulated technology is to be used for determining the temperature classification of the insulation systems.

IEEE C57.12.70-2000 (R2006), Standard Terminal Markings and Connections for Distribution and Power Transformers
Standard terminal markings and connections are described for single-phase and three-phase distribution, power, and regulating transformers.

IEEE C57.12.80-2010, Standard Terminology for Power and Distribution Transformers
This standard is a compilation of terminology and definitions related to electric power and distribution transformers and associated apparatus. It also includes similar terminology relating to power systems and insulation which is commonly involved in transformer technology.

This standard describes methods for performing tests specified in IEEE Std C57.12.00™ and other standards applicable to liquid-immersed distribution, power, and regulating transformers. It is intended for use as a basis for performance and proper testing of such transformers.

IEEE C57.120-1991 (R2006), Loss Evaluation Guide for Power Transformers and Reactors
A method for establishing the dollar value of the electric power needed to supply the losses of a transformer or reactor is provided.

IEEE C57.123-2010, Guide for Transformer Loss Measurement
This guide provides background information and general recommendations of instrumentation, circuitry, calibration and measurement techniques of no-load losses (excluding auxiliary losses), excitation current, and load losses of power and distribution transformers. The test codes, namely, IEEE Std C57.12.90, C57.12.91, and the test code section of IEEE Std C57.15, provide specifications and requirements for conducting these tests. This guide has been written to provide supplemental information for each test.

IEEE C57.125-2015, Guide for Failure Investigation, Documentation, Analysis, and Reporting for Power Transformers and Shunt Reactors
This guide recommends a procedure to be used to perform and document a failure analysis and the reporting and statistical analysis of reliability of power transformers and shunt reactors used on electric power systems.

IEEE C57.127-2007, Guide for the Detection and Location of Acoustic Emissions from Partial Discharges in Oil-Immersed Power Transformers and Reactors
This guide is applicable to the detection and location of acoustic emissions from partial discharges and other sources in oil-immersed power transformers and reactors. Both electrical sources (partial discharge) and mechanical sources (such as loose clamping, bolts, or insulation parts) generate these emissions. There are descriptions of acoustic instrumentation, test procedures, and interpretation of results.

IEEE C57.129-2007, Standard for General Requirements and Test Code for Oil-Immersed HVDC Converter Transformers
The electrical, mechanical, and physical requirements of oil-immersed singlephase and three-phase converter transformers are specified. Tests are described and test code defined. Devices such as arc furnace transformers and rectifier transformers for industrial or locomotive applications are not covered.

IEEE C57.13-2008, Standard Requirements for Instrument Transformers
This standard is intended for use as a basis for performance and interchangeability of equipment covered, and to assist in the proper selection of such equipment. Safety precautions are also addressed. It covers certain electrical, dimensional, and mechanical characteristics, and takes into consideration certain safety features of current and inductively coupled voltage transformers of types generally used in the measurement of electricity and the control of equipment associated with the generation, transmission, and distribution of alternating current.

IEEE C57.13.1-2006, Field Testing of Relaying Current Transformers
Describes field test methods that assure that current transformers are connected properly, are of marked ratio and polarity, and are in a condition to perform as designed both initially and after having been in service for a period of time.

IEEE C57.13.2-2005 (R2010), Standard Conformance Test Procedure for Instrument Transformers
This standard describes the tests and documentary requirements for conducting a conformance test on instrument transformers.

IEEE C57.13.5-2009, Standard of Performance and Test Requirements for Instrument Transformers of a Nominal System Voltage of 115 kV and Above
This standard applies to single-phase instrument transformers of a nominal system voltage of 115 kV and above with capacitive insulation system for line-to-ground connection and for both indoor and outdoor application.
IEEE C57.13.6-2005 (R2010), Standard for High-Accuracy Instrument Transformers
This standard defines one new 0.15 accuracy class for voltage transformers, two new 0.15 accuracy classes for current transformers, two new current transformer burdens, and two new current transformer routine accuracy test methods.

This document provides guidance in the application of dissolved gas analysis (DGA) to transformers and reactors subjected to factory temperature rise tests. This document consists of evaluation procedures and guidelines for acceptable levels of gases generated in conventional mineral-oil-filled transformers and reactors during factory temperature rise tests.

IEEE C57.135-2012, Guide for the Application, Specification and Testing of Phase Shifting Transformers
This guide covers the application, specification, theory of operation, and factory and field testing of single-phase and three-phase oil-immersed phase-shifting transformers (PST). This guide is limited to matters particular to PSTs and does not include shifting transformers (PST). This guide is limited to reactors during factory temperature rise tests.

IEEE C57.139-2015, Guide for Dissolved Gas Analysis in Transformer Load Tap Changers
This guide discusses and recommends methods of testing and evaluating dissolved gases in mineral based transformer oils found in Load Tap Changers (FTCs). General types of LTC mechanisms, breathing configurations, and electrical design will be included for evaluation criteria in determining when mechanical damage or failure has occurred. Dissolved Gas Analysis (DGA) of the oil in the LTC is required.

IEEE C57.140-2010, Guide to Describe the Occurrence and Mitigation of Switching Transients Induced by Transformer, Switching Device, And System Interaction
This Guide addresses the application of transformers in the presence of oscillatory switching transients. These oscillatory transients are typically produced by the interaction of the switching device, transformer, load, and system. This Guide defines operating conditions that may produce switching voltages damaging to the transformer insulation system. It discusses the electrical characteristics of the system source, switching device, transformer, and load and the nature of their transient interaction. It outlines several mitigation methods.

IEEE C57.143-2012, Guide for Application for Monitoring Equipment to Liquid-Immersed Transformers and Components
This guide covers identification of the key parameters that can be monitored for obtaining an indication of the condition of liquid-immersed transformers. It also covers risk/benefit analysis, sensor application, and monitoring systems application. This guide does not cover interpretation of monitoring results.

IEEE C57.144-2004 (R2010), Guide for Metric Conversion of Transformer Standards
A consistent and accurate method of converting dimensions and quantities in transformer standards to SI units is provided in this guide.

IEEE C57.146-2005 (R2011), Guide for the Interpretation of Gases Generated in Silicone-Immersed Transformers
This guide is intended to apply to silicone-immersed transformers in which the silicone fluid was the fluid supplied when the transformer was originally manufactured. This guide also addresses the following: the theory of combustible gas generation in a silicone-filled transformer; recommended procedures for sampling and analysis; recommended actions based on the interpretation of results; a bibliography of related literature.

IEEE C57.148-2011, Standard for Control Cabinets for Power Transformers
This Standard will provide minimum and optional function, layout and construction requirements for standard control cabinet designs. It will also include a coding system for specifying standard control cabinets with the required options. This standard will apply to Class 1 and Class 2 power transformers and will not apply to distribution nor padmount design transformers.

IEEE C57.149-2012, Guide for the Application and Interpretation of Frequency Response Analysis for Oil-Immersed Transformers
This guide is applicable to the measurement of Frequency Response Analysis (FRA) of an oil immersed power transformer. The guide will include the requirements and specifications for instrumentation, procedures for performing the tests, techniques for analyzing the data, and recommendations for long-term storage of the data and results. This guide can be used in both field and factory applications.

IEEE C57.15-2009, Standard Requirements, Terminology, and Test Code for Dry-Type Air-Core Series-Connected Reactors
This standard applies to series-connected dry-type air-core single-phase and three-phase outdoor or indoor reactors of distribution and transmission voltage class that are connected in the power system to control power flow under steady-state conditions and or limit fault current under short-circuit conditions. Dry-type air-core reactors covered by this standard are self-cooled by natural air convection.

IEEE C57.150-2012, Guide for the Transportation of Transformers and Reactors Rated 10 000 KVA or Higher
This guide provides recommendations and considerations for the transportation of transformers and reactors rated 10 000 KVA or larger. It provides information for minimizing the risk of damage and delays in the moving of transformers and reactors regarding their design, shipment preparation, transportation, heavy hauling, and arrival inspections.

IEEE C57.152-2013, Guide for Diagnostic Field Testing of Fluid-Filled Power Transformers, Regulators, and Reactors
This guide describes diagnostic field tests and measurements that are performed on fluid-filled power transformers and regulators. Whenever possible, shunt reactors are treated in a similar manner to transformers.

IEEE C57.153-2015, Guide for Parallelizing Regulating Transformers
This paralleling guide describes and compares control methods of paralleling regulating transformers. The control methods include: master/follower, circulating current, power factor, circulating reactive current and negative reactance methods.

IEEE C57.157-2015, Guide for Conducting Functional Life Tests on Switch Contacts Used in Insulating Liquid-Immersed Transformers
This guide is intended for use in establishing a methodology to evaluate expected long term performance of infrequently operated switch contacts used within insulating liquid filled immersed transformers. These switch contacts are typically found in de-energized tapchangers, dual voltage switches, reversing switches, on-load tapchangers, and step voltage regulators, but the test might possibly be used to evaluate any contact that is used in insulating liquids with similar operating characteristics and within similar environments.

IEEE C57.16-2011, Standard Requirements, Terminology, and Test Code for Dry-Type Air-Core Series-Connected Reactors
This standard applies to series-connected dry-type air-core single-phase and three-phase outdoor or indoor reactors of distribution and transmission voltage class that are connected in the power system to control power flow under steady-state conditions and or limit fault current under short-circuit conditions. Dry-type air-core reactors covered by this standard are self-cooled by natural air convection.

IEEE C57.163-2015, Guide for Establishing Power Transformer Capability while under Geomagnetic Disturbances
This guide describes the effects of Geomagnetic Disturbances (GMD) on power transformers when there is the presence of Geomagnetically Induced Current (GIC) in a power transformer. It establishes specification parameters and performance characteristics for power transformers to help minimize the risk and impact when GIC is present in the power system.

IEEE C57.17-2012, Standard Requirements for Arc Furnace Transformers
This standard covers electrical characteristics and mechanical features of liquid-immersed transformers 69 kV or less (but not limited to 69 kV), used for supplying electric power to direct arc-melting furnaces.
IEEE C57.19-2004 (R2010), IEEE Standard General Requirements and Test Procedures for Power Apparatus Bushings
This standard applies to power apparatus bushings that have basic impulse insulation levels of 110 kV and above for use as components of oil-filled transformers and oil-filled reactors.

IEEE C57.19.100-2012, Guide for Application of Power Apparatus Bushings
Guidance on the use of outdoor power apparatus bushings is provided in this document. The bushings are limited to those built in accordance with IEEE Std C57.19.00-1991 (not the latest revision). The latest revision of C57.19.00 does not address the use of condenser bushings in oil circuit breakers and several voltage classes were dropped that are still in use.

IEEE C57.21-2008, Standard Requirements, Terminology, and Test Code for Shunt Reactors Rated Over 500 kVA
This standard covers all oil-immersed or dry-type, single-phase or three-phase, outdoor or indoor shunt reactors rated over 500 kVA. It states terminology and general requirements and sets forth the basis for rating shunt reactors. Routine, design, and other tests are described. It also covers losses and impedance, temperature rise, dielectric tests, and insulation levels, as well as construction requirements for oil-immersed reactors and construction and installation requirements for dry-type reactors. This standard also covers thyristor controlled shunt reactors used in a static VAR compensator (SVC).

This standard applies to devices used for the purpose of controlling the ground current or the potentials to ground of an alternating current system. These devices are: grounding transformers, ground-fault neutralizers, resistors, reactors, or combinations of these devices.

The scope of this guide covers mineral insulating oil commonly defined as transformer oil; definition and description of reclaiming procedures; the test methods used to evaluate the progress and end point of the reclamation process, and what criteria recommended for the use of reclaimed oils are considered suitable. This guide does not cover the use of oil in new apparatus under warranty.

IEEE C57.93-2007, Guide for Installation and Maintenance of Liquid-Immersed Power Transformers
This guide provides guidance and recommended practices on the installation and maintenance of liquid-immersed power transformers rated 501 kVA and above with secondary voltages of 1000 V and above. It covers the entire range of power transformers, including extra high voltage (EHV) transformers. This guide does not cover special transformers such as furnace transformers, rectifier transformers etc. Distinctions are made as required for various MVA ratings, voltage ratings, and types of liquid insulation.

IEEE C57.94-2015, Recommended Practice for Installation, Application, Operation, and Maintenance of Dry-Type Distribution and Power Transformers
This recommended practice covers general recommendations for the application, installation, operation, and maintenance of all single and polyphase ventilated, non-vented, and sealed dry-type distribution and power transformers or autotransformers, including those with solid-cast and/or resin encapsulated windings.

IEEE C62.11a-2008, Standard for Metal-Oxide Surge Arresters for AC Power Circuits (> 1 kV) - Amendment: Short-Circuit Tests for Station, Intermediate and Distribution Arresters
New procedures for short-circuit testing of station, intermediate and distribution arresters would replace existing pressure-relief and short-circuit test procedures for these classes of arrester.

IEEE C62.21-2003 (R2009), Guide for the Application of Surge Voltage Protective Equipment on AC Rotating Machinery 1000 V and Greater (including IEEE C62.21/Cor1-2008)
This guide covers the application of surge voltage protective equipment to ac rotating machines rated 1000 V and greater. This standard, the first part of which may be assembled from any combination of series and/or parallel diode chips.

This standard applies to two or three terminal, four or five layer, thyristor surge protection devices (SPDs) for application on systems with voltages equal to or less than 1000 V rms or 1200 V dc. These protective devices are designed to limit voltage surges on communication circuits and on power circuits operating from direct current (dc) to 420 Hz. The thyristor SPD can be manufactured with unidirectional or bidirectional, symmetrical, or asymmetrical V-I characteristics.

This application guide applies to Thyristor Surge Protective Components (SPCs) used in systems with voltages up to 1000 Vrms or 1200 Vdc. These components are designed to limit overvoltage and divert surge currents by limiting the voltage and switching to a low impedance state.

This standard sets terms, test methods, test circuits, measurement procedures and preferred result values for series connected, self-restoring current limiter components used in low-voltage telecommunication circuit surge protection. It is only applicable for components in telecommunications circuits with sinusoidal ringing voltages up to 150 V rms at 15 Hz to 70 Hz and dc powering voltages up to 400 V.


This guide describes the surge voltage, surge current, and temporary overvoltages (TOV) environment in low-voltage [up to 1000 V root mean square (rms)] dc power circuits. This scope does not include other power disturbances, such as notches, sags, and noise.

IEEE C62.43-2005 (R2010), IEEE Guide for the Application of Surge Protectors Used in Low-Voltage (Equal to or Less than 1000 V, rms, or 1200 V, DC) Data, Communications, and Signaling Circuits

This guide provides assistance in selecting the most appropriate type of surge protector for a particular data, communication, and/or signaling circuit application. The purpose of this guide is to enable an understanding and an evaluation of the functions of the various types of multiple-component data, communications, and signaling circuit protectors in terms of particular applications.

IEEE C62.45-2002 (R2008), Recommended Practice on Surge Testing for Equipment Connected to Low-Voltage (1000 V and Less) AC Power Circuits

The scope of this recommended practice is the performance of surge testing on electrical and electronic equipment connected to low-voltage ac power circuits, specifically using the recommended test waveforms defined in IEEE Std C62.41.2 & #153; 1998. The recommendations are applicable to any surge testing, regardless of the specific surges that may be applied.

IEEE C62.62-2010, Standard Test Specifications for Surge-Protective Devices (SPDs) for Use on the Load Side of the Service Equipment in Low Voltage (1000 V and Less) AC Power Circuits

This standard applies to surge-protective Devices (SPDs) intended to be installed on the load side of the service equipment connected to 50 Hz or 60 Hz AC power circuits rated at 1000 V (rms) or less. Performance characteristics and standard methods for testing and rating are established for these devices, which may be composed of any combination of components. The tests in this standard are aimed at providing comparisons among the variety of surge-protective devices available.

IEEE C62.64-2009, Standard Specifications for Surge Protectors Used in Low-Voltage Data, Communications, and Signaling

This standard applies to surge protectors for application on multi-conductor and coaxial, balanced or unbalanced, data, communications, and signaling circuits with voltages less than or equal to 1000 V rms, or 1200 V dc. These surge protectors are intended to limit voltage surges, current surges, or both.

IEEE C62.72-2007, Guide for the Application of Surge Protective Devices for Low Voltage (1000 Volts or Less) AC Power Circuits

Information is provided to specifiers and users of surge protective devices (SPDs) about the application considerations associated with power distribution systems within North America. Applies to SPDs to be connected to the load side of the service entrance main over current protective device of 50 Hz or 60 Hz ac power circuits rated at 100-1000 Vrms.


The scope of this project is to summarize the general considerations in grounding of generating station auxiliary power systems, the factors to be considered in selecting between the appropriate grounding classes and specifying equipment ratings. This guide applies to both medium-voltage (1kV - 15kV) and low-voltage (less than 1kV) auxiliary power systems.


This document provides information on the basic factors and general considerations in selecting the class and means of neutral grounding for a particular ac transmission or sub-transmission system, and the suggested method and apparatus to be used to achieve the desired grounding.

IEEE C93.4-2012, Standard for Power-Line Carrier Line-Tuning Equipment (30 kHz to 500 kHz) Associated with Power Transmission Lines

This standard applies to power-line carrier line-tuning equipment connected between the coupling capacitors and power-line carrier transmitter/receiver terminals operating in the frequency range of 30 to 500 kHz over power transmission lines and cables or to similar line-tuning equipment in a carrier bypass. Power-line carrier line-tuning equipment includes assemblies and components: tuning inductor, impedance matching transformer, balancing transformer, tuning capacitor, inductance-capacitance (LC) tuning unit, hybrid, filter, protective unit, interconnecting cables and enclosure.

IEEE C95.1-2006, Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz

Provides recommendations to protect against harmful effects in human beings exposed to electromagnetic fields in the frequency range from 3 kHz to 300 GHz. Intended to apply in controlled environments and for general population exposure.

IEEE C95.3-2002 (R2008), Recommended Practice for Measurements and Computations of Radio Frequency Electromagnetic Fields With Respect to Human Exposure to Such Fields, 100 kHz-300 GHz

The scope of this recommended practice is to revise and develop specifications for preferred methods for measuring and computing external radio frequency electromagnetic fields to which persons may be exposed.

IEEE C95.3.1-2010, Recommended Practice for Measurements and Computations of Electric, Magnetic, and Electromagnetic Fields with Respect to Human Exposure to Such Fields, 0 - 100 kHz

This recommended practice describes 1) methods for measuring external electric and magnetic fields and contact currents to which persons may be exposed, 2) instrument characteristics and the methods for calibrating such instruments, and 3) methods for computation and the measurement of the resulting fields and currents that are induced in bodies of humans exposed to these fields. This recommended practice is applicable over the frequency range of 0 to 100 kHz.

IEEE C95.4-2002 (R2008), Recommended Practice for Determining Safe Distances from Radio Frequency Transmitting Antennas When Using Electric Blasting Caps During Explosive Operations

This document provides recommended practices for the prediction and practical determination of safe distances from radio and radar transmitting antennas when using electric blasting caps to remotely detonate an explosive charge.

IEEE C95.6-2007, Standard for Safety Levels with Respect to Human Exposure to Electromagnetic Fields, 0-3 kHz

This standard makes recommendations to prevent harmful effects in human beings exposed to electromagnetic fields in the frequency range of 0–3 kHz. The recommendations are intended to apply to exposures of the general public, as well as to individuals in controlled environments. They are not intended to apply to the purposeful exposure of patients by or under the direction of practitioners of the healing arts and may not be protective with respect to the use of medical devices or implants. A rationale that describes how the recommendations were arrived at, and the factors taken into account in formulating them, is included.

IES (Illuminating Engineering Society)


Today's digital technology, in both control systems and light sources, offers new potential to better control the lighting system and provide the right amount of lighting when required.
Errata for ANSI/IES LM-80-15 changes to Section 6.1 DUT Photometric and Electrical Measurements.

ANSI/IES RP-1-2013, IES Recommended Practice for Office Lighting
ANSI/IES RP-1-12 Recommended Practice for Office Lighting covers the current design standards for commercial office spaces, and is updated with new illumination levels corresponding with the IES Lighting Handbook, 10th Edition, 2011, as well as many updates for energy codes.

ANSI/IES RP-22-2011, Practice for Tunnel Lighting
New material on lamp data added since first public review

ANSI/IES RP-27.3-2017, Photobiological Safety for Lamps - Risk Group Classification and Labeling
The purpose of this standard (BSR/IES RP-27.3-xx) is to provide the criteria for proper categorization, classification, and informational requirements of lamps so that such sources may be properly applied in the design of lamp systems.

An update of ANSI/IES RP-28-07 includes major additions centered on the aging population and those with low vision. Seniors represent the fastest growing segment of the population with over 40 million Americans over 65.

ANSI/IES RP-29-2016, Lighting for Healthcare Facilities
This practice provides guidelines for good lighting, inspires the designers of lighting systems so that the sick and infirm will have a more comfortable and enjoyable recovery environment.

ANSI/IES RP-8-2014, IES Recommended Practice for Roadway Lighting
ANSI/IES RP-8-xx Recommended Practice for Roadway Lighting covers the current design standards for roadway lighting, and is updated with new illumination levels, as well as many updates for new technologies.

ANSI/IESNA DG-3-2000 (R2015), Application of Luminaire Symbols on Lighting Design Drawing
This Design Guide provides a consistent guideline for creating a symbology for luminaires represented on drawings.

ANSI/IESNA LM-63-2002 (R2008), File Format for the Electronic Transfer of Photometric Data and Related Information
This standard addresses photometric data file formats for lighting data transfer and for data storage and retrieval.

A standard procedure by which entertainment lighting luminaires, specifically designed for use in theater, AV environment, film studios or on-location shoots can be measured.

ANSI/IESNA RP-16-2005, Addendum c-2009, Nomenclature and Definitions for Illuminating Engineering
Modified language to maintain harmony as much as possible with international standards and popular usage.

ANSI/IESNA RP-16-2005, Addendum c-2016, Nomenclature and Definitions for Illuminating Engineering - Addendum C
Advances in lighting technology (e.g. LEDs) have created new lighting terminology. Better measurement techniques have led to more international agreement in fundamental units and constants used in basic laws of physics. There is greater use of SI units today in illuminating engineering. This Standard reflects these changes with several new terms and definitions, and revisions in existing definitions.

ANSI/IESNA RP-16-2005, Nomenclature and Definitions for Illuminating Engineering
The standard reflects advances in lighting technology and new lighting terminology and updates terms and definitions for illuminating engineering.

ANSI/IESNA RP-16a-2008, Nomenclature and Definitions for Illuminating Engineering
With the increased use of solid state lighting devices, it has become necessary to establish definitions for LEDs, their components, and performance characteristics to insure a common understanding of the terminology.

ANSI/IESNA RP-16b-2009, Nomenclature and Definitions for Illuminating Engineering, Addenda
Update to a previous addendum (A) in constantly changing terminology for solid state lighting (LED sources).

ANSI/IESNA RP-27.1-2015, Recommended Practice for Photobiological Safety of Lamps and Lamp Systems-General Requirements
This recommended practice covers the evaluation and control of optical radiation hazards from all electrically powered sources of optical radiation that emit in the wavelength form 200 nm to 3,000 nm except for light emitting diodes (LEDs) used in optical fiber communications systems and for lasers which are covered in a separate series of ANSI standards (series 2136).

This standard applies to electrically powered light sources of optical radiation that emit in the wavelength range from 200 nm to 3,000 nm. It offers guidance regarding problems related to photobiological hazard measurements.

ANSI/IESNA RP-3-2013, Recommended Practice on Lighting for Educational Facilities
Lighting is a critical element in the school environment. Lighting can influence behavior, satisfaction, psychological responses to a space and task performance, communication and interest, visual comfort and safety and security, while defining space and architecture.

ANSI/IESNA RP-30-2016, Recommended Practice for Museum Lighting
BSR/IES RP-30 Museum Lighting includes current lighting techniques and new lighting technology since 1996 and intended for lighting designers, museum administrators, curators, and exhibit designers.

ANSI/IESNA RP-7-2012, Recommended Practice for Lighting Industrial Facilities
A comprehensive treatment of lighting in the industrial environment. It provides guidance to achieve efficient, reliable and easily maintained lighting systems.

IEST (Institute of Environmental Sciences and Technology)

ANSI/IEST/ISO 14644-1-2015, Cleanrooms and associated controlled environments - Part 1: Classification of air cleanliness by particle concentration
This Final Draft of ISO 14644 establishes the classification of air cleanliness in terms of concentration of airborne particles in cleanrooms and clean zones; and separative devices as defined in ISO 14644-7:2004. Only particle populations having cumulative distributions based on threshold (lower limit) particle sizes ranging from 0.1 μm to 5 μm are considered for classification purposes. The use of light scattering (discrete) airborne particle counters (LSAPC) is the basis for determination of the concentration of airborne particles, equal to and greater than the specified sizes, at designated sampling locations. This part of ISO 14644 does not...
ANSI/IEST/ISO 14644-2-2015, Cleanrooms and associated controlled environments - Part 2: Monitoring to provide evidence of cleanroom performance related to air cleanliness by particle concentration

This Final Draft of ISO 14644 specifies minimum requirements for a monitoring plan for cleanroom or clean zone performance related to air cleanliness by particle concentration, based upon parameters that measure or affect airborne particle concentration. This part of ISO 14644 does not address condition monitoring of aspects such as vibration or general maintenance of the engineering systems. It does not provide for monitoring of particle populations that are outside the specified lower threshold particle-size range, 0.1 μm to 5 μm. Concentrations of ultrafine particles (particles smaller than 0.1 μm) are addressed in ISO 14644:2 - 1).


This part of ISO 14644 specifies test methods for designated classification of airborne particulate cleanliness and for characterizing the performance of cleanrooms and clean zones. Performance tests are specified for two types of cleanrooms and clean zones: those with unidirectional flow and those with non-unidirectional flow, in three possible occupancy states: as-built, at-rest and operational. The test methods recommend test apparatus and test procedures for determining performance parameters.


This part of ISO 14644 specifies requirements for the design and construction of cleanroom installations but does not prescribe specific technological or contractual means to meet these requirements. It is intended for use by purchasers, suppliers and designers of cleanroom installations and provides a checklist of important parameters of performance. Construction guidance is provided, including requirements for start-up and qualification. Basic elements of design and construction needed to ensure continued satisfactory operation are identified through the consideration of relevant aspects of operation and maintenance. Note: Further guidance in respect of the above requirements is given in annexes A to H. Other parts of ISO 14644 may provide complementary information. Application of this part of ISO 14644 is restricted in the following: user requirements are represented by purchaser or specifier; specific processes to be accommodated in the cleanroom installation are not specified; fire and safety regulations are not considered specifically—the appropriate national and local requirements should be respected; process media and utility services are only considered with respect to their routing between and in the different zones of cleanliness; regarding initial operation and maintenance, only cleanroom construction-specific requirements are considered.


This part of ISO 14644 specifies basic requirements for cleanroom operations. It is intended for those planning to use and operate a cleanroom. Aspects of safety that have no direct bearing on contamination control are not considered in this part of ISO 14644 and national and local safety regulations must be observed. This document considers all classes of cleanrooms used to produce all types of products. Therefore, it is broad in application and does not address specific requirements for individual industries. Methods and programmes for routine monitoring within cleanrooms are not covered in detail in this part of ISO 14644 but reference is made to ISO 14644-2 and ISO 14644-3 for monitoring particles and ISO 14698-1 and ISO 14698-2 for monitoring micro-organisms.

ANSI/IEST/ISO 14644-7-2004, Cleanrooms and associated controlled environments-Part 7: Separative devices (clean air hoods, gloveboxes, isolators and minienvironments

This part of ISO 14644 specifies the minimum requirements for the design, construction, installation, test and approval of separative devices, in those respects where they differ from cleanrooms as described in ISO 14644-4 and 14644-5. The application of this part of ISO 14644 takes into account the following limitations: user requirements are as agreed by customer and supplier; application-specific requirements are not addressed; specific processes to be accommodated in the separative-device installation are not specified; fire, safety and other regulatory matters are not considered specifically; where appropriate, national and local regulations apply. This part of ISO 14644 is not applicable to full-suits.

ANSI/IEST/ISO 14644-8-2006, Cleanrooms and associated controlled environments - Part 8: Classification of airborne molecular contamination

This part of ISO 14644 covers the classification of airborne molecular contamination (AMC) in cleanrooms and associated controlled environments, in terms of airborne concentrations of specific chemical substances (individual, group or category) and provides a protocol to include test methods, analysis and time weighted factors within the specification for classification. (Full scope as presented in Standard includes additional limitations.

IIAR (International Institute of Ammonia Refrigeration)

ANSI/IIAR 1-2017, Definitions and Terminology Used in IIAR Standards

This Standard provides a unified set of definitions for use in the IIAR Standards. A set of common definitions is provided to prevent confusion for those that use IIAR Standards. This Standard is a companion to ANSI/IIAR Standards.


The standard is being revised and shall provide the minimum safe requirements for application and design of ammonia refrigeration systems.

ANSI/IIAR 3-2017, Ammonia Refrigeration Valves

The purpose of this standard is to specify performance criteria for valves and strainers used in closed-circuit ammonia refrigeration systems.

ANSI/IIAR 4-2015, Installation of Closed-Circuit Ammonia Refrigeration Systems

Standard shall provide the minimum requirements for the safe installation of closed-circuit ammonia refrigeration systems.

ANSI/IIAR 5-2013, Start-up and Commissioning of Closed-Circuit Ammonia Mechanical Refrigerating Systems

This standard specifies minimum requirements for the start-up and commissioning of ammonia mechanical refrigerating systems.

ANSI/IIAR 7-2013, Developing Operating Procedures for Closed-Circuit Ammonia Mechanical Refrigerating Systems

This standard includes the minimum criteria for operating procedures for closed-circuit ammonia mechanical refrigerating systems.

ANSI/IIAR 8-2015, Decommissioning of Closed-Circuit Ammonia Refrigeration Systems

This Standard specifies minimum criteria for removing the ammonia charge and decommissioning of closed-circuit ammonia refrigeration systems.

IICRC (the Institute of Inspection, Cleaning and Restoration Certification)

ANSI/IICRC S100-2015, Standard for Professional Cleaning of Textile Floor Coverings

This standard describes the procedures, methods, and systems to be followed when performing professional commercial and residential textile floor coverings (e.g., carpet and rugs) maintenance and cleaning.


This Standard provides a specific set of practical standards for water damage restoration. It does not attempt to teach comprehensive water damage restoration procedures; rather, it provides the foundation for basic principles of proper restoration practices. It does not attempt to include exhaustive performance characteristics or standards for the manufacture or installation of structural components, materials and contents (personal property).

The S600 Standard and Reference Guide will cover both Residential and Commercial Carpet Installations. This industry consensus document will give specific guidance for the proper, recommended procedures for installing various carpet products in different types of installations. Note: All comments must be submitted on the comment form provided by IICRC. Contact Mili at mili@iicrc.org for comment form.

ANSI/IICRC S800-2013, Standard and Reference Guide for Professional Inspection of Textile Floor Coverings

The scope of the S800 includes inspection of textile floor covering including carpet and rugs. The S800 establishes a procedural standard and reference guide for professionally inspecting textile floor coverings.

IKECA (International Kitchen Exhaust Cleaning Association)

ANSI/IKECA C10-2016, Standard for the Methodology for Cleaning Commercial Kitchen Exhaust Systems

This standard is intended to determine the methodology for frequency and necessity for commercial kitchen exhaust system cleaning through inspection procedures, to define acceptable methods for cleaning exhaust systems and components, and to set standards for acceptable post-cleaning cleanliness.

ANSI/IKECA-I10-2015, Standard for the Methodology for Inspection of Commercial Kitchen Exhaust Systems

This standard shall provide minimum requirements for inspecting commercial kitchen exhaust systems and system components for mechanical conditions, structural integrity, fire safety, and cleanliness levels.

ILTVA (International Light Transportation Vehicle Association, Inc.)

ANSI/ILTVA Z130.1-2012, Standard for Golf Cars - Safety and Performance Specifications

This standard provides safety and performance specifications relating to golf cars, driven by electric motors or internal combustion engines specifically intended for and used on golf courses for transporting golfers and their equipment. This standard does not apply to Personal Transport Vehicles, (PTVs), which are covered by ANSI Z135.


This standard provides safety and performance specifications relating to personal transport vehicles, (PTVs), driven by electric motors or internal combustion engines to be operated on designated roadways, or within a closed community where permitted by law or by regulatory authority rules. This standard does not apply to golf cars, which are covered by ANSI Z130.1.

InfoComm (InfoComm International)

ANSI/INFOCOMM 10-2013, Audiovisual Systems Performance Verification

Provides a framework and supporting processes for determining elements of an audiovisual system that need to be verified; the timing of that verification within the project delivery cycle; a process for determining verification metrics, and reporting procedures. Consultants, integrators, manufacturers, technology support staff, owners, third-party commissioning agents, and architects who have verification processes in place can integrate those existing processes into the framework this Standard provides, adding customized items to those already defined in the Standard.

ANSI/INFOCOMM 2M-2010, Audiovisual Systems Design and Coordination Components

A successful professional audiovisual system installation depends on the clear definition and coordination of processes, resources, and responsibilities of the design and installation project teams. A properly documented audiovisual system provides the information necessary to understand and implement the system goals and project requirements in a logical and efficient manner. The documentation should complement and coordinate related architectural, engineering, and construction documentation. This standard outlines a consistent set of the standard tasks, responsibilities, and deliverables required for professional audiovisual systems design and construction.

ANSI/INFOCOMM 3M-2011, Projected Image System Contrast Ratio

Defines projected image system contrast ratio and its measurement. It applies to both permanently installed systems and live events. It applies to front and rear projection. This Standard defines four contrast ratios based on content viewing requirements. System contrast ratio refers to the image as it is presented to viewers in a space with ambient light. Practical metrics to measure and validate the defined contrast ratios are provided. This Standard includes an optional HTML test pattern (appendix), which can be downloaded as a zip file from: http://docdev.infocomm.org/apps/group_public/documents.php?view=openforcomment


Addresses power consumption management of audiovisual systems. Although the requirements and procedures can be applied to many types of audiovisual systems, this Standard pertains to audiovisual systems that have been permanently installed. This Standard addresses requirements of the audiovisual system as a whole, while allowing the user flexibility in design and selection of individual components. No power consumption or efficiency requirements for components are made as part of this Standard. An ROI spreadsheet and an energy management plan spreadsheet form are available for download at www.infocomm.org/standardsforms.

ANSI/INFOCOMM A102.01-2017, Audio Coverage Uniformity in Listener Areas

This Standard defines parameters for characterizing an audio system’s coverage of defined listening areas. It provides performance classifications and measurement procedures to assess the uniformity of coverage of an audio system’s early arriving sound, with the goal of achieving consistent sound pressure levels throughout the defined listening areas.

ANSI/INFOCOMM V202.01:2016 , Display Image Size for 2D Content in Audiovisual Systems

This Standard determines required display image size and relative viewing positions according to two defined viewing needs: Basic Decision Making and Analytical Decision Making. The Standard can be used to design a new space or to assess/modify an existing space, from either drawings or the space itself. It applies to both permanently installed systems and temporary systems. The Standard applies to the overall system and not the performance or efficiency of any component.
INMM (ASC N14) (Institute of Nuclear Materials Management)

ANSI N14.1-2012, Uranium Hexafluoride - Packagings for Transport
This standard provides criteria for packagings used for transport of uranium hexafluoride (UF6). It includes specific information on design and fabrication requirements for the procurement of new UF6 packagings for transportation of 0.2205 lb (0.1 kg) or more of UF6. This standard also defines the requirements for in-service inspections, cleanliness, and maintenance for packagings in service. Packagings currently in service and not specifically defined in this standard are acceptable for use, provided that they are used within their original design limitations and are inspected, tested, and maintained so as to comply with the intent of this standard.

ANSI N14.5-2014, Leakage Tests on Packagings for Shipment
This Standard specifies methods for demonstrating that Type B packages designed for transport of normal form radioactive material comply with the containment requirements of Title 10 of the Code of Federal Regulations Part 71 (10 CFR Part 71). This Standard describes package release limits, methods for relating package release limits to allowable and reference leakage rates and minimum requirements for leakage rate test procedures.

ANSI N14.7-2013, Guidance for Packaging Type A Quantities of Radioactive Materials
This standard was prepared to provide guidance to individuals responsible for developing the design of packagings for transport of radioactive material limited to Type A quantities including fissile material that does not exceed the limits authorized under the general license sections of the US NRC regulation for packaging and transportation of radioactive material. This standard is also intended to assist those who test, evaluate, fabricate, fill, ship, or otherwise perform functions related to Type A packages in accordance with applicable regulatory requirements.

ANSI/N14.36-2013, Measurement of Radiation Level and Surface Contamination for Packages and Conveyances
This standard sets forth methods for radiation and contamination measurement for packaging and transportation of radioactive material by all transportation modes and during all phases of transportation activities. The objective of this standard is to provide users with an approach to conformance with regulations that control residual surface contamination and external radiation of shipping packages and conveyances.

ANSI N15.36-2010, American National Standard for Methods of Nuclear Material Control -- Measurement Control Program -- Nondestructive Assay Measurement Control and Assurance
This standard is directed to the scientist or engineer, with appropriate technical training, who is responsible for establishing, maintaining, or supervising a measurement control program for nondestructive assay of nuclear materials. The measurement control program provides administration, evaluation, and control of the measurement process and ensures that the measurement process provides results of sufficient quality for facility operations.

ANSI N15.51-2007, Methods of Nuclear Material Control Measurement Control Program - Nuclear Materials Analytical Chemistry Laboratory
This standard provides the principal elements of a measurement control program for an analytical chemistry laboratory supporting nuclear fuel cycle activities. The ability to safely manage and to maintain accounts of these materials requires measurement of the materials as they are produced, used, shipped, stored, and inventoried. A comprehensive measurement control program demonstrates the reliability of the measurement data, quantifies the performance of the measurement system, assures that the measurements are suitable for the intended use, and provides for detection and correction of adverse changes.

This standard defines administrative practices for generating and reporting of nondestructive assay (NDA) data regarding holdup deposits. It provides guidance on procedures, definition of terms, definition of quality objectives, vocabulary, recordkeeping, application of techniques, calculation, reporting of values, and uncertainties so that some consistency of use can be achieved by as large a community of stakeholders as practicable.

ANSI N15.8-2009 (R2015), Standard for Methods of Nuclear Material Control - Material Control Systems - Special Nuclear Material Control and Accounting Systems for Nuclear Power Plants
This standard provides the principle elements of a system for the controlling and accounting for special nuclear material (SNM) at a nuclear power plant. It sets forth the fundamentals of an SNM control and accounting system, including criteria for the receipt, internal control, physical inventory, and shipment of SNM.

INMM (ASC N15) (Institute of Nuclear Materials Management)

ANSI IT4.185-2018, American National Standard for Test Method for ascertaining the Purity of Ferric Ammonium Ethylenediaminetetraacetic Acid (EDTA) [Ethylenedinitrolyl(tetraacetic Acid), and Its Salts
This standard establishes criteria for the purity of photographic-grade ferric ammonium ethylenediaminetetraacetic acid (EDTA) and its salts, and describes the tests to be used to determine the purity.

ANSI IT4.189-1984 (R2007), Photography (Chemicals) – Sodium Thiocyanate
This standard establishes criteria for the purity of photographic-grade sodium thiocyanate crystals and sodium thiocyanate solution (50%), and describes the tests to be used to determine the purity.

INMM (Materials Management)

ANSI N15.7-2012, Uranium Hexafluoride - Packagings for Transport
This standard provides criteria for packagings used for transport of uranium hexafluoride (UF6). It includes specific information on design and fabrication requirements for the procurement of new UF6 packagings for transportation of 0.2205 lb (0.1 kg) or more of UF6. This standard also defines the requirements for in-service inspections, cleanliness, and maintenance for packagings in service. Packagings currently in service and not specifically defined in this standard are acceptable for use, provided that they are used within their original design limitations and are inspected, tested, and maintained so as to comply with the intent of this standard.

ANSI N14.5-2014, Leakage Tests on Packagings for Shipment
This Standard specifies methods for demonstrating that Type B packages designed for transport of normal form radioactive material comply with the containment requirements of Title 10 of the Code of Federal Regulations Part 71 (10 CFR Part 71). This Standard describes package release limits, methods for relating package release limits to allowable and reference leakage rates and minimum requirements for leakage rate test procedures.

ANSI N14.7-2013, Guidance for Packaging Type A Quantities of Radioactive Materials
This standard was prepared to provide guidance to individuals responsible for developing the design of packagings for transport of radioactive material limited to Type A quantities including fissile material that does not exceed the limits authorized under the general license sections of the US NRC regulation for packaging and transportation of radioactive material. This standard is also intended to assist those who test, evaluate, fabricate, fill, ship, or otherwise perform functions related to Type A packages in accordance with applicable regulatory requirements.

ANSI/N14.36-2013, Measurement of Radiation Level and Surface Contamination for Packages and Conveyances
This standard sets forth methods for radiation and contamination measurement for packaging and transportation of radioactive material by all transportation modes and during all phases of transportation activities. The objective of this standard is to provide users with an approach to conformance with regulations that control residual surface contamination and external radiation of shipping packages and conveyances.

ANSI N15.36-2010, American National Standard for Methods of Nuclear Material Control -- Measurement Control Program -- Nondestructive Assay Measurement Control and Assurance
This standard is directed to the scientist or engineer, with appropriate technical training, who is responsible for establishing, maintaining, or supervising a measurement control program for nondestructive assay of nuclear materials. The measurement control program provides administration, evaluation, and control of the measurement process and ensures that the measurement process provides results of sufficient quality for facility operations.

ANSI N15.51-2007, Methods of Nuclear Material Control Measurement Control Program - Nuclear Materials Analytical Chemistry Laboratory
This standard provides the principal elements of a measurement control program for an analytical chemistry laboratory supporting nuclear fuel cycle activities. The ability to safely manage and to maintain accounts of these materials requires measurement of the materials as they are produced, used, shipped, stored, and inventoried. A comprehensive measurement control program demonstrates the reliability of the measurement data, quantifies the performance of the measurement system, assures that the measurements are suitable for the intended use, and provides for detection and correction of adverse changes.

This standard defines administrative practices for generating and reporting of nondestructive assay (NDA) data regarding holdup deposits. It provides guidance on procedures, definition of terms, definition of quality objectives, vocabulary, recordkeeping, application of techniques, calculation, reporting of values, and uncertainties so that some consistency of use can be achieved by as large a community of stakeholders as practicable.

ANSI N15.8-2009 (R2015), Standard for Methods of Nuclear Material Control - Material Control Systems - Special Nuclear Material Control and Accounting Systems for Nuclear Power Plants
This standard provides the principle elements of a system for the controlling and accounting for special nuclear material (SNM) at a nuclear power plant. It sets forth the fundamentals of an SNM control and accounting system, including criteria for the receipt, internal control, physical inventory, and shipment of SNM.

ANSI/IREC 14732-2014, General Requirements for the Accreditation of Clean Energy Certificate Programs
This standard forms the foundation for the accreditation of certificate-awarding entities that develop and administer credit or non-credit clean energy-related programs offered in formal educational institutions and other legal entities. For the purposes of this standard, clean energy technologies and practices include renewable energy, energy efficiency, distributed renewable energy generation, and other sustainability practices.

IS&T (The Society for Imaging Science & Technology)

ANSI IT4.206-1984 (R2007), Photography (Chemicals) – 5-Nitrobenzimidazole Nitrate
This standard establishes criteria for the purity of photographic-grade 5-nitrobenzimidazole nitrate and describes the tests to be used to determine the purity.

ANSI IT4.207-1982 (R2007), Photography (Chemicals) – Sodium Bromide
This specification establishes criteria for the purity of photographic grade sodium bromide and describes the test to be used to determine the purity.

ANSI IT4.234-1986 (R2007), Photography (Chemicals) – Trisodium Phosphate, Dodecahydrate
This standard establishes criteria for purity of photographic-grade trisodium phosphate, dodecahydrate and describes the tests to be used to determine the purity.

ANSI/II 13A IT4.177-1983 (R2007), Photography (Chemicals) – Sodium Thiocyanate
This standard establishes criteria for the purity of photographic grade sodium thiocyanate crystals and sodium thiocyanate solution (50%), and describes the tests to be used to determine the purity.

ANSI/II 13A IT4.185-1987 (R2007), Photography (Chemicals) – Ethylenediaminetetraacetic Acid (EDTA) [(Ethylenedinitrolyl(tetraacetic Acid), and Its Salts
This standard establishes the criteria for the purity of photographic-grade ethylenediaminetetraacetic acid (EDTA) and its salts, and describes the tests to be used to determine the purity.

ANSI/II 13A IT4.189-1984 (R2007), Photography (Chemicals) – Ferric Ammonium Ethylenediaminetetraacetate Solution and Sodium Ferric Ethylenediaminetetraacetate Trihydrate
This standard establishes criteria for the purity of photographic-grade ferric ammonium ethylenediamine - tetraacetate solution and sodium ferric ethylenediaminetetraacetate trihydrate and indicates the test methods to be used to determine their purity.
ISA (Organization) (International Society of Automation)

ANSI/ISA 100.11a-2011, Wireless Systems for Industrial Automation: Process Control and Related Applications

This standard will present a wireless industrial process automation network to address control, alerting, and monitoring applications plant-wide. The focus will be on field devices with the ability to scale to large installations. It will address wireless infrastructure, interfaces to legacy host applications plus security, and network management requirements in a functionally scalable manner.

ANSI/ISA 101.01-2015, Human Machine Interfaces for Process Automation Systems

Scope encompasses human machine interfaces (HMI) for equipment and automated processes, in applications including continuous, batch, discrete processes, and any process using an HMI for interfacing to a controlled system. There may be differences in implementation to meet the specific needs based on process type.

ANSI/ISA 107.01-2013, Industry Standard File Format for Revolution-Based Tip Timing Data

This standard presents the file format to be utilized for data acquired by a revolution-based tip timing data system. It standardizes the following: - All header information needed to describe the contents of the data file - The format of the header - The definition and type of all variable names - The format of the sensor(s) data blocks

ANSI/ISA 12.10.02 (IEC 61241-0:2006) (R2015), Electrical Apparatus for Use in Zone 20, Zone 21, and Zone 22 Hazardous (Classified) Locations - General Requirements

This standard specifies general requirements for the design, construction, testing and marking which is applicable to electrical apparatus protected by any recognized protection technique for use in areas where combustible dust may be present in quantities that could lead to a fire or explosion hazard.

ANSI/ISA 12.12.01-2015 / CAN/CSA C22.2 No. 213, Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations, same as CAN/CSA C22.2 No. 213

The purpose of this standard is to provide minimum requirements for the design, construction, and marking of electrical equipment or parts of such equipment for use in Class I and Class II, Division 2 and Class III, Divisions 1 and 2 hazardous (classified) locations.

ANSI/ISA 18.2-2016, Management of alarm systems for the process industries

Addresses the development, design, installation, and management of alarm systems in the process industries. Alarm management includes multiple work processes throughout the alarm system lifecycle. This standard defines the terminology and models to develop an alarm system, and it defines the work processes recommended to effectively maintain the alarm system throughout the lifecycle.

ISI/ISA 5.06.01-2007, Functional Requirements Documentation for Control Software Applications

This standard establishes control software documentation requirements for that class of industrial automation equipment and systems consisting of distributed control systems, programmable controllers, and industrial personal computers. It provides techniques for documenting control system software, and establishes a basis for validation of run-time application software after it is developed and tested to ensure that the initial requirement specification has been met.

IAN/ISA 5.1-2009, Instrumentation Symbols and Identification

Establishes a uniform means of designating instruments and instrumentation systems used for industrial process measurement and control. To this end, a designation system is presented that includes symbols and an identification code.

IAN/ISA 50.00.01-1975 (R2012), Compatibility of Analog Signals for Electronic Industrial Process Instruments

This document applies to analog dc signals used in process control and monitoring systems to transmit information between subsystems or separated elements of systems. Its purpose is to provide for compatibility between the several subsystems or separated elements of given systems.

IAN/ISA 61241-1 (12.10.03)-2007 (R2015), Electrical Apparatus for Use in Zone 21 and Zone 22 Hazardous (Classified) Locations - Protection by Enclosures "tD"

This standard is applicable to electrical apparatus protected by enclosures and surface temperature limitation for use in explosive dust atmospheres classified as zone 21 or zone 22 hazardous locations in accordance with Article 506 of the NEC®. It specifies requirements for design, construction and testing of electrical apparatus.

IAN/ISA 61241-11 (12.10.04)-2007 (R2015), Electrical Apparatus for Use in Zone 20, Zone 21 and Zone 22 Hazardous (Classified) Locations - Protection by Intrinsic Safety "iD"

This standard specifies requirements for the construction and testing of intrinsically safe apparatus intended for use in an explosive dust atmosphere and for associated apparatus that is intended for connection to intrinsically safe circuits which enter such atmospheres.

IAN/ISA 61241-18 (12.10.07)-2007 (R2015), Electrical Apparatus for Use in Zone 20, Zone 21 and Zone 22 Hazardous (Classified) Locations - Protection by Intrinsic Safety "mD"

This standard is applicable to electrical apparatus protected by encapsulation type of protection "mD" and surface temperature limitation for use in areas where combustible dust may be present in quantities which could lead to a fire or explosion hazard. It specifies requirements for design, construction and testing of electrical apparatus, parts of electrical apparatus and Ex components where the rated voltage does not exceed 10 kV.

ISA (ASC Z213) (International Society of Arboriculture)

ANSI Z133-2012, Standard for Arboricultural Operations - Safety Requirements

This standard contains the arboriculture safety requirements for pruning, repairing, maintaining, and removing trees, and for using equipment in such operations.

ANSI/ISA IT4.201-1981 (R2007), Photography (Chemicals) - Potassium Iodide

This specification establishes criteria for the purity of photographic grade potassium iodide and describes the tests to be used to determine the purity.

ANSI/ISA IT4.23-2001 (R2006), Photography (Processing) - Roll and Dental Films - Film Clips and Hangers - Bite Dimensions

This standard specifies requirements for film clips and hangers used to hold photographic films and dental radiographic films during processing.

ANSI/ISA IT4.231-1982 (R2006), Photography (Chemicals) - Sodium Metaborate Octahydrate

This specification establishes criteria for the purity of photographic grade sodium metaborate octahydrate and describes the tests to be used to determine the purity.


This document specifies a profile of JPEG 2000 suitable for use in digital still cameras (DSC profile). The profile specifies the following items: Decoder/Reader conformance requirements for software and hardware devices (including the camera itself) that desire to read images captured on JPEG 2000 based digital still cameras (DSC). This includes both codestream and file format requirements. Encoder/Writer conformance requirements for the files created by digital still cameras. This includes both codestream and file format requirements. Note: this is a reaffirmation of ANSI/ISA IT10.2000-2004 as an IS&T standard.

ANSI/IS&T IT10.7000-2015, Photography - Digital still cameras - Guidelines for reporting pixel-related specifications

This standard specifies guidelines for reporting pixel-related specifications (e.g., the number of camera pixels) of a digital still camera, for the purposes of camera labeling, camera packaging, advertising, and the like. It is applicable to monochrome and color digital still cameras using one or more image sensors. Note: this is a reaffirmation of ANSI/ISA IT10.7000-2004 as an IS&T standard.

ANSIB/ISA IT4.232-2006, Photography - Processing chemicals - Specifications for photographic grade ammonium hydroxide, NH 4 OH (aqueous ammonia)

This standard states the purity requirements and test methods for photographic grade ammonium hydroxide.

ISA (ASC Z213) (International Society of Arboriculture)

ANSI Z133-2012, Standard for Arboricultural Operations - Safety Requirements

This standard contains the arboriculture safety requirements for pruning, repairing, maintaining, and removing trees, and for using equipment in such operations.
**ANSI/ISA 61241-2 (12.10.06)-2007 (R2015),**

Electrical Apparatus for Use in Zone 21 and Zone 22 Hazardous (Classified) Locations - Protection by Pressurization "pD"

This standard gives requirements on the design, construction, testing and marking of electrical apparatus for use in combustible dust atmospheres in which a protective gas (air or inert gas), maintained at a pressure above that of the external atmosphere, is used to prevent the entry of dust which might otherwise lead to the formation of a combustible mixture within enclosures which do not contain a source of combustible dust.

**ANSI/ISA 61804-3-2016, Functions Blocks (FB) for process control and Electric Device Description Language (EDDL) - Part 3: EDDL Syntax and semantics**

This standard specifies the Electronic Device Description Language (EDDL) technology, which enables the integration of real product details using the tools of the engineering life cycle. This standard specifies EDDL as a generic language for describing the properties of automation system components. EDDL is used to create Electronic Device Description (EDD), for example, concrete devices, common usable profiles or libraries. This EDD is used with appropriate tools to generate an interpretable code to support parameter handling, operation, and monitoring of automation system components such as remote I/Os, controllers, sensors, and programmable controllers.

**ANSI/ISA 61804-4-2016, Functions Blocks (FB) for process control and Electric Device Description Language (EDDL) - Part 4: EDD interpretation**

This standard specifies EDD interpretation for EDD applications and EDDs to support EDD interoperability. This document is intended to ensure that field device developers use the EDDL constructs consistently and that the EDD applications have the same interpretations of the EDD. It supplements the EDDL specification to promote EDDL application interoperability and improve EDD portability between EDDL applications.

**ANSI/ISA 61804-5-2016, Functions Blocks (FB) for process control and Electric Device Description Language (EDDL) - Part 5: EDDL Built-in library**

This standard specifies the EDDL Built-in library and provides the profiles of the various fieldbus.

**ANSI/ISA 62381-2012, Automation Systems in the Process Industry - Factory Acceptance Test (FAT), Site Acceptance Test (SAT), and Site Integration Test (SIT)**

Defines procedures and specifications for the Factory Acceptance Test (FAT), the Site Acceptance Test (SAT), and the Site Integration Test (SIT). These tests are carried out to prove that the automation system is in accordance with the specification.

**ANSI/ISA 62382-2012, Control Systems in the Process Industry - Electrical and Instrumentation Loop Check**

Describes the steps recommended to complete a loop check, which comprises the activities between the completion of the loop construction (including installation and point-to-point checks) and the startup of cold commissioning. This standard is applicable for the construction of new plants and for expansion/retrofits (i.e. revamping) of E&I installations in existing plants (including PLC, BAS, DCS, panel-mounted and field instrumentation). It does not include a detailed checkout of power distribution systems, except as they relate to the loops being checked (i.e. a motor starter or a power supply to a four-wire transmitter).


The first of a multipart series, this standard addresses the electronic or cyber security of industrial automation and control systems. The term security is considered here to mean the prevention of illegal or unwanted penetration or of intentional or unintentional interference with the proper and intended operation of industrial automation and control systems. Electronic security, the focus of this standard, includes computers, networks, or other programmable components of the system.


Describes the elements contained in a cyber security management system for use in the industrial automation and control systems environment and provides guidance on how to meet the requirements described for those elements.

**ANSI/ISA 62443-3-(99.03.03)-2013, Security for industrial automation and control systems - Part 3-3: System security requirements and security levels**

This part of the ISA 62443 series provides detailed technical control system requirements associated with the seven foundational requirements described in ISA 62443 &##829; 1 &##829; 1 and 99.01.01 including defining the requirements for control system capability security levels.

**ANSI/ISA 62453-1 (103.00.01)-2011, Field device tool (FDT) interface specification - Part 1: Overview and guidance**

This part presents an overview and guidance for this series. It explains the structure and content of the series; provides explanations of some aspects of the ISA 62453 series that are common to many of the parts of the series; describes the relationship to some other standards.
61784 series specifies communication and other parameters concerning allowed values and FDT data types. For restrictions of protocol specific only specifies the mapping of Modbus parameters to FDI standard (ISA-62453-2). This part of the ISA 62453 series provides information for integrating Modbus TCP and Modbus Serial Line protocol support into FDT based systems. NOTE &h#195;This part of ISA 62453 series only specifies the mapping of Modbus parameters to FDT data types. For restrictions of protocol specific parameters concerning allowed values and concerning limitations of arrays used in the definition of FDT data types, refer to IEC 61158-5-15 and the MODBUS Application Protocol Specification.

ANSI/ISA 62453-3-2011, Field device tool (FDT) interface specification - Part 315: Communication profile integration - IEC 61784 CPF 15

This standard defines the FDI Information Model. One of the main tasks of the Information Model is to reflect the topology of the automation system. Therefore it represents the devices of the automation system as well as the connecting communication networks including their properties, relationships, and the operations that can be performed on them. The types in the AddressSpace of the FDI Server constitute some kind of catalog, which is built from FDI Packages.

ANSI/ISA 62769-1:2016, Field Device Integration (FDI) - Part 1: Overview

This standard describes the concepts and overview of the Field Device Integration (FDI) specifications. The detailed motivation for the creation of this technology is also described.

ANSI/ISA 62769-101-1:2016, Field Device Integration (FDI) - Part 101-1: Profiles - Foundation Fieldbus H1

This standard specifies an FDI profile of ISA-62769 for IEC 61784-1_CP 1/1 (FOUNDATION™ Fieldbus H1).


This standard specifies the ISA-62769 profile for IEC 61784-1, CP 1/2 (FOUNDATION™ Fieldbus HSE).

ANSI/ISA 62769-103-1:2016, Field Device Integration (FDI) - Part 103-1: Profiles - PROFIBUS

This standard specifies an FDI profile of ISA-62769 for IEC 61784_1_CP 3/1 (PROFIBUS DP) and IEC 61784_1_CP3/2 (PROFIBUS PA).

ANSI/ISA 62769-103-4:2016, Field Device Integration (FDI) - Part 103-4: Profiles - PROFINET

This standard specifies an FDI profile of ISA-62769 for IEC 61784-2_CP 3/4, IEC 61784-2_CP3/5 and IEC 61784-2_CP3/6 (PROFINET).


This standard specifies an FDI profile of ISA-62769 for IEC 61784_1_CP 9/1 (HART*) and IEC 61784_1_CP 9/2 (WirelessHART*).

ANSI/ISA 62769-2-2016, Field Device Integration (FDI) - Part 2: FDI Client

This standard specifies the FDI Client and specific architectural components within the overall FDI architecture.

ANSI/ISA 62769-3:2016, Field Device Integration (FDI) - Part 3: FDI Server

This standard specifies the FDI Server and specific architectural components within the overall FDI architecture.

ANSI/ISA 62769-4:2016, Field Device Integration (FDI) - Part 4: FDI Packages

This standard specifies the FDI Packages and specific architectural components within the overall architecture.

ANSI/ISA 62769-5:2016, Field Device Integration (FDI) - Part 5: FDI Information Model

This standard defines the FDI Information Model. One of the main tasks of the Information Model is to reflect the topology of the automation system. Therefore it represents the devices of the automation system as well as the connecting communication networks including their properties, relationships, and the operations that can be performed on them. The types in the AddressSpace of the FDI Server constitute some kind of catalog, which is built from FDI Packages.

ANSI/ISA 62769-6:2016, Field Device Integration (FDI) - Part 6: FDI Technology Mapping

This standard specifies the technology mapping for the concepts described in the Field Device Integration (FDI) standard. The technology mapping focuses on implementation regarding the components FDI Client and User Interface Plug-in (UIP) that are specific only to the workstation platform as defined in ISA-62769-4.2015, Annex E.

ANSI/ISA 62769-7:2016, Field Device Integration (FDI) - Part 7: FDI Communication Devices

This standard specifies the elements implementing communication capabilities called Communication Devices (ISA-62769-5).

ANSI/ISA 67.02.01-2016, Field Device Integration (FDI) - Part 1: Profiles - Related to Nuclear Safety, Related to Related to Nuclear Safety

This standard specifies an FDI profile for IEC 61784-1, CP 1/1 (FOUNDATION™ Fieldbus H1).

ANSI/ISA 67.04.01-2006 (R2011), Setpoints for Nuclear Safety-Related Instrumentation

This standard defines the requirements for assessing, establishing, and maintaining nuclear safety-related and other important instrument setpoints associated with nuclear power plants or nuclear reactor facilities. The scope includes instrumentation-based setpoints that assure compliance to one or more design limits.
ANSI/ISA 75.08.04-2007 (R2013), Face-to-Face Dimensions for Butt weld-End Globe-Style Control Valves (Class 4500)
This standard applies to butt weld-end globe-style control valves, sizes 1/2 inch (15 mm) through 8 inches (200 mm), having top and cage guiding.

ANSI/ISA 75.08.05-2016, Face-to-Face Dimensions for Butt weld-End Globe-Style Control Valves (Classes 150, 300, 600, 900, 1500, and 2500)
This standard applies to butt weld-end globe-style control valves, sizes 15 mm (1/2 inch) through 450 mm (18 inches) for Classes 150 through 2500, having top, top and bottom, port, or cage guiding.

ANSI/ISA 75.08.06-2002 (R2013), Face-to-Face Dimensions for Flanged Globe-Style Control Valve Bodies (Classes 900, 1500, and 2500)
This standard applies to flanged globe-style control valves, sizes 15 mm (1/2 inch) through 450 mm (18 inches), having top, top and bottom, port, or cage guiding.

ANSI/ISA 75.08.07-2001 (R2013), Face-to-Face Dimensions for Separable Flanged Globe-Style Control Valves (Classes 150, 300, and 600)
This standard applies to separable flanged globe-style control valves, sizes 1 inch through 4 inches.

ANSI/ISA 75.08.08-2015, Face-to-Centerline Dimensions for Flanged Globe-Style Angle Control Valve Bodies (Classes 150, 300, and 600)
This standard aids users in their piping design by providing Classes 150, 300, and 600 raised-face flanged globe-style angle control valve face-to-centerline dimensions without giving special considerations to the equipment manufacturer to be used.

ANSI/ISA 75.08.09-2016, Face-to-Face Dimensions for Sliding Stem Flangeless Control Valves (Classes 150, 300, and 600)
This standard applies to sliding stem flangeless control valves, sizes 20 mm (3/4 inch) through 600 mm (24 inches) for Classes 150, 300, and 600.

ANSI/ISA 75.10.01-2013, General Requirements for Clamp or Pinch Valves
This document applies to valves, sizes 1 inch through 26 inches, of the clamp or pinch valve design, incorporating clamp or pinch elements.

ANSI/ISA 75.10.02-2014, Installed Face-to-Face Dimensions for Dual Pinch Flanged Clamp or Pinch Valves (Classes 125 and 150)
This document applies to valves, sizes NPS 3/8" (DN 15) through NPS 26 (DN 650), of the clamp or pinch valve design incorporating clamp or pinch elements.

ANSI/ISA 75.10.03-2015, Installed Face-to-Face Dimensions for Shell and Tube Flanged Pinch Valves
This document applies to directly pneumatically operated pinch valves, sizes 1/2 inch through 24 inches, of the shell and tube design which have flanges that mate with ASME B16.1 Class 125 (PN20) and/or ASME B16.5 Class 150 (PN20) flanges. This document excludes solenoid-actuated valves, electric motor operated valves, cylinder operated valves, diaphragm operated valves, pressure-reducing valves, and manually (hand wheel) operated valves. This document applies only to pinch valves of the shell and tube design.

ANSI/ISA 75.11.01-2013, Inherent Flow Characteristic and Rangeability of Control Valves
The scope of this standard is to define the statement of typical control valve inherent flow characteristics and inherent rangeabilities, and to establish criteria for adherence to manufacturer-specified flow characteristics.

ANSI/ISA 75.13.01-2013, Method of Evaluating the Performance of Positioners with Analog Input Signals and Pneumatic Output
This standard specifies tests designed to determine the performance of positioners with analog input signals and pneumatic output. The method of evaluation described in this standard specifies the use of an actuator of the user's or manufacturer's choice. The positioner may be single-acting or double-acting.

ANSI/ISA 75.19.01-2013, Hydrostatic Testing of Control Valves
This standard establishes requirements and definitions for standard hydrostatic shell testing of control valves by the valve manufacturer to prove the structural integrity and leak tightness of the valves' pressure retaining parts, including any closure parts such as the valve body to bonnet joint, but excluding packings, bellows or other moving seals, and packing leakoff/purge/vent port connections.

ANSI/ISA 75.25.01-2001 (R2010), Test Procedure for Control Valve Response
This standard defines the testing and reporting of step response of control valves that are used in throttling closed loop control applications. A control valve consists of the complete, ready-to-use assembly of the control valve body, actuator, and any required accessories. The most probable accessory is a valve positioner.

ANSI/ISA 75.34.01-2019 (R2011), Fossil Fuel Power Plant Feedwater Control System - Drum Type
Assist in the development of design specifications covering the measurement and control of feedwater systems in boilers with steam capacities of 200,000 lbs/hr (25 kg/s) or greater.

ANSI/ISA 75.37.01-2014, Fossil Fuel Power Plant Unit/Plant Demand Development
The scope of this standard is to address the unit/plant demand development subsystem for boilers with steam capacities of 200,000 lbs/hr (25 kg/s) or greater. This subsystem includes generation demand, boiler demand development, turbine demand development, throttle/annular pressure control, and unit megawatt steam flow control as applicable.

ANSI/ISA 77.14.01-2010, Fossil Fuel Power Plant Steam Turbine Controls
This standard addresses steam turbine governor controls and overspeed protection of steam turbine generators in fossil power plants. Specifically excluded from consideration are single valve and controlled extraction turbines, mechanical drive turbines, automated startup/shutdown systems, turbine supervisory instrumentation, steam bypass systems, and turbine water induction prevention (TWIP) systems.

ANSI/ISA 77.20.01-2012, Fossil Fuel Power Plant Simulators: Functional Requirements
The scope of this standard is to address the simulation of fossil fuel power plants typically consisting of: Boiler, turbine, and balance of plant with steam capacities of 200,000 lbs/hr (25 kg/s) or greater and boiler turbine or combined cycle combustion turbine capacity of greater than 100MWs and/or 226; Associated or interactive processes This standard will address high-fidelity process and control logic models, highly replicated user interfaces, highly functional instructor tools, high-realism physical fidelity trainee environments, simulator platform considerations, and minimum levels of documentation.
ANSI/ISA 77.44.01-2010, Steam Temperature Controls

This standard provides general requirements for the specification of pneumatic rack and pinion actuators. This document applies to actuators with a maximum allowable operating pressure (MAOP) up to 150 psig with a compressed gas (i.e., instrument air).

ANSI/ISA 95.00.04-2012, Enterprise-Control System Integration - Part 4: Object Models

This standard defines business-to-object models and attributes of the object models that define some of the information exchanged between functions defined in ANSI/ISA-95.00.03. The object models and attributes may be used in the design and implementation of interface standards and for interoperability in manufacturing operations management.

ANSI/ISA 95.00.05-2013, Enterprise-control system integration - Part 5: Business-to-manufacturing transactions

This standard defines business-to-manufacturing transactions that may be used on the objects defined in the object models of the Part 1 and Part 2 standards in the ANSI/ISA-95 series. The transactions of required and actual manufacturing activities bind and organize the manufacturing objects and activities defined in those earlier standards.

ANSI/ISA 95.00.06-2014, Enterprise-Control System Integration - Part 6: Messaging Service Model

Defines a set of services that may be used to exchange information messages in a publish/subscribe mode and a request/response mode. Defines a minimal interface subset to message exchange systems.

ANSI/ISA 96.02.01-2016, Guidelines for the Specification of Electric Valve Actuators

This standard covers the development of specifications, minimum design requirements and sizing criteria for electric actuators.

ANSI/ISA 96.03.01-2012, Guidelines for the Specification of Pneumatic Scotch Yoke Valve Actuators

This standard provides general requirements for the development of specifications for pneumatic scotch yoke actuators. This document applies to actuators with a maximum allowable operating pressure (MAOP) up to 250 psig with a compressed gas (i.e., instrument air).

ISANTA (International Staple, Nail and Tool Association)

ANSI SNT-101-2015, Safety Requirements for Portable, Compressed-Air-Actuated Fastener Driving Tools

The requirements of this standard apply to portable hand-held compressed-air-powered tools for driving fasteners, such as nails and staples, into or through concrete, fabric, fiberboard, metal, plastic, wood, wood products, cartons, and other materials.
ISEA (ASC Z87) (International Safety Equipment Association)

ANSI ISEA 287.1-2015, Occupational and Educational Personal Eye and Face Protection Devices

This standard sets forth criteria related to the general requirements, testing, permanent marking, selection, care, and use of protectors to minimize the occurrence and severity or prevention of injuries from such hazards as impact, non-ionizing radiation and liquid splash exposures. Certain hazardous exposures, such as those caused by recreational activities or biological agents are not covered in this standard.

ISEA (International Safety Equipment Association)

ANSI/ISEA 101-2014, Limited-Use and Disposable Coveralls - Size and Labeling Requirements

This standard provides requirements for finished dimensions, labeling and packaging for limited-use and disposable coveralls. It also provides guidance on selecting the appropriate garment size for the wearer.

ANSI/ISEA 102-1990 (R2015), Gas Detector Tube Units - Short Term Type for Toxic Gases and Vapors in Working Environments

This standard sets forth the minimum performance requirements for gas detector tube units and components, which are used to determine the concentration of toxic gases and vapors in working environments.

ANSI/ISEA 104-2009 (R2015), Air Sampling Devices - Diffusive Type for Gases and Vapors in Working Environments

This standard sets forth the test methods, performance parameters, and reporting requirements for diffusion type sampling devices used to determine the concentrations of gases and vapors in working environments. The information provided by manufacturers in compliance with this standard is necessary for the proper selection and use of these devices for measuring workplace exposures, including determining compliance with Occupational Exposure Limit Value (ELV), e.g., Threshold Limit Value (TLV), Permissible Exposure Limit (PEL), Short Term Exposure Limit (STEL).

ANSI/ISEA 105-2016, Hand Protection Classification

This standard addresses the classification and testing of hand protection for specific performance properties related to chemical and industrial applications. Hand protection includes gloves, mittens, partial gloves, or other items covering the hand or a portion of the hand that are intended to provide protection against or resistance to a specific hazard.

ANSI/ISEA 107-2015, High-Visibility Safety Apparel and Accessories

This standard specifies performance requirements for high visibility safety apparel and accessory PPE. Performance requirements are included for color, retroreflection, and minimum areas of background, retroreflective and combined-performance materials used in the construction of high-visibility garment configurations.

ANSI/ISEA 113-2013, Fixed and Portable Decontamination Shower Units

This standard addresses testing and performance criteria for fixed and portable decontamination shower units designed for facilities used by first responders and receiving medical facilities for initially treating victims of hazardous materials exposure.

ANSI/ISEA 125-2014, Conformity Assessment of Safety and Personal Protective Equipment

This standard establishes criteria for conformity assessment of safety and personal protective equipment which is sold with claims of compliance with product-performance standards. Specific provisions are described for qualification performance testing data collection and maintenance; periodic verification; substantiation of processes to maintain manufacturing quality; roles and responsibilities of suppliers, testing organizations; and certification organizations who participate in the process.

ANSI/ISEA 201-2012, Classification of Insulating Apparel Used in Cold Work Environments

Establishes classification requirements for occupational apparel items worn in cold environments. Specific criteria are included for thermal insulation (in units of clo), thermal transport properties, and resistance to the deterioration of these properties due to laundering.

ANSI/ISEA Z308.1-2014, Minimum Requirements for Workplace First Aid Kits and Supplies

Revision addresses technical issue regarding criteria for splints (Section 6.17) and requirements for first aid kit labeling.

ANSI/ISEA Z358.1-2014, Emergency Eyewash and Shower Equipment

This standard establishes minimum performance requirements for emergency flushing fixtures for the immediate treatment of eyes and the body of a person who has been exposed to injurious or corrosive materials. Specific equipment includes: emergency showers, eyewash equipment, eye/face wash equipment, combination units and supplemental equipment such as personal wash units and drench hoses.

ANSI/ISEA Z89.1-2014, Industrial Head Protection

This standard establishes minimum performance requirements for protective helmets that reduce the forces of impact and penetration that may provide protection from electrical shock. It also includes product assessment for optional features. Type and class designations and product markings are also included.

ITI (INCITS) (InterNational Committee for Information Technology Standards)

ANSI INCITS 373-2003 [S2013], Information technology - Fibre Channel Framing and Signaling Interface (FC-FS)

This standard describes the framing and signaling interface of a high-performance serial link for support of FC-4s associated with upper level protocols (e.g., SCSI, IP, SB/COS, VI). FC-FS (along with FC-PH) is the combination of the FC-PH [1], its amendments 1 [2] and 2 [3], FC-PH-2 [4] and FC-PH-3 [5] standards. This standard also deletes or obsoletes outdated functions and features from those standards.


ISO/IEC 18092, ISO/IEC 14443 and ISO/IEC 15693 specify the radio frequency signal interface, initialization, anti-collision and protocols for wireless interconnection of closely coupled devices and access to contactless integrated circuit cards operating at 13.56 MHz. This Standard specifies the communication mode selection mechanism, designed not to disturb any ongoing communication at 13.56 MHz, for devices implementing ISO/IEC 18092, ISO/IEC 14443 or ISO/IEC 15693. This Standard requires implementations to enter the selected communication mode as specified in the respective Standard. The communication mode specifications, however, are outside the scope of this Standard.

INCITS 100-1989 [S2010], Interface Between DTE & DCE for Packet Mode Operation with Packet Switch Data Communications Networks (CCITT X.25)

Conforms to the requirements of CCITT Recommendation X.25, ISO 7776:1986, and ISO 8208:1987, and covers both the DTE/DCE and DTE/DTE interfaces.

INCITS 100a-1991 [S2010], Information Systems - Interface between Data Terminal Equipment (DTE) and Data Circuit-Terminating Equipment (DCE) for Operation with Packet-Switched Data Communications Networks (PSDN), or between Two DTEs, by Dedicated Circuit Addendum

Specifies extensions that were considered important to have available in the U.S., prior to publication of the next full revision of the national standard. It addresses extensions related to the Network User Identification (NUI) Selection facility. Implementations conforming to this supplement must conform to X3.100:1989 and the 1988 version of CCITT Recommendation X.25. Supplement to ANSI X3.100-1989
INCITS 103-1983 [S2011], Unrecorded Magnetic Tape Minicassette For Information Interchange, Coplanar 3.81 mm (0.150 Inch)
Represents the minimum requirements for mechanical and magnetic interchangeability of the minicassette between information processing systems, communication systems, and associated equipment using ANSI X3.4-1977, American Standard Code for Information Interchange (ASCII).

INCITS 11-1990 [S2007], General Purpose Paper Cards for Information Processing
This standard specifies the quality of paper, dimensions and quality of general purpose cards, and test methods for general purpose cards of 7 3/8 inch length.

INCITS 111-1986 [S2007], Information Systems - Optical Character Recognition (OCR) - Matrix Character Sets for OCR-M
Describes the matrix of dot placement and size limits for OCR-M alphanumeric characters and symbols for optical character recognition (OCR) systems.

INCITS 112-1984 [S2007], 14-inch (356-mm) Diameter and Low Surface Friction Magnetic Storage Disk
Provides the mechanical, physical and magnetic properties of a magnetic disk with a 14-inch (356-mm) diameter and low surface friction intended for mounting in data storage devices operating at 160 oo flux transitions per track and at typical track density of 480 tracks per inch (tpi).

INCITS 113-1987 [S2008], Information Systems - Programming Language – Full BASIC
Promotes the interchangeability of BASIC programs among a variety of automatic data processing systems.

INCITS 113a-1989 [S2008], Information Systems - Programming Languages – Modules and Individual Character Input for Full BASIC
Establishes the syntax of BASIC programs written using individual character input, or modules, or both; the semantic rules for interpreting the meaning of a BASIC program that uses individual character input, or modules, or both; the errors and exceptional circumstances that shall be detected; and also the manner in which such errors and exceptional circumstances shall be handled.

INCITS 115-1984 [S2007], Unformatted 80 Megabyte Trident Pack for Use at 370 TPI and 6000 BPI – Physical, Mechanical and Magnetic Characteristics
Specifies the general, physical and magnetic requirements for interchangeability of the five disk pack, as required to achieve unrecorded pack interchange between disk storages and associated information processing systems.

INCITS 116-1986 [S2007], Recorded Magnetic Tape Cartridge for Information Interchange 4-Track, Serial 0.250 in (6.30 mm) 6400 BPI (252 BPM) Inverted Modified Frequency Modulation Encoded
This American National Standard is intended to provide a format and recording standard for a 0.250-inch (6.30-mm) wide, 4-track magnetic tape in a cartridge to be used for information interchange between information processing systems, communications systems, and associated equipment utilizing a standard code for information interchange, as agreed upon by the interchange parties.

INCITS 117-1984 [S2007], Printable/Image Areas for Text and Facsimile Communication Equipment
This standard defines the sizes and location of the printable/image areas common to both the ISO A4 and North American paper sizes for international communication on text and facsimile equipment.

INCITS 118-1998 [S2008], Personal Identification Number – PIN Pad
This standard identifies the fixed arrangement of the alphanumeric characters and keys of a PIN pad. The PIN pad is used by a customer to enter a Personal Identification Number (PIN) when requested as part of a transaction. As this standard is being submitted for stabilization maintenance, INCITS will consider requests for change and information on the submittal of such requests.

INCITS 119-1984 [S2007], Contact Start/Stop Storage Disk, 158361 Flux Transitions per Track, 8.268 Inch (210 mm) Outer Diameter and 3.937 Inch (100 mm) Inner Diameter
Provides the mechanical, physical and magnetic properties of a magnetic disk with an 8.268 inch (210 mm) diameter and low surface friction intended for mounting in data storage devices. A typical recording density is 480 tpi with 8464 flux transitions per inch (ftpi) at a radius of 2.978 in (78.64 mm).

INCITS 120-1984 [S2007], Contact Start/Stop Storage Disk, 95840 Flux Transitions per Track, 7.874 Inch (200 mm) Outer Diameter and 2.500 Inch (63.5 mm) Inner Diameter
Provides the mechanical, physical and magnetic properties of a magnetic disk with an 7.874-in (200-mm) diameter and low surface friction intended for mounting in data storage devices. A typical recording density is 480 tpi with 6858 flux transitions per inch (ftpi) at a radius of 2.224 in (56.49 mm).

INCITS 121-1984 [S2011], Two-Sided Unformatted 8-Inch (200 MM) Double Density Flexible Disk Cartridge (For 13262 FTPR Two-headed Application) (Combined with Project 287)
Specifies the general, physical, and magnetic requirements for interchangeability of the two-sided, 8-in (200-mm) (nominal), 48-tracks-per-inch (tpi) flexible disk cartridge (for 13 262 flux transitions per radian (ftpr) for use) as required to achieve unformatted disk cartridge interchange among disk drives using 77 tracks per side and associated information processing systems.

INCITS 124-1985 [S2012], Information processing systems - Computer graphics - Graphical Kernel System (GKS) Functional Description
Specifies a set of functions for computer graphics programming (GKS). GKS is a basic graphics system for applications that produce computer generated two-dimensional pictures on line graphics or raster graphics output devices. It supports operator input and interaction by supplying basic functions for graphical input and picture segmentation and allows storage and dynamic modification of pictures.

INCITS 124.1-1985 [S2011], FORTRAN Binding of Graphical Kernel System (GKS)
Specifies a language independent nucleus of graphics system. For integration into a programming language, GKS is embedded in a language dependent layer obeying the particular conventions of that language. This document specifies such a language dependent layer for the FORTRAN language.

Specifies a language-independent nucleus of a graphics system. For integration into a programming language, GKS is embedded in a language-dependent layer obeying the particular conventions of that language. This part of ANSI X3.124 specifies such a language-dependent layer for the Pascal language.

INCITS 124.3-1989 [S2010], Information technology - Computer Graphics - Graphical Kernel System (GKS), Ada Binding
The Graphical Kernel System (GKS), as described in ANSI X3.124-1985, specifies a language-independent nucleus of a graphics system. For integration into a programming language, GKS is embedded in a language-independent layer obeying the particular conventions of that language. This document specifies such a language-dependent layer for the Ada language.

INCITS 125-1985 [S2011], Two-Sided, Double-Density, Unformatted 5.25 Inch (130 mm) 48-tpi (1.9 tpm) Flexible Disk Cartridge for 7958 BPR Use
Specifies the general, physical, and magnetic requirements for the interchangeability of the two-sided, 5.25 inch (130 mm) (nominal), 48-tracks-per-inch (tpi) 1.9-tracks-per-millimeter (tpmm) flexible disk cartridge (for 7958 bits-per-radian (bpr) use) as required to achieve unformatted disk cartridge interchange among disk drives using 40 tracks per side and associated information processing systems.
INCITS 126-1986 [S2007], One- and Two-Sided Double Density Unformatted 5.25 Inch (130 mm) 96 Tracks per Inch (3.8 Tracks per mm) Flexible Disk Cartridge – General, Physical, and Magnetic Requirements for 7958 BPR Use

This standard specifies the general, physical, and magnetic requirements for interchangeability of the one- or two-sided, 5.25-Inch (130-mm) (nominal), 96-tracks-per-inch (tpi) (3.8-tracks-per-millimeter (tpmm)) flexible disk cartridge (for 7958-bits-per-radian (bpr) use) as required to achieve unformatted disk cartridge interchange among disk drives using 80 tracks per side and associated information processing systems.

INCITS 127-1987 [S2007], Information Systems – Unrecorded Magnetic Tape Cartridge for Information Interchange, 0.250 Inch (6.30 mm), 6400–10 000 ftpi (252–394 ftppm)

Presents the minimum requirements for an unrecorded cartridge containing 0.250-inch (6.30-mm) wide magnetic tape regarding the mechanical and magnetic interchangeability of the cartridge between information processing systems, using physical recording densities in the range of 6400 to 10 000 flux transitions per inch (ftpi) (252 to 394 flux transitions per millimeter (ftppm)).

INCITS 131-1994 [S2013], Information technology - Small Computer System Interface - 2 (SCSI-2)

This standard defines an input/output bus for interconnecting computers and peripheral devices. It defines extensions to the Small Computer System Interface (ISO 9316: 1989), referred to herein as SCSI-1. It also provides more complete standardization of the previously defined command sets.

INCITS 136-1986 [S2007], Serial Recorded Magnetic Tape Cartridge for Information Interchange, Four and Nine Track, 0.250 Inch (6.30 mm), 8000 bpi (315 bpmms), Streaming Mode, Group Code Recording

Provides a format and recording standard for an 8000-bpi (315-bpmms) streaming 0.250-inch (6.3-mm) wide, 4- and 9-track, magnetic tape in a cartridge to be used for information interchange between information processing systems, communication systems, and associated equipment utilizing a standard code for information interchange, as agreed upon by the interchange parties.

INCITS 137-1988 [S2008], Information Systems - One- and Two-sided, Unformatted, 90-mm (3.5-in), 5.3-tpmm (135-tpi) Flexible Disk Cartridge for 7958 BPR Use - General, Physical, and Magnetic Requirements

The standard specifies the general, physical and magnetic requirements for interchangeability of the one-and two-sided 90mm (3.5 in) (nominal) flexible disk cartridge (for 7958 bits-per-radian (bpr) use) as required to achieve unformatted disk cartridge interchange among disk drives using 80 tracks per side and associated information processing systems.

INCITS 137-1988/AM1-1999 [S2012], Information Systems - One- and Two-sided, Unformatted, 90-mm (3.5-in), 5.3-tpmm (135-tpi) Flexible Disk Cartridge for 7958 BPR Use - General, Physical, and Magnetic Requirements

The revision contains substantive and editorial changes to INCITS 137-1988. The standard specifies the general, physical and magnetic requirements for interchangeability of the one-and two-sided 90mm (3.5 in) (nominal) flexible disk cartridge (for 7958 bits-per-radian (bpr) use) as required to achieve unformatted disk cartridge interchange among disk drives using 80 tracks per side and associated information processing systems.

INCITS 139-1987 [S2007], Information Systems – Fiber Distributed Data Interface (FDDI) – Token Ring Media Access Control (MAC)

Provides specifications for format and recording for a 1/2 inch, 9-track magnetic tape to be used for information interchange among information processing systems, communication systems, and associated equipment utilizing ANSI X3.4:1977, American National Code for Information Interchange (ASCII). This standard deals solely with recording on magnetic tape and supports and complements ANSI X3.40-1983, Unrecorded Magnetic Tape for Information Interchange, (9-Track 800 CPI, NRZI, 1600 CPI, PE and 6250 CPI, GCR).

INCITS 148-1988 [S2008], Fiber Distributed Data Interface (FDDI) Physical Layer (PHY)

Provides a format and recording standard for an 8000-bpi (315-bpmms) streaming 0.250-inch (6.3-mm) wide, 4- and 9-track, magnetic tape in a cartridge to be used for information interchange between information processing systems, communication systems, and associated equipment utilizing a standard code for information interchange, as agreed upon by the interchange parties.

INCITS 149-1986 [R2012], Financial Transaction Card Formsets - Location of Imprinted Information

Provides the location of the imprinted account number, area for source ID, amount of transaction, and date of transaction as they appear on 51-column and 80-column card size financial transaction card formsets.

INCITS 150-1987 [S2007], Business Machines, Data Processing Equipment and Business Forms – Character and Line Spacing

This standard specifies the most commonly used character line spacings for office machines and data processing equipment.

INCITS 151-1987 [S2007], Bond Papers and Index Bristols – Common Sheet Sizes

This standard (1) lists the preferred and common sheet sizes of bond papers and index bristols and their applicable tolerances; (2) cross references to metric sizes, and (3) references a standard test method.


This standard provides the following specifications for adding machine paper rolls: terminology; roll widths; roll length; paper substance and quality, thickness, finish, color, brightness, opacity, tearing and bursting strength; diameter of rolls; winding and cutting, core materials; diameter of core and spindle hole; roll end sealing; and quantity packaging and cartoning.

INCITS 154-1988 [S2009], Information technology - Office Machines and Supplies Alphanumeric Machine -- Keyboard Arrangement

Describes the arrangement of the 48 basic keys on the keyboard and the uppercase and lowercase characters that appear on the keys. The character assignments are divided into five application areas, in recognition of the different graphic character requirements of each application.


This American National Standard provides specifications for format and recording for a 1/2-inch (12.7-mm), 9-track magnetic tape to be used for interchange among information processing systems, communication systems, and associated equipment utilizing a standard code for interchange as agreed upon by the interchange parties.

INCITS 158-1987 [S2008], Information Systems – Recorded Magnetic Tape Cassette for Information Interchange – 4 Track, 0.150 Inch (3.81 mm) 8000 bpi (315 bpmms), Group Code Recording

This American National Standard is intended to provide a format and recording standard for an 8000-bpi (315-bpmms) streaming 0.150-inch (3.81-mm)-wide, 4-track magnetic tape cassette to be used for information interchange among information processing systems, communication systems, and associated equipment utilizing a standard code for interchange, as agreed upon by the interchange parties.

INCITS 162-1988 [S2009], Information Systems - Two-Sided, High-Density, Unformatted, 5.25-inch (130-mm), 96-tpi (3.8 tpmm) Flexible Disk Cartridge for 13 262 ftps Use - General, Physical, and Magnetic Requirements

This standard specifies the general, physical, and magnetic requirements for interchangeability for the two-sided, 5.25-in (130-mm), 96-tracks-per-inch (tpi) (3.8-tracks-per-millimeter (tpmm)) flexible disk cartridge for 13 262 flux-transitions-per-radian (ftpr) use as required to achieve unformatted disk cartridge interchange among disk drives using 77 or 80 tracks per side and associated information processing systems.

Specifies the general, physical, and magnetic requirements for interchangeability for two-sided, 5.25-in (130-mm), 96-tracks-per-inch (tpi) (3,8-track-per-millimeter (tpmm)) flexible disk cartridge (for 13 262 flux-transitions-per-radian (ftpr) use) as required to achieve unformatted disk cartridge interchange among disk drives using 77 or 80 per side and associated information processing systems.

INCICTS 163-1988 [S2007], Information Systems – Contact Start/Stop Metallic Film Storage Disk – 83,333 Flux Transitions Per Track, 130-mm (5.118 in) Outer Diameter and 40-mm (1.575 in) Inner Diameter

Specifies the general, physical, and magnetic requirements for interchangeability for the two-sided, 5.25-in (130-mm) flexible disk cartridge (for 13262 flux transitions per radian use) as required to achieve unformatted disk cartridge interchange among disk drives using 77 or 80 tracks per side and associated information processing systems.

INCICTS 164-1990 [S2011], Unrecorded Magnetic Tape Cassette for Information Interchange 3.81 mm (0.150 In), 252 to 394 ftppm (6400 to 10000 ftpp)

Presents the minimum requirements for the mechanical and magnetic interchangeability of the cassette between information processing systems, using the physical recording density of 394 ftppm (10 000 ftpp).


This standard is designed to promote the interchangeability of DIBOL programs among a variety of computers. Programs conforming to this standard will be said to be written in DIBOL.

INCICTS 166-1989 [S2010], Fiber Distributed Data Interface (FDDI) Physical Layer, Medium Dependent (PMD)

Specifies Physical Layer, Medium Dependent (PMD) requirements for the Fibre Distributed Data Interface (FDDI). The FDDI provides a high-bandwidth (100 Mbit/s) general-purpose interconnection among computers and peripheral equipment using fibre optics as the transmission medium. The FDDI may be configured to support a sustained transfer rate of approximately 80 Mbit/s (10 Mbyte/s). It may not meet the response time requirements of all unbuffered high-speed devices. The FDDI establishes the connection among many FDDI nodes (stations) distributed over distances of several kilometers in extent.

INCICTS 17-1981 [S2007], Character Set for Optical Character Recognition (OCR-A)

Prescribes shapes and sizes of OCR-A alphanumeric characters and symbols for optical character recognition (OCR) systems.

INCICTS 171-1989 [S2010], One and Two-Sided, High Density, Unformatted, 90-mm (3.5 in), 5,3 tspmm (135-tpi), Flexible Disk Cartridge for 15 916 bpr Use - General, Physical and Magnetic Requirements

This standard specifies the general, physical, and magnetic requirements for interchangeability of the one- and two-sided, high-density, 90-mm (3.5-in) (nominal) flexible disk cartridge for 15 916 bits-per-radian (bpr) use as required to achieve unformatted disk cartridge interchange among disk drives using 80 tracks per side and associated information processing systems. The one- and two-sided flexible disk enclosed in a protective case and having one or two recording surfaces is of the type intended specifically for use with digital recording and reproducing equipment employing access mechanisms capable of positioning to these data tracks.

INCICTS 172-2002 [S2012], Information Technology - Standard Dictionary of Information Technology (ANSDIT)

[NOTE - ANSI INCITS 172-2002 is published in HTML format. The file you will download is a .ZIP file containing all the necessary files. To view the standard, please unzipped all of the files and place them into the same folder, then open the HTML file ANSDIT.HTM’. This file provides links to the other sections of the standard.] ANSI INCITS 172-2002 contains concepts used in information technology. In general, concepts or terms found in an everyday non-technical dictionary are not included.

INCICTS 175:1999 [S2013], 19-mm Type ID-1 Recorded Instrumentation - Digital Cassette Tape Form

Establishes the format of information on 19-mm type ID-1 instrumentation digital cassettes. It specifies the dimensions and locations of the helical data, control, time code, and annotation tracks. Also, it defines the format and recording requirements of the data blocks forming the helical data record containing digital instrumentation and other associated data and specifies the content, format, and recording method for the control record. This standard also specifies the recording requirements for the longitudinal records contained in the annotation and the time code tracks.

INCICTS 178-1990 [S2010], Packet-Switched Signalling System Between Public Networks Providing Data Transmission Services

CCITT Recommendation X.75, Packet-Switched Signalling System Between Public Networks Providing Data Transmission Services, defines the interface between public networks providing data transmission services in the packet-switched mode. The 1988 (Blue book) version of the Recommendation is the current official version of the X.75 interface definition. Subsequent references to X.75 in this document will be to the 1988 version unless otherwise stated. This standard adapts the international X.75 standard, with modifications and extensions to apply to interfaces between public networks within the United States.

INCICTS 178a-1991 [S2010], Packet-Switched Signalling System Between Public Networks Providing Data Transmission Services - Addendum

This supplement addresses extensions related to the Network User Identification (NUI) utility. In particular, it provides procedures for passing verified NUI utility values between networks and additional constraints on the parameter field format.

INCICTS 179-1990 [S2007], 95-mm Diameter Rigid Digital Recording Disk

Provides the mechanical, physical and magnetic properties of a low-friction disk with a diameter of 95 mm (3.740 inches) and with a typical recording density of 31.5 tracks per millimeter (tpmm) (800 tracks per inch (tpi)) with 567 flux transitions per millimeter (ftppm) (14 400 flux transitions per inch (ftpi)) at a radius of 23 mm (0.900 inch).

INCICTS 18-1974 [S2010], Punched paper tape - Dimensions and location of feed holes and code holes

Covers the physical dimensions of the paper tape and its perforations and is for perforated paper tape with fully punched round holes.

INCICTS 180-1990 [S2011], Magnetic Tape and Cartridge for Information Interchange, 18-Track, Parallel, 12.65mm (1/2 in.) 1491 cpmm (37 871 cpi) Group-Coded, Requirements for Recording

Provides the requirements for a tape cartridge to be used for information interchange among information-processing systems, communication systems, and associated equipment utilizing a standard code for information interchange as agreed upon by the interchange parties.

INCICTS 18093:1990 [S2010], Information technology - Data Interchange on 130 mm Optical Disk Cartridges of Type WORM (Write Once Read Many) using Irreversible Effects - Capacity: 5,2 Gbytes per Cartridge

Specifies the characteristics of a 130-mm optical disk cartridge (ODC) of Type WORM (Write Once Read Many) with a capacity of 5,2 Gbytes. Type WORM ODCs use writing effects that are inherently irreversible. Written marks cannot be erased and attempted modification of the written marks are detectable.

INCICTS 181-1990 [S2011], Recorded Magnetic Tape Cartridge for Information Interchange 0.500 in, 22 and 48 Tracks Serial Serpentine, 6 667 and 10 000 bpi

Provides the requirements for a tape cartridge to be used for information interchange among information-processing systems, communications systems, and associated equipment utilizing a standard code for information interchange as agreed upon by the interchange parties. This standard deals solely with the requirements for recording on magnetic tape.
INCITS 182-1990 [S2007], Guideline for Bar Code Print Quality
Covers the optical characteristics of a printed bar code symbol. This document shall be used with the appropriate application specifications, or symbology specifications, or both. The appropriate application specifications, or symbology specifications, or both, shall take precedence over this guideline.

Provides the mechanical, electrical and signalling protocol specifications for an efficient simplex high-performance point-to-point interface between pieces of data-processing equipment. The interface described in this document can be operated at peak data rates of 800 or 1600 Mbit/s, over distances of up to 25m by means of copper cabling. A distance-independent signalling protocol allows the average data rates to approach the peak data rates, even over distances longer than specified for the HIPPI-PH.

INCITS 184-1993 [S2013], Fiber Distributed Data Interface (FDDI) Single Mode Physical Layer Medium Dependent (SMF-PMD)
This standard specifies a media-level, point-to-point, 12-channel, full-duplex, electrical/optical interface, with each channel operating at 500 Mbit/s or 1 Gbit/s. Multimode (MM) fiber cables, and single-mode (SM) fiber cables, are used for distances up to 1 km when carrying the HIPPI-6400-PH protocol. Differential signals are used on the electrical side.

INCITS 186-1992 [S2007], Information Systems – Fiber-Distributed Data Interface (FDDI) – Hybrid Ring Control (HRC)
Specifies a Hybrid Ring Control (HRC) protocol that provides a mode of operation in which both packet switched and isochronous data are transmitted within the same special frame structure, called a cycle.

INCITS 187-1990 [S2011], Recorded Magnetic Tape for Longitudinal Recording of Instrumentation Data-Interchange
Presents the minimum requirements for the mechanical and magnetic interchangeability of the cassette between information processing systems, using the physical recording density of 394 ft/pm (10 000 fpi).

INCITS 189-1991 [S2007], Information Systems – Interface between Data Terminal Equipment (DTE) and Data Circuit-Terminating Equipment (DCE) for Terminals Operating in the Packet Mode and Accessing a Packet-Switched Public Data Network Through Switched Access
Adopts the international CCITT X.32 standard, modifications and extensions to apply to DTE/DCE interfaces.

INCITS 19-1974 [S2010], Eleven-Sixteenths Inch Perforated Paper Tape for Information Interchange
Covers the physical dimensions of the paper tape and its perforations and is for perforated paper tape with fully punched round holes.

INCITS 197-1991 [S2007], Information Systems – Unrecorded Magnetic Tape and Cartridge for Information Interchange 1/2 in (12.65 mm), Serial Serpentine, 22-Track, 6667 ftpi (262 ftpmm) and 48-Track, 10,000 ftpi (394 ftppm)
Provides the requirements for a tape cartridge to be used for information interchange among information-processing systems, and associated equipment. This standard provides the general requirements, definitions, physical and magnetic tape characteristics, and the tape cartridge requirements.

INCITS 199-1991 [S2012], Information Systems - 356-mm Optical Disk Cartridge (Write-Once) - Test Methods for Media Characteristics
 Specifies test methods for media characteristics of 356-mm nominal diameter optical disk cartridges used for information processing systems and for information storage.

INCITS 20-1967 [S2010], Take-up Reels for One Inch Perforated Tape for Information Interchange
Covers the physical dimensions of take-up (or storage) reels, with either fixed or separable flanges, so that reels of perforated tape may be interchanged among machines of various manufacturers, and is intended to serve as a guide in the coordination of equipment design.

INCITS 203-1992 [S2007], Information Systems – Helical-Scan Digital Computer Tape Cartridge for Information Interchange (3.81 mm (0.150 in)) Digital Data Storage (DDS) Recorded Format
Provides the requirements for the helical-scan recording method and the Digital Data Storage (DDS) recorded format of a 3.81-mm (0.150-in) magnetic tape cartridge to be used for information interchange between information processing systems. Information interchange between information processing systems requires the use of this standard in conjunction with the unrecorded tape and cartridge requirements provided by the American National Standard for Information Systems - Unrecorded Helical-Scan Digital Computer Tape Cartridge for Information Interchange, 3.81-mm (0.150-in), ANSI X3.206-1993.

INCITS 204-1992 [S2007], Information Systems – Recorded Magnetic Tape for Information Interchange, 15 and 18 Track, 0.250-inch (6.35-mm) 10 000-bpi (394-bppm) Streaming Mode, Group Code Recording
This standard provides the requirements for a standard for a streaming 0.250 inch (6.30 mm), wide, 15 & 18 Track, magnetic tape in a cartridge to be used for information interchange between information processing systems, communications systems, and associated equipment utilizing a standard code for information interchange, as agreed upon by the interchange parties. This standard refers solely to recording on magnetic tape.

INCITS 205-1992 [S2007], Information Systems – Helical-Scan Digital Computer Tape Cartridge for Information Interchange (3.81-mm (0.150 in)) Data/DAT Recorded Format
This standard provides the requirements for the Helical-Scan recording method and the DATA/DAT recorded format of a 3.81 mm (0.150 in) magnetic tape cartridge to be used for information interchange between information processing systems.

INCITS 207-1991 [S2012], Office Machines and Supplies - Alphanumeric Machines - Alternate Keyboard Arrangement
Provides a performance-oriented keyboard arrangement to the keyboard presented in American National Standard for Office Machines and Supplies-Keyboard Arrangement for Alphanumeric Machines, ANSI X3.154. This standard describes the arrangement of the 48 basic printing keys on the keyboard and the characters, uppercase and lowercase, that appear on the keys.

Describes the matrix of dot placement and size limits for OCR-MB alphanumeric characters and symbols for optical character recognition (OCR) systems.

INCITS 21-1967 [S2007], Rectangular Holes in Twelve-Row Punched Cards
Specifies the size and location of rectangular holes in twelve-row 3-1/4 inch wide punched cards.

INCITS 210-2008 [S2013], Information technology - High-Performance Parallel Interface - Framing Protocol (HIPPI-FP)
This American National Standard provides data framing for a high-performance point-to-point interface between data-processing equipment. This standard does not protect against certain errors that might be introduced by intermediate devices interconnecting multiple HIPPI-PHs.

INCITS 212-1992 [S2012], Information Systems - 130-mm Rewritable Optical Disk Cartridge for Information Interchange
The standard specifies the characteristics of 130-mm optical disk cartridges (ODC) of the type providing for information to be written, read, and erased many times using the magneto-optical effect.
INCITS 213-1994 [S2009], Information Technology - 90-mm (3.54-in) Optical Disk Cartridge Rewritable and Read Only Using Direct Block Format (DBF) Method for Digital Information Interchange

Specifies the characteristics of a 90-mm (3.54-in) optical disk cartridge (ODC) of the type providing for information to be written, read, and erased many times, using thermomagnetic and magneto-optical effect. A part or all of the optical disk may be prerecorded (read only) and be reproduced by embossing information in the recording layer. This information is read without recourse to the magneto-optical effect. The optical disk cartridge consists of two parts, a protective case and an optical disk held inside the case. The optical disk shall be single-sided with one substrate and one recording layer.

INCITS 214-1992 [S2012], Information Systems - 130-mm Write-Once Optical Disk Cartridge Using Servoed Servo and 4/15 Encoding

This standard specifies the characteristics of 130-mm optical disk cartridges (ODC) of the type providing for information to be written once and read many times.

INCITS 215:1994 [R2011], Information Systems - Programming Languages - Forth

This Standard specifies an interface between a Forth System and a Forth Program by defining the words provided by a Standard System.


This Standard specifies a common method for encapsulating ISO/IEC 8802-2 (IEEE Std 802.2) Logical Link Control Protocol Data Units that conform to ISO/IEC 8802-2 (IEEE Std 802.2) Logical Link Control; – Provision for 48-bit source and destination addresses conforming to IEEE 802.1a; – Provision for eight forwarding classes to distinguish, for example, among ordinary data PDUs, PDUs for services that require bandwidth guarantees such as packet video, etc.

INCITS 22-1983 [S2011], Recorded Magnetic Tape for Information Interchange (800 CPI, NRZI)

Provides for format and recording for 1/2 inch, 9-track magnetic tape to be used for information interchange among information processing systems, communication systems, and associated equipment utilizing ANSI X3.4.1977. This standard deals solely with recording on magnetic tape and supports and complements ANSI X3.40.1983, Unrecorded Magnetic Tape for Information Interchange, (9-Track 800 CPI, NRZI, 1600 CPI, PE and 6250 CPI, GCR).

INCITS 220-1992 [S2012], Information Systems - Digital Information Interchange 130-mm Optical Disk Cartridges of the Write-Once, Read Multiple (WORM) Type, Using the Magnetic-Optical Effect

This standard specifies the characteristics of 130-mm optical disk cartridges (ODC) of the Write Once Multiple (WORM) type, which provides for the disk to be initialized once, and the information to be written once only and read many times using the magnet.

INCITS 222-1997 [S2012], Information Technology - High-Performance Parallel Interface - Switch Control (HIPPI-SC)

This American National Standard provides switch control for physical layer switches using the High-Performance Parallel Interface (HIPPI). a high-performance point-to-point interface between data-processing equipment. This standard does not protect against errors introduced by intermediate devices interconnecting multiple HIPPI-PHs.

INCITS 223-1995 [S2011], Data Compression Algorithm – Adaptive Coding with Embedded Dictionary (DCLZ Algorithm) for Information Interchange

Specifies a lossless compression algorithm to reduce the number of bits required to represent information coded by means of 8-bit bytes. This algorithm is known as DCLZ, which stands for Data Compression according to Lempel and Ziv. (See annex C for reference).

INCITS 224-1994 [S2008], Extended Tape Format for Information Interchange, (18-Track, Parallel, 12.65 mm (0.50 in), 1491 cpmn (37 871 cpi), Group-Coded Recording)

Provides the requirements for a tape format to be used for information interchange of processed or unprocessed data between information processing systems, communication systems, and associated equipment using standard code as agreed upon by the interchange parties. This standard deals solely with the requirements for recording, with provision made for using a processing algorithm, on magnetic tape. From: NCITS Storefront: http://www.csisinfo.com/cgi-bin/detail?product_id=56212.

INCITS 225-1994 [S2008], Compaction Algorithm, Binary Arithmetic Coding

Provides the information necessary to ensure interchangeability of compacted data between information processing systems, communications systems, and associated equipment using standard codes as agreed upon by the interchange parties. This standard deals solely with the requirements for using the compaction algorithm.

INCITS 226-1994 [S2008], Programming Language Common Lisp

The specification set forth in this document is designed to promote the portability of Common Lisp programs among a variety of data processing systems. It is a language specification aimed at an audience of implementors and knowledgeable programmers. It is neither a tutorial nor an implementation guide.

INCITS 227-1996 [S2011], Recorded Magnetic Tape Mini-Cartridge for Information Interchange - Serial, 0.250 in (6.30 mm) 20 Tracks, 10,000 bpi (394 bpm) and 28-Track, 14 700 bpi (579 bpcm), MFM Encoded

Provides the requirements for a tape cartridge to be used for information interchange among information processing systems, communication systems and associated equipment utilizing a standard code for information interchange as agreed upon by the interchange parties.

INCITS 228-1993 [S2008], Information Systems – X.25 Data Transfer Phase (DTP) Procedures for Operation with Frame Relay

Describes X.25 Data Transfer Phase (DTP), which facilitates: (a) interworking with X.25/X.31 subnetworks; and (b) provision of the data-transfer aspects of the OSI CONS in the frame relay end points (terminals).

INCITS 229-1994 [S2008], Fiber Distributed Data Interface (FDDI) Station Management (SMT)

Provides the PICS proforma for the Fibre Distributed Data Interface (FDDI) specified in the base standards as denoted in Section 5, General Description, of this PICS.


The described Physical Layer Protocol Standard is intended for use in a high-performance multimedia network. This protocol is designed to be effective at 100 megabits per second using a token ring architecture and fiber optics or other transmission media over distances of several kilometers in extent.


Defines the CAM (Common Access Method) for SCSI (Small Computer Systems Interface). The purpose of this standard is to define a method whereby multiple environments may adopt a common procedure for the support of SCSI devices.

INCITS 234-1993 [S2008], Information Systems – Test Methods for Media Characteristics – 130-mm Rewritable Optical Disk Data Storage Cartridges with Continuous Composite Servo (CCS)

Specifies test methods for media characteristics of optical disks used for information processing systems and for information storage.

INCITS 235-1995 [S2010], Unrecorded Magnetic Tape Cartridge for Information Interchange - 0.25 (6.30 mm), 10000 -12500 ftpi, (394 - 492 ftppm) Coercivity 550 oersteds (44000 amperes/meter) (Types 6150, 6250, 6037)

Provides the information necessary to ensure mechanical and magnetic interchangeability for a tape cartridge between information processing systems, communication systems, and associated equipment. This standard provides the general requirements, definitions, physical and magnetic tape characteristics, and the cartridge requirements.
INCITS 237-1995 [S2011], Fiber Distributed Data Interface (FDDI) Low-Cost Fiber Physical Layer - Medium Dependent (LCF-PMD)

Specifies requirements for the Fibre Distributed Data Interface (FDDI) Part: Token ring low-cost fibre physical layer medium dependent (LCF-PMD). FDDI provides a high-bandwidth (100 Mbit/s), general-purpose interconnection among computers and peripheral equipment.

INCITS 238-1994 [S2008], Information Technology - Programming Language - PL/B

Specifies the form and establishes the interpretation of programs written in the PL/B programming language. The standard is designed to promote portability of PL/B programs among a variety of data processing systems. It is intended for use by implementors.

INCITS 239-1994 [S2008], FDDI - Media Access Control-2 (MAC-2)

Specifies the Media Access Control (MAC), the middle sublayer of the Data Link Layer (DLL), for Fibre Distributed Data Interface (FDDI).

INCITS 241-1994 [S2008], Data Compression Method, Adaptive Coding with Sliding Window for Information Interchange

Specifies an encoding method for the lossless compression of binary data.

INCITS 242-1994 [S2008], Magnetic Tape Cartridge for Information Interchange, .50 in (12.65 mm) Serial Serpentine, 48-Track, 42-500 bpi (1 673 bppm), DLT1 Format

Provides the requirements for a tape cartridge to be used for information interchange among information-processing systems, communications systems, and associated equipment utilizing a standard code for information interchange as agreed upon by the interchange parties. This standard deals with the requirements for the unrecorded cartridge and for recording on the enclosed magnetic tape.

INCITS 243-1996 [S2011], Serial Magnetic Tape Cartridge for Information Interchange, 26 Tracks, 0.250 in (6.35 mm), 16 000 bpi (630 bppm), Streaming Mode, Group Code Recording

Provides the requirements for a streaming 0.250 inch (6.35 mm) wide, 26-Track, magnetic tape in a cartridge to be used for information interchange between information processing systems, communication systems, and associated equipment utilizing a standard code for information interchange, as agreed upon by the interchange parties.

INCITS 244-1995 [S2010], Information Technology - Test Methods for Media Characteristics - 90 mm Read Only and Rewritable M.O. Optical Disk Data Storage Cartridges with Continuous Composite Servo (CCS)

Specifies test methods of 90mm Read Only and Rewritable M.O. Optical Disk Cartridges with CCS used for information processing systems and for information storage.

INCITS 245-1995 [S2011], Abstract Test Suite for FDDI Media Access Control Conformance Testing (FDDI MAC ATS)

Contains the abstract test suite for the Fiber Distributed Data Interface (FDDI) token ring Media Access Control (MAC) layer protocol. This test suite was developed based on the principles defined in OSI Conformance Testing Methodology and Framework (ISO INCITS 246-1994 [S2009], Information Processing Systems - Test Methods for Media Characteristics of 90mm Read Only and Rewritable M.O. Optical Disk Data Storage Cartridge with Discrete Block Format (DBF)

Specifies methods for media characteristics of optical disks used for information processing systems and for information storage (90-mm rewritable optical disk cartridges, using discrete block format (DBF).


Defines a conformance test of the PHY functions in a path through an FDDI node. Figure 1 is a functional block diagram of an FDDI path. The path contains the necessary functions to repeat (that is, decode and retransmit) frames through an FDDI path. The PHY Repeat Filter is optional when there is a MAC in the repeat path, then the function is implemented in PHY.

INCITS 249-1995 [S2010], Unrecorded Magnetic Tape Cartridge for Information Interchange, 0.25 in (6.35 mm), 10 000 - 14 700 ftpi (394 579 ftppm), Coercivity 550 oersteds (44 000 amperes/meter), (Types 2000, 2060, 2080, 2120)

Provides the information necessary to ensure mechanical and magnetic interchangeability for a tape cartridge between information processing systems, communication systems, and associated equipment. This standard provides the general requirements, definitions, physical and magnetic tape characteristics, and the cartridge requirements.

INCITS 250-1996 [S2011], Recorded Magnetic Tape Mini-Cartridge for Information Interchange, 0.250 in (630 mm)12 and 24 Track,10000 bpi (394 bppm) GCR

Provides the requirements for a tape mini cartridge to be used for information interchange among information processing systems, communication systems, and associated equipment utilizing a standard code as agreed upon by the interchange parties.

INCITS 251-1995 [S2010], Unrecorded Magnetic Tape Cartridge for Information Interchange, 0.25 in (6.35 mm), 20 000 ftpi (787 ftppm), Coercivity 550 oersteds (44 000 amperes/meter), (Types 6320, 6525, 6080, 6081)

Provides the information necessary to ensure mechanical and magnetic interchangeability for a tape cartridge between information processing systems, communication systems, and associated equipment. This standard provides the general requirements, definitions, physical and magnetic tape characteristics, and the cartridge requirements.

INCITS 255-1996 [S2011], Abstract Test Suite for FDDI Physical Medium Dependent Conformance Testing (FDDI PMD ATS)

International Standard ISO 9314-3:1990, Fibre Distributed Data Interface (FDDI) - Physical Layer Medium Dependent (PMD), specifies the requirements for theoretical input/output port of FDDI stations as well as for cable plants. The intention of ISO 9314-

INCITS 256:2007 [R2012], Radio Frequency Identification (RFID)

Establishes a technical standard for a family of compatible RFID devices, specifically, RFID devices operating in freely available international frequency bands at license-free power levels. Its purposes are as follow: Promote interoperability and compatibility between RFID devices by defining a common API and limited physical and data link layer options. Support item management applications and provide flexibility in the physical layer definitions to allow additional features for uses that value such enhancements.

INCITS 257-1997 [S2012], Information Technology - FDDI Station Management-2 Common Services (SMT-2-CS)

This standard specifies the common services portion of station management-2 (SMT-2-CS) for the Fibre Distributed Data Interface (FDDI). FDDI provides a high bandwidth (100 Mbit/s) general purpose interconnection among computers and peripheral equipment using optical fibre or copper twisted pair as the transmission medium in a ring configuration. FDDI can be configured to support a sustained transfer rate of approximately 80 Mbit/s (10 Mbyte/s). The use of dual attachment stations with dual MACs allows these rates to be doubled under the circumstance of a fault-free FDDI ring.

INCITS 258-1997 [S2012], Fibre Distributed Data Interface (FDDI) - Station Management-2 - Isochronous Services (SMT-2-IS)

This standard specifies the isochronous Services portion of Station Management-2 (SMT-2-IS) for the Fibre Distributed Data Interface (FDDI). FDDI provides a high bandwidth (100 megabits per second) general purpose interconnection among computers and peripheral equipment using optical fibre or copper twisted pair as the transmission medium in a ring configuration. FDDI can be configured to support a sustained transfer rate of approximately 80 megabits (10 megabytes) per second. The use of dual attachment stations with dual MACs allows these rates to be doubled under the circumstance of a fault-free FDDI ring.
connectivity for many nodes distributed over may not meet the response time requirements of all transfer rate of at least 80 Mbit/s (10 Mbyte/s). It FDDI can be configured to support a sustained data computers and peripheral equipment using fibre twisted pair as the transmission medium in a ring configuration. FDDI can be configured to support a sustained transfer rate of approximately 80 megabits width held inside the case on a reel. The tape shall be transported on the reel for digital recording at a physical density of 1944 ftpmm (49 378 fppi).

INCITS 261-1996 [S2011], Extended Magnetic Tape Format for Information Interchange 36-track, Parallel Serpentine, 12.65 mm (0.50 in), 1491 cpm (37 871 cpi) Group-Coded Recording Provides the requirements for a 36-track tape format to be used for information interchange of data between information processing systems, communication systems, and associated equipment using standard code as agreed upon by the interchange parties. This standard deals solely with the requirements for recording, with provision made for using a processing algorithm, on magnetic tape.

INCITS 262-1995 [S2010], Protocol Implementation Conformance Statement Proforma for FDDI (FDDI CT-PCS) Provides the PICS proforma for the Fibre Distributed Data Interface (FDDI) specified in the base standards as denoted in Section 5, General Description, of this PICS.

INCITS 263-1995 [S2010], Fiber Distributed Data interface (FDDI) Twisted Pair - Physical Medium Dependent (TP-PMD) Requirements for the Fibre Distributed Data Interface. FDDI provides a high-bandwidth (100 Mbit/s) general-purpose interconnection among computers and peripheral equipment using fibre optics and twisted pair as the transmission medium. FDDI can be configured to support a sustained data transfer rate of at least 80 Mbit/s (10 Mbyte/s). It may not meet the response time requirements of all unbuffered high-speed devices. FDDI provides connectivity for many nodes distributed over distances of several kilometers in extent. Default values for FDDI were calculated on the basis of 1 000 physical links and a total fibre path length of 200 km.

INCITS 264-1996 [S2011], Unrecorded Helical-Scan Digital Computer Tape Cartridge for Information Interchange, 19 mm (0.748 in) Type D-1 Provides the unrecorded requirements for a computer tape cartridge to be used for information interchange between information processing systems. Such a cartridge is comprised of two parts: - a case to provide protection from contaminants and human

INCITS 265-1995 [S2011], Unrecorded Magnetic Tape Cartridge for Information Interchange, 36-Track, Parallel Serpentine, Extended Length, 12.57 mm (0.495 in), 1944 ftpmm (49 378 fppi), Group-Coded Recording Provides the requirements for an unrecorded tape cartridge to be used for information interchange among information-processing systems. Such a cartridge comprises two parts: (a) a case to provide protection of the media from contaminants and human handling, and to facilitate loading and unloading of the cartridge by the drive and (b) a magnetic tape of 12.573 mm (0.495 in) width held inside the case on a reel. The tape shall be transported on the reel for digital recording at a physical density of 1944 ftpmm (49 378 fppi).

INCITS 266-1996 [S2011], Magnetic Tape Cartridge for Information Interchange, 50 in (12.65 mm), Serial Serpentine, 112-Track, 42 500 bpi (1673 bpsm) (DLT2 Format) Provides the requirements for a tape cartridge to be used for information interchange among information-processing systems, communication systems, and associated equipment utilizing a standard code for information interchange as agreed upon by the interchange parties.

INCITS 267-1996 [S2011], Helical-Scan Digital Computer Tape Cartridge, 12.65 mm (0.498 in) for Information Interchange Specifies the requirements for a helical data storage (HDS) tape cartridge to be used for information interchange among information-processing systems, communication systems and associated equipment utilizing a standard code for information interchange a.

INCITS 269-1996 [S2011], SCSI-3 Fibre Channel Protocol (FCP) This standard defines the SCSI-3 Fibre Channel Protocol (FCP). The FCP is a mapping protocol (FC-4) for applying the SCSI command set to the Fibre Channel. The FCP defines the Fibre Channel information units in accordance with the SCSI Architecture Model (ANSI X3.270-1996). The FCP additionally defines how the Fibre Channel services are used to perform the services defined by the SCSI Architecture Model.

INCITS 27-1987 [S2008], Magnetic Tape Labels and File Structure for Information Interchange This standard specifies the file structure and the labeling of magnetic tapes for the interchange of information between users of information processing systems.

INCITS 273-1997 [S2012], Information Technology - CASE Tool Integration Messages This standard includes an abstract interface to services used by CASE tools. This interface will insulate a tool that uses a service from the provider of the service. The standard focuses on: - Defining specific messages with their abstract parameters; - Message semantics; - Message sequencing (constraints on message ordering); - Messages for Computer Aided Software Engineering domain.

INCITS 274-1996 [S2008], Information Technology - Programming Language REXX Specifies the semantics and syntax of the programming language REXX by specifying requirements for a conforming language processor. The scope of this standard includes: - the syntax and constraints of the REXX language; - the semantic rules for interpreting REXX programs; - the restrictions and limitations that a conforming language processor may impose; - the semantics of configuration interfaces.

INCITS 274-1996/AM1-2000 [S2008], Information Technology - Programming Language REXX Amendment 1 Specifies the semantics and syntax of the programming language REXX by specifying requirements for a conforming language processor. The scope of this standard includes: - the syntax and constraints of the REXX language; - the semantic rules for interpreting REXX programs; - the restrictions and limitations that a conforming language processor may impose; - the semantics of configuration interfaces.

INCITS 278-1997 [S2012], Information Technology - Fibre distributed data interface (FDDI) - Physical Layer Repeater Protocol (PHY-REP) This FDDI standard specifies the Physical Layer Repeater Protocol (PHY-REP) for the upper sublayer of the FDDI Physical Layer. FDDI provides a high-bandwidth (100 Mbit/s), general-purpose interconnection among information processing systems, subsystems, and peripheral equipment, using fibre optics or other transmission media. FDDI can be configured to support a sustained data transfer rate of at least 80 Mbit/s (10 Mbyte/s). FDDI provides connectivity for many nodes distributed over distances of several kilometers in extent.

INCITS 280-1996 [S2011], Data Compression Algorithm Adaptive Lossless Data Compression (ALDC), Algorithm for Information Interchange Provides the requirements for a lossless compression algorithm to reduce the number of bytes required to represent data. The algorithm is known as the ALDC (Adaptive Lossless Data Compression) algorithm. The ALDC has been assigned ISO algorithm identifier numbers as follows: History Buffer Size 512-Byte 1024-Byte 2048-Byte Algorithm id number 3 4 5

INCITS 282-1996 [S2011], Magnetic Tape Cartridge for Information Interchange, 0.50 in (12.65 mm) Serial Serpentine, 128-Track, 62 500 bpi (2460 bpsm), DLT3 Format Provides the requirements for a tape cartridge to be used for information interchange among information-processing systems, communication systems, and associated equipment utilizing a standard code for information interchange as agreed upon by the interchange parties.
INCITS 284-2011 [R2016], Information Technology - Identification Cards - Health Care Identification Cards
This Standard describes the parameters for identification cards for health care applications in the United States.

INCITS 286-1997 [S2012], Information Technology - Abstract Test Suite for FDDI Station Management Conformance Testing (FDDI SMT ATS)
This American National Standard contains the Abstract Test Suites for the Fiber Distributed Data Interface (FDDI) token ring Station Management (SMT) layer protocol. The SMT Protocol is extensive and very complex. In the development process, the protocol was broken into six separate areas. Those areas dealt with Physical Connection Management (PCM), Entity Coordination Management (ECM) Ring Management (RMT), Configuration Management (CMT), Frame Based Management (FBM) and Management Information Base (MIB).

INCITS 29-1971 [S2010], Specifications for Properties of Unpunched Oiled Paper Perforator Tape
Defines the physical characteristics of unpunched oiled paper tape to be used in perforated tape equipment.

INCITS 293-1996 [S2011], Serial Storage Architecture - Physical Layer 1 (SSA-PH1)
Defines the physical layer of the Serial Storage Architecture (SSA). SSA defines a serial interface hierarchy to be used for purposes within its distance and performance characteristics, including, but not limited to, storage subsystems. This standard is intended to be used with an upper layer protocol (e.g., SCSI-2 Protocol (SSA-S2P)) and a transport layer (e.g., SSA Transport Layer 1 (SSA-TL1)). A major goal of the SSA-PH1 standard is to define a physical layer acceptable to device vendors, looking for an evolution from parallel SCSI, and systems designers looking for opportunities to more fully exploit the capabilities inherent to a serial bus.

Describes an upper-level protocol of Serial I/O Subsystem. SSA-S2P is a mapping of the existing SCSI-2 protocol, described in American National Standard for Information Systems - Small Computer Systems Interface-2 (SCSI-2), ANSI X3.131-1994 (R1999), with extensions to map SCSI-2 to the SSA serial link.

INCITS 295-1996 [S2011], Serial Storage Architecture - Transport Layer-1 (SSA-TL1)
Defines the transport layer of the Serial Storage Architecture (SSA). SSA defines a serial interface hierarchy to be used for purposes within its distance and performance characteristics, including, but not limited to, storage subsystems. This standard is intended to be used with an upper layer protocol (e.g., SCSI-2 Protocol (SSA-S2P)) and a physical layer (e.g., SSA Physical Layer 1 (SSA-PH1)). A major goal of the SSA-TL1 standard is to define a transport layer acceptable to vendors, looking for an evolution from parallel SCSI, and systems designers looking for opportunities to more fully exploit the capabilities inherent to a serial bus.

INCITS 296-1997 [S2012], Information technology - Single Byte Command Code Sets CONNection (SBCON)
SBCON describes an input/output (I/O) and interconnection architecture. SBCON specifies fiber optic links, switched point-to-point topology, and I/O protocols for high bandwidth, high performance and long distance information exchange.

INCITS 30:1997 [R2013], Representation of Calendar Date and Ordinal Date for Information Interchange
The scope is limited to the representation of calendar date for interchange among data systems; it does not describe how the date is determined.

INCITS 300-1997 [S2012], Information technology - High-Performance Parallel Interface - Serial Specification (HIPPI-Serial)
This American National Standard specifies a physical-level interface for transmitting digital data at 800 Mbit/s or 1600 Mbit/s serially over fiber-optic cables across distances of up to 10 km. The signalling sequences and protocol used are compatible with HIPPI-PH, ANSI X3.183-1991, which is limited to 25 m distances. HIPPI-Serial may be integrated as a host's native interface, or used as an external extender for HIPPI-PH ports.

INCITS 302-1998 [S2013], Information technology - SCSI-3 Parallel Interface - 2 (SPI-2)
This standard defines the mechanical, electrical, timing, and protocol requirements of the SCSI parallel interface to allow conforming devices to interoperate. The SCSI parallel interface is a local I/O bus that may be operated over a wide range of transfer rates.

INCITS 303-1998 [S2013], Fibre Channel Physical and Signaling Interface-3 (FC-PH-3)
FC-PH-3 describes the enhancement to ANSI X3.230, FC-PH and to the ANSI X3.297, FCPH-2 and is an addendum to the FC-PH and FC-PH-2 documents.

INCITS 305:1998 [R2013], Information technology - SCSI Enclosure Services (SES)
The SCSI Enclosure Services (SES) command set documents the commands and parameters necessary to manage and sense the state of the power supplies, cooling devices, displays, indicators, individual drives, and other non-SCSI elements installed in an enclosure. The command set uses the SCSI SEND DIAGNOSTIC and RECEIVE DIAGNOSTIC RESULTS commands to obtain configuration information for the enclosure and to set and sense standard bits for each type of element that may be installed in the enclosure.

INCITS 305:1998/AM1:2000 [R2013], Information technology - SCSI - Enclosure Services (SES) - Am 1
This is the amendment to INCITS 305-1998[R2008]

INCITS 306:1998 [R2013], Information technology - SCSI-3 Block Commands (SBC)
This standard defines the command set extensions to facilitate operation of SCSI block devices. The clause (s) of this standard pertaining to the SCSI block device class, implemented in conjunction with the applicable clauses of the ANSI NCITS 301-1999 SCSI-3 Primary Commands (SPC), fully specify the standard command set for SCSI block devices.

INCITS 307-1997 [S2012], Information Technology - Serial Storage Architecture - Physical Layer 2 (SSA-PH2)
The SSA-PH2 standard (ANSI NCITS 307-1997) defines a physical layer that supports the SSA transport layer 2 (ANSI NCITS 308-1997), and any protocols supported by SSA-TL2 (ANSI NCITS 308-1997). The goals of SSA-PH2 (ANSI NCITS 307-1997) are: a) extending the cable distance; b) copper cable operation at 40 Mbit/s; c) full duplex operation to achieve an aggregate 80 Mbit/s between two ports; and d) other capabilities that fit within the scope of SSA-PH2 (ANSI NCITS 307-1997) that may be proposed during the development phase by the participants in the project.

INCITS 308:1997 [S2012], Information Technology - Serial Storage Architecture - Transport Layer 2 (SSA-TL2)
This document defines a transport layer of the Serial Storage Architecture (SSA) that runs SSA-S2P and SSA-S3P while running on SSA-PH2. The goals of SSA-TL2 are: a) provide an Extended Distance Option; b) provide support for higher data rates in the physical layer 2 (SSA-PH2); c) enhance packet formats and addressing methods; d) define a transport layer acceptable to vendors looking for an evolution from parallel SCSI and systems designers looking for opportunities to more fully exploit the capabilities inherent to a serial bus; etc.
This document defines a protocol layer of the Serial Storage Architecture (SSA) that runs on SSA-TL2 while running on SSA-PH2. The goals of SSA-53P are: a) map the SAM services and terminology to SSA; b) define the data field format of the SSA-53P SMs; c) support for dual port and alternate pathing; d) provide support for auto-sense; e) provide support for third-party operations; f) other capabilities that fit within the scope of SSA-53P that may be proposed during the development phase by the participants in the project.

INCITS 31-2009 [R2014], Information technology - Codes for the Identification of Counties and Equivalent Areas of the United States, Puerto Rico, and the Insular Areas
This standard establishes a structure for the assignment of identifying codes to counties and county equivalents of the United States and its insular and associated areas, for the purpose of information interchange among data processing systems.

INCITS 310:1998 [R2013], Information Technology - Representation of Time for Information Interchange
Presents representation of time for interchange among data systems; it does not describe how time is determined.

INCITS 311:1998 [S2013], Magnetic Tape Format for Information Interchange, 128-Track, Parallel Serpentine, 12.65 mm (1/2 in), 3400 bpm (86 360 bpi) Run Length Limited Recording
Provides the requirements for a 128-track tape format to be used for information interchange of data between information processing systems, communication systems, and associated equipment using standard code as agreed upon by the interchange parties. Deals solely with the requirements for recording, with provision made for using a processing algorithm, on magnetic tape.

INCITS 312:1998 [S2013], Magnetic Tape Cartridge 0.50 in (12.65 mm), Serial Serpentine, 112-Track, 81 600 bpi (3213 bppm), DLT4 Format
Provides the requirements for a tape cartridge to be used for information interchange among information-processing systems, communication systems, and associated equipment utilizing a standard code for information interchange as agreed upon by the interchange parties. Deals with the requirements for the unrecorded cartridge and for recording on the enclosed magnetic tape.

INCITS 314-1998 [S2013], Information technology - SCSI-3 Medium Changer Commands (SMC)
This standard defines the command set extensions for operation of SCSI medium changer devices, and command set extensions that allow medium changer functions in other types of SCSI devices.

INCITS 315:1998 [S2013], Unrecorded magnetic tape cartridge for information interchange, 12.65 mm (0.498 in), 128-track, parallel serpentine, 2550 fpm (64 770 fpi)
Provides the requirements for an unrecorded tape cartridge to be used for information interchange among information-processing systems. Such a cartridge comprises two parts: a) to provide protection of the media and contaminants and human handling, and to facilitate loading and unloading of the cartridge by the drive; b) a magnetic tape of 12.65 mm (0.498 in) width held inside the case on a reel.

INCITS 318-1998 [S2013], Information technology - SCSI Controller Commands - 2 (SCC-2)
This standard defines the command set extensions to facilitate operation of SCSI storage array devices. Clauses of this standard pertaining to the SCSI storage array device class, implemented in conjunction with the applicable clauses within any of the SCSI command standards, shall specify the standard command set available for SCSI storage arrays.

INCITS 319-1998 [S2012], Information Technology - Programming Languages - Smalltalk
This is a standard for the Smalltalk language such that: 1. working only from the standard, a conforming implementation can be produced, 2. Smalltalk programs which conform to the standard will have the same execution semantics on any conforming implementation, and 3. the standard shall be sufficiently complete to allow useful Smalltalk programs to be constructed.

INCITS 320:1998 [R2013], Information technology - Spatial Data Transfer
The standard will provide a common mechanism for transferring digital spatial data among different systems, for sharing and integrating data from many diverse sources.

INCITS 322-2015, Information technology - Card Durability Test Methods
This American National Standard describes Test Methods for the evaluation of identification (ID) card durability. An ID card is defined as a card identifying its holder and issuer which may carry data required as input for the intended use of the card.

This American National Standard specifies a physical-level, point-to-point, full-duplex, link interface for reliable, flow-controlled, transmission of user data at 6400 Mbit/s, per direction, across distances of up to 1 km. A parallel copper cable interface for distances of up to 40 m is specified. Connections to a separate longer-distance optical interface are provided. Small fixed-size micropackets provide an efficient, low-latency, structure for small transfers, and a component for large transfers.

INCITS 323-1998/AM 1-2001 [S2016], Information Technology - High-Performance Parallel Interface - 6400 Mbit/s Physical Layer (HIPPI -6400-PH) - Amendment 1
S2016
Provides the requirements for a tape cartridge to be used for information interchange among information processing systems.

INCITS 325-1998 [S2013], Information technology - SCSI-3 Serial Bus Protocol 2 (SBP-2)
This standard defines a protocol for the transport of commands and data over High Performance Serial Bus, as specified by ANSI/IEEE 1394. The transport protocol, Serial Bus Protocol 2 or SBP-2, requires implementations to conform to the requirements of the aforementioned standard as well as to ISO/IEC 13213:1994, Control and Status Register (CSR) Architecture for Microcomputer Buses, and permits the exchange of commands, data and status between initiators and targets connected to Serial Bus.

INCITS 328-2000 [S2015], Information Technology - 19 mm DD-2 Helical Scan Digital Computer Tape Cassette for Information Interchange
Presents the requirements for DD-2 digital data storage cassettes to be used for information interchange between information processing systems.

INCITS 329-2000 [S2015], Magnetic Tape Cartridge for Information Interchange, 0.50 in (12.65 mm), Serial Serpentine, 208-Track, 85 940 bpi (3383 bppm), DLT5 Format
Provides the requirements for a tape cartridge to be used for information interchange among information-processing systems, communication systems, and associated equipment utilizing a standard code for information interchange as agreed upon by the interchange.

INCITS 330-2000 [S2015], Information technology - Reduced Block Commands (RBC)
This standard defines a Reduced Block Command set for logical block devices. The Reduced Block Commands along with the required SPC-2 commands and their restrictions described in this standard, fully specify the complete command set for RBC logical block devices.

INCITS 330:2000/AM1:2003 [R2013], Information technology - SCSI - Reduced Block Command Set (RBC) - Am 1
This is the amendment to INCITS 330:2000
INCITS 332-1999 [S2014], Information technology - Fibre Channel Arbitrated Loop (FC-AL-2)
This American National Standard for FC-AL specifies signaling interface enhancements for ANSI X3, FC-PH-x to allow L_Ports to operate with an Arbitrated Loop topology. This standard defines L_Ports that retain the functionality of Ports as specified in ANSI X3, FC-PH-x. The Arbitrated Loop topology attaches multiple communicating points in a Loop without requiring switches.

INCITS 332-1999/AM 2-2006 [S2016], Information technology - Fibre Channel Arbitrated Loop 2nd Generation (FC-AL-2) - Amendment 2
Amendment 2 to INCITS 332-1999

INCITS 332-1999/AM1:2003 [S2013], Information technology - Fibre Channel Arbitrated Loop (FC-AL) - Amendment 1
This is the amendment to INCITS 332:1999

INCITS 333-2000 [S2015], Information technology - SCSI Multi-Media Commands - 2 (MMC-2)
This standard defines a multimedia command set extensions for Device Type 5 devices. The commands specified within this standard define standard access and control to those Features of the device that are used in multimedia applications. The SPC command set and these extensions are transport independent and may be implemented across a wide variety of environments for that a SCSI command mapping and delivery vehicle has been defined. To date these include Fibre Channel, SCSI Parallel Interface, High Performance Serial Bus, Serial Storage Architecture, and ATA/ATAPI. The objective of this command set is to provide for the following: 1) A definition of the command formats and functions independent of delivery, protocol/signaling or transport mechanism. Architectural constraints regarding command functions, over the various transports, are addressed in the document specific to the physical transport. 2) Standardized access to common Features of SCSI devices employed in multimedia applications. 3) System software/firmware independence across device classes. Thus, different tape drives, optical media drives, and other devices can be added to the system without requiring modifications to generic system hardware and software. Provision is made for the addition of special Features and functions through the use of vendor-specific options. Reserved Opcodes are provided for future standardization. 4) To provide compatibility such that properly conforming SCSI-2 devices may inter-operate with subsequent devices given that the system engineering is correctly done. SCSI protocol extensions are designed to be permissive of rejections by conforming SCSI-2 devices and thus allow the SCSI-2 device to remain backward-compatible.

INCITS 334-2000 [S2015], Information Technology - Magnetic Tape Cartridge for Information Interchange - 0.50 in (12.65 mm), Serial Serpentine 128-Track, 62 500 BPI (2 460 BPPM) DLT 3-XT Format
Specifies the physical and magnetic characteristics of a 0.5-in (12.65-mm)-wide 128-track magnetic tape cartridge, to enable physical interchange of such cartridges. It also specifies the quality of the recorded signals, a format - called Digital Linear Tape 3 Extended (DLT 3-XT) - and a recording method, thereby allowing data interchange between drives. The use of a labeling standard such as American National Standard for Information Technology - File Structure and Labelling of Magnetic Tapes for Information Interchange, ANSI X3.27-1987 (R1998), will support data interchange between data processing systems.

INCITS 335-2000 [R2015], Information technology - Small Computer System Interface (SCSI-3) Stream Commands (SSC)
This standard defines the command set extensions to facilitate operation of SCSI stream devices. The classes of this standard, implemented in conjunction with the applicable classes of the SCSI Primary Commands – 2 standard, fully specify the standard command set for the SCSI stream device class. The objectives of the SCSI-3 Stream Commands standard (SSC) is to provide the following: a) Permit an application client to communicate over a SCSI service delivery subsystem, with a logical unit that declares itself to be a sequential access device or printer device in the device type field of the INQUIRY command response data; b) define commands unique to each type of SCSI stream device; c) define commands to manage the operation of SCSI stream devices; and d) define the differences between the types of SCSI stream devices.

INCITS 337-2000 [S2015], Information technology - Scheduled Transfer Protocol (ST)
Specifies a connection-oriented data transfer protocol supporting flow-controlled Read and Write sequences and non-flow-controlled, persistent-memory Put, Get and FetchOp sequences. For all sequences, small control messages are used to preallocate buffers at the data destination before the data movement begins, thus allowing the data to be moved immediately from the physical network into the end device’s memory. The control and data messages may use different physical media or may share a single physical medium. Procedures are provided for moving data over HIPPI, Ethernet, and other media.

INCITS 338:2003 [S2013], IT - High-Performance Parallel Interface - 6400 Mbit/s Optical Specifications (HIPPI-6400-OPT)
This American National Standard specifies a media-level, point-to-point, 12-channel, full-duplex, electrical/optical interface, with each channel operating at 500 Mbit/s or 1 Gbit/s. Multimode (MM) fiber cables, and single-mode (SM) fiber cables, are used for distances up to 1 km when carrying the HIPPI-6400-PH protocol. Differential signals are used on the electrical side.

INCITS 34-1972 [S2010], Interchange Rolls of Perforated Tape for Information Interchange
Describes conventions for rolled-up, perforated tapes which are used for the interchange of information. This standard defines and applies to interchange rolls of tape not contained on reels, it does not preclude the interchange of tapes wound on take-up reels.

INCITS 340-2000 [R2015], Information technology - AT Attachment with Packet Interface - 5
This standard specifies the AT Attachment Interface between host systems and storage devices. It provides a common attachment interface for systems manufacturers, system integrators, software suppliers, and suppliers of intelligent storage devices. The application environment for the AT Attachment Interface is any host system that has storage devices contained within the processor enclosure. This standard defines the connectors and cables for physical interconnection between host and storage device, as well as the electrical and logical characteristics of the interconnecting signals. It also defines the operational registers within the storage device, and the commands and protocols for the operation of the storage device. This standard maintains a high degree of compatibility with the AT Attachment with Packet Interface Extensions standard (ATA/ATAPI-4), INCITS 317, and while providing additional functions, is not intended to require changes to presently installed devices or existing software.

INCITS 341:2000 [S2015], Information technology - 25.4 mm (1 in) Type DCRsi Recorded Instrumentation - Digital Cartridge Tape Format
This standard establishes the format of information on 25.4 mm (1 in) type DCRsi instrumentation digital cartridges. It specifies the dimensions and locations of the transverse scan data and pilot tone track, the control track and the longitudinal data track. It defines the formatting, randomizing, ECC, and other recording requirements of the data blocks forming the transverse data record, containing user data and other associated data and specifies the content, format, and recording method for the control track to ensure that a compliant recorder will be able to reproduce the recorded tape. This standard also specifies the recording requirements for the longitudinal records contained in the longitudinal data tracks. Additionally this standard specifies the prerecorded and post-recording zones of the transverse scan tracks and the longitudinal data track. The physical requirements, magnetic requirements and test methods for the magnetic tape and tape cartridge are also specified in this standard. All dimensions given are metric with their corresponding U.S. customary engineering units (similar to British Imperial units) shown in parentheses.
INCITS 344-2001 [S2011], Information Technology - 12.65 mm wide Magnetic Tape Format for Information Interchange - Helical Scan Recording - Recorded Instrumentation Format

Represents the minimum requirements for 12.65 mm (0.50 in) digital data storage cassettes for instrumentation systems and associated data analysis equipment. The physical requirements, magnetic requirements, and test methods for the magnetic tape and tape cassette are specified in ISO/IEC CD 15204. This proposed standard is for a recording format supported by the referenced standard.

INCITS 345-2001 [S2011], Magnetic Tape Cartridge for Information Interchange, 0.5 in (12.65 mm) Serial Serpentine, 208-Track, 98 250 BPI (3868 BPM), DLT 6 Format

Represents the minimal environmental, mechanical and magnetic requirements for a 40 Gigabytes user data 0.5 in cartridge for data interchange between systems. It also describes the format, DLT 6 used in the recorded portion of the media.


This standard defines a second version of the SCSI Fibre Channel Protocol (FCP). This standard is a mapping protocol for applying the SCSI command set to Fibre Channel. This standard defines how the Fibre Channel services and the defined Information Units (IUs) are used to perform the services defined by the SCSI-3 Architecture Model - 2 (SAM-2). This second version includes additions and clarifications to the first version, removes information that is now contained in other standards, and describes additional error recovery capabilities for the Fibre Channel protocol.

INCITS 356-2002 [S2012], Information technology - Fibre Channel Audio-Video (FC-AV)

This American National Standard specifies the transport of digital Audio and Video formats over Fibre Channel.

INCITS 357-2002 [S2012], Information technology - Fibre Channel Virtual Interface Architecture Mapping Protocol (FC-VI)

This standard defines the Fibre Channel mapping protocol for the Virtual Interface (VI) Architecture (FC-VI). FC-VI defines the Fibre Channel Information Units in accordance with the VI Architecture model. FC-VI additionally defines how Fibre Channel services are used to perform the services required by the VI Architecture model of its network transport.

INCITS 358:2002 [R2012], Information technology - BioAPI Specification

Defines the Application Programming Interface and Service Provider Interface for a standard biometric technology interface. It is beyond the scope of this specification to define security requirements for biometric applications and service providers, although some related information is included by way of explanation of how the API is intended to support good security practices.


This Amendment to INCITS 358 adds support for biometric fusion to the standard and extends the API and the SPI of BioAPI by specifying new functions and new values for existing data types.

INCITS 359-2012, Information Technology - Role Based Access Control

The RBAC Reference Model defines sets of basic RBAC elements (i.e., users, roles, permissions, operations and objects) and relations as types and functions that are included in this standard.

INCITS 360:2002 [R2012], Information Technology - SCSI Multimedia Commands - 3 (MMC-3)

This standard defines multimedia command set extensions for Device Type 5 devices. The commands specified within this standard define standard access and control to those Features of the device that are used in multimedia applications. The SPC and these extensions are transport independent and may be implemented across a wide variety of environments for which a SCSI transport protocol has been defined. To date these include Fibre Channel, SCSI Parallel Interface, High Performance Serial Bus (IEEE 1394), Serial Storage Architecture, and ATA/ATAPI.

INCITS 361:2002 [R2012], Information technology - AT Attachment with Packet Interface-6 (ATA/ATAPI-6)

This standard specifies the AT Attachment Interface between host systems and storage devices. It provides a common attachment interface for systems manufacturers, system integrators, software suppliers, and suppliers of intelligent storage devices.


This standard specifies the AT Attachment Interface betweenhost systems and storage devices. It provides a common attachment interface for systems manufacturers, system integrators, software suppliers, and suppliers of intelligent storage devices. In this erratum, pages 65-66A and 341-343 are reprinted with corrections.

INCITS 364:2003 [S2014], Information technology - Fibre Channel - 10 Gigabit (10GFC)

10GFC describes signaling and physical requirements that may be utilized by the FC-2 level to transport data at a rate in excess of 10 gigabits per second. The Fibre Channel signaling and physical requirements described in this document are: - Link Architecture including retiming - clause 5; - Physical Layer specifications - clause 6; - Connector performance specifications - clause 7; - Link and cable plant management specifications - clause 8; - FC-1 data path interface - clause 9; - Optional interconnect interfaces clauses 10, 11, and 14; - Transmission Coding - clauses 12 and 13; - Management interface and register set - clause 15

INCITS 364:2003/AM1:2007 [R2012], Information technology - Fibre Channel - 10 Gigabit - Amendment 1 (10GFC/AM1)

This amendment to ANSI INCITS 364-2002, Information Technology - Fibre Channel - 10 Gigabit, corrects the definition of the clock synchronization primitives to comply with ANSI INCITS 424-2007, Information Technology - Fibre Channel - Framing and Signaling - 2.

INCITS 365:2002 [R2012], Information Technology - SCSI RDMA Protocol (SRP)

This standard defines the rules for exchanging information between SCSI devices using an RDMA communication service. Other SCSI transport protocol standards define the rules for exchanging information between SCSI devices using other interconnects.

INCITS 366:2003 [R2013], Information technology - SCSI Architecture Model-2 (SAM-2)

The set of SCSI (Small Computer System Interface) standards consists of this standard and the SCSI implementation standards described in 1.3. This standard defines a reference model that specifies common behaviors for SCSI devices, and an abstract structure that is generic to all SCSI I/O system implementations.

INCITS 367:2003 [R2013], SCSI Parallel Interface - 5 (SPI-5)

This standard defines the mechanical, electrical, timing, and protocol requirements of the SCSI parallel interface to allow conforming SCSI devices to interoperate. The SCSI parallel interface is a local I/O bus that may be operated over a wide range of transfer rates.

INCITS 368:2003 [R2013], Information technology - SCSI Passive Interconnect Performance (PIP)

In the past only the performance requirements for uniform bulk cable (called “media” in earlier standards) have been specified in SCSI standards. Since bulk cable provides only part of the electrical path in a SCSI bus segment, the performance requirements of the interconnect comprising the path is incomplete if only bulk cable is considered. This document expands the coverage to the complete assembled interconnect including connectors, uniform bulk cable, and non-uniform bulk cable. A syntax and framework is described for all types of passive interconnect.

INCITS 369:2003 [R2013], Information technology - SCSI Signal Modeling (SSM-2)

This Standard establishes a common methodology for SCSI system signal modeling. Using this methodology, SCSI systems may be modeled accurately and consistently. This Standard establishes the requirements for the exchange of signal performance information between component suppliers, system integrators, and those carrying-out simulations. This Standard defines the acceptable methods for extracting the electrical and signal performance attributes of the constituent parts of a SCSI bus segment. This Standard establishes the acceptable methods for modeling these parts.
INCITS 37:1999 [S2014], Information Technology - Programming Language APT: Processor Input Language and System-Neutral CLFILE

This standard establishes the form for and the interpretation of programs expressed in the Automatically Programmed Tools (APT) language and of the System-Neutral CLFILE (SCL), which can be generated by processors, such as APT, or by graphical systems. The purpose is to promote portability of these input language programs to a wide variety of computers.

INCITS 370-2004 [R2014], Information technology - ATA/ATAPI Host Adapters Standard (ATA - Adapter)

This standard specifies the AT Attachment Interface between host systems using Automatic Direct Memory Access (ADMA) and storage devices. It provides a common link layer interface for systems manufacturers, system integrators, and software suppliers.

INCITS 377-2009 [R2014], Information technology - Finger Pattern Data Interchange Format

This is the revised version of Finger Pattern Data Interchange Format, ANSI INCITS 377-2004. This standard specifies an interchange format for the exchange of fingerprint recognition data. It describes the conversion of a raw fingerprint image to a cropped and down-sampled finger pattern followed by the cellular representation of the fingerprint pattern image to create the finger-pattern interchange data.

INCITS 382-2004 [R2013], Information technology - SCSI Media Changer Command Set (SMC-2)

This standard defines the command set extensions for operation of SCSI media changer devices, and command set extensions that allow media changer functions in other types of SCSI devices.

INCITS 383-2008 [R2013], Information Technology - Biometric Profile - Interoperability and Data Interchange - Biometrics Based Verification and Identification of Transportation Workers

 Specifies the application profile in support of identification and verification of transportation workers, through the use of Biometric data collected during enrollment, at local access points (i.e., doors or other controlled entrances) and across local boundaries within the defined area of control.

INCITS 385-2004 [R2014], Information technology - Face Recognition Format for Data Interchange

This standard specifies definitions of photographic (environment, subject pose, focus, etc.) properties, digital image attributes and a face interchange format for relevant applications, including human examination and computer automated face recognition.

INCITS 374:2003/AM1:2007 [R2012], Information technology - Single-Byte Command Set - 3 (FC-SB-3) - Amendment 1 (FC-SB-3/AM1)

This amendment to ANSI INCITS 374:2003, Information Technology - Fibre Channel - Single-Byte Command Set-3 (FC-SB-3), describes persistent IU pacing, a method for allowing an FC-SB-3 channel to retain a pacing count that can be used at the start of execution of a channel program. This may improve performance of long I/O programs at higher link speeds and long distances by allowing the Channel to send more IUs to the control unit and eliminating the delay of waiting for the first Command Response.

INCITS 375:2004 [R2013], Information technology - Serial Bus Protocol 3 (SBP-3)


INCITS 380-2009 [R2014], Information technology - Finger Image Based Data Interchange Format

This standard specifies a data record interchange format for storing, recording, and transmitting the information from one or more fingerprint or palm image areas. An amendment to this standard is currently in process.

INCITS 381-2009/AM 1:2011 [R2016], Information technology - Finger Image Based Data Interchange Format - Amendment 1

Amendment 1 to INCITS 381:2009.


This National Standard defines an API specification that serves as a boundary across which application software uses facilities of programming languages to invoke the services of the RTLS Air Interface Protocol standard as defined by INCITS T20.

INCITS 374:2003 [S2013], Information technology - Fibre Channel Single - Byte Command Set-3 (FC-SB-3)

This document describes a communication interface between a channel and I/O control units that utilize the Single-Byte Command Code Sets (SBCCS) as implemented in a wide range of data processing systems. It employs information formats and signaling protocols that provide a uniform means for communicating with various types of I/O control units, facilitating a high bandwidth, high performance, and long distance information exchange environment.

INCITS 374:2003/AM1:2007 [R2012], Information technology - Single-Byte Command Set - 3 (FC-SB-3) - Amendment 1 (FC-SB-3/AM1)

This amendment to ANSI INCITS 374:2003, Information Technology - Fibre Channel - Single-Byte Command Set-3 (FC-SB-3), describes persistent IU pacing, a method for allowing an FC-SB-3 channel to retain a pacing count that can be used at the start of execution of a channel program. This may improve performance of long I/O programs at higher link speeds and long distances by allowing the Channel to send more IUs to the control unit and eliminating the delay of waiting for the first Command Response.

INCITS 375:2004 [R2013], Information technology - Serial Bus Protocol 3 (SBP-3)


INCITS 377-2009 [R2014], Information technology - Finger Pattern Data Interchange Format

This is the revised version of Finger Pattern Data Interchange Format, ANSI INCITS 377-2004. This standard specifies an interchange format for the exchange of pattern-based fingerprint recognition data. It describes the conversion of a raw fingerprint image to a cropped and down-sampled finger pattern followed by the cellular representation of the fingerprint pattern image to create the finger-pattern interchange data.

INCITS 378-2009 [R2014], Information Technology - Finger Minutiae Format for Data Interchange

This Standard specifies a concept and data format for representation of fingerprints using the fundamental notion of minutiae. The data format is generic, in that it may be applied and used in a wide range of application areas where automated fingerprint recognition is involved. No application-specific requirements or features are addressed in this standard. The Standard contains definitions of relevant terms, a description of where minutiae shall be defined, a data format for containing the data, and conformance information. An amendment to this standard is currently in process.

INCITS 378:2009/AM 1:2010 [R2015], Information Technology - Finger Minutiae Format for Data Interchange - Amendment 1

Amendment 1 to INCITS 378:2009

INCITS 380:2003 [R2013], Information technology - SCSI Stream Commands - 2 (SSC-2)

This standard defines the command set extensions to facilitate operation of the sequential-access device type member of the SCSI stream device class. The clauses of this standard, implemented in conjunction with the applicable clauses of the SCSI Primary Commands - 3 standard, fully specify the standard command set for the sequential-access device type member of the SCSI stream device class.

INCITS 381-2009 [R2014], Information technology - Finger Image Based Data Interchange Format

This standard specifies a data record interchange format for storing, recording, and transmitting the information from one or more fingerprint or palm image areas. An amendment to this standard is currently in process.

INCITS 381-2009/AM 1:2011 [R2016], Information technology - Finger Image Based Data Interchange Format - Amendment 1

Amendment 1 to INCITS 381:2009.

INCITS 382-2004 [R2013], Information technology - SCSI Media Changer Command Set (SMC-2)

This standard defines the command set extensions for operation of SCSI media changer devices, and command set extensions that allow media changer functions in other types of SCSI devices.

INCITS 383-2008 [R2013], Information Technology - Biometric Profile - Interoperability and Data Interchange - Biometrics Based Verification and Identification of Transportation Workers

Specifies the application profile in support of identification and verification of transportation workers, through the use of Biometric data collected during enrollment, at local access points (i.e., doors or other controlled entrances) and across local boundaries within the defined area of control.

INCITS 385-2004 [R2014], Information technology - Face Recognition Format for Data Interchange

This standard specifies definitions of photographic (environment, subject pose, focus, etc.) properties, digital image attributes and a face interchange format for relevant applications, including human examination and computer automated face recognition.

INCITS 374:2003/AM1:2007 [R2012], Information technology - Single-Byte Command Set - 3 (FC-SB-3) - Amendment 1 (FC-SB-3/AM1)

This amendment to ANSI INCITS 374:2003, Information Technology - Fibre Channel - Single-Byte Command Set-3 (FC-SB-3), describes persistent IU pacing, a method for allowing an FC-SB-3 channel to retain a pacing count that can be used at the start of execution of a channel program. This may improve performance of long I/O programs at higher link speeds and long distances by allowing the Channel to send more IUs to the control unit and eliminating the delay of waiting for the first Command Response.
A standard application programming interface (API) defines a scope within which, and a grammar by which, it is possible to write application software without attention to vendor-specific infrastructure behavior. The Fibre Channel HBA API standard specifies a standard API, the scope of which is management of Fibre Channel host bus adapters (HBAs) and use of certain Fibre Channel facilities for discovery and management of the components of a Fibre Channel Storage Area Network (SAN).

INCITS 39-1986 [S2007], Recorded Magnetic Tape for Information Interchange (1600 CPI, PE)
This standard provides specifications for format and recording for a 1/2 inch (12.7-mm), 9-track magnetic tape to be used for information interchange among information processing systems, communication systems, and associated equipment utilizing a code for information interchange that was agreed upon by the interchange parties.

INCITS 397-2005 (R2015), Information technology - AT Attachment with Packet Interface-7 (ATA/ATAPI-7)
This standard specifies the AT Attachment Interface between host systems and storage devices. It provides a common attachment interface for systems manufacturers, system integrators, software suppliers, and suppliers of intelligent storage devices.

INCITS 397:2005/AM1:2007 [R2012], Information technology - AT Attachment with Packet Interface-7 Amendment 1 (ATA/ATAPI-7/AM1)
This is the first Amendment to INCITS 397-2005 that specifies the AT Attachment Interface between host systems and storage devices. It provides a common attachment interface for systems manufacturers, system integrators, software suppliers, and suppliers of intelligent storage devices.

INCITS 398:2008 [R2013], Information technology - Common Biometric Exchange Formats Framework (CBEFF)
This standard (revision of ANSI INCITS 398-2005) specifies a common set of data elements necessary to support multiple biometric technologies and to promote interoperability of biometric-based application programs and systems by allowing for biometric data exchange. These common data elements can be placed in a single file, re-coded, or data object used to exchange biometric information between different system components and applications. This standard specifies the biometric data elements.

INCITS 399-2004 [S2014], Information technology - Fibre Channel Switch Application Programming Interface (FC-SWAPI)
A standard application programming interface (API) defines a scope within which, and a grammar by which, it is possible to write application software without attention to vendor-specific infrastructure behavior. This standard specifies a standard API, the scope of which is management of Fibre Channel Switches and exercise of certain Fibre Channel facilities for discovery and management of the components of a Fibre Channel Storage Area Network (SAN).

INCITS 4:1986 [R2012], Information Systems - Coded Character Sets - 7-Bit Standard Code for Information Interchange (7-Bit ASCII)
Details information interchange among information processing systems, communication systems, and associated equipment. Specifies a set of 128 characters (control characters and graphics characters such as letters, digits, and symbols) with their coded representation.

INCITS 40-1993 [S2008], Information Systems – Unrecorded Magnetic Tape for Information Interchange (9-track 800 CPI, NRZI; 1600 CPI, PE; and 6250 CPI, GCR)
This standard provides the information necessary to enable mechanical and magnetic interchangeability for reels of 1/2-inch-wide unrecorded magnetic tape between information processing systems, communication systems, and associated equipment utilizing American National Standard for Information systems - Coded character sets - 7-bit American national standard code for information interchange (7-bit ASCII), ANSI X3.4-1986, and amendments thereto. This standard deals solely with magnetic tape for digital recording and supports and complements American National Standards on recorded magnetic tape for information interchange.

INCITS 401-2005 [S2015], Information technology - SCSI Multimedia Commands - 4 (MMC-4)
This standard defines a set of SCSI command descriptor blocks that are useful in accessing and controlling devices with a peripheral device type set to 5. This command set is transport independent and may be implemented across a wide variety of environments for which a SCSI transport protocol has been defined. To date, these include Parallel SCSI, ATA/ATAPI, Serial ATA, Universal Serial Bus (USB versions 1.1 and 2.0), and High Performance Serial Bus (IEEE 1394, 1394A, and 1394B). The command set described has been selected for correct operation when the physical interface is ATA with the ATAPI command protocol. Although some commands are also described in the SPC-3, the descriptions are also in this standard for the purpose of profiling mandatory and optional command features as applied to multimedia devices. The objective of this command set is to provide for the following: A definition of the command formats and functions independent of delivery, protocol/signaling or transport mechanism. Architectural constraints regarding command functions, over the various transports, are addressed in the document specific to the physical transport. -Standardized access to common features of devices employed in multimedia applications. -System software/firmware independence across device classes and physical interfaces. Provision is made for the addition of special features and functions through the use of vendor specific options. -Compatibility such that properly conforming devices may interoperate with subsequent devices.

INCITS 403-2005 [R2015], Information technology - Automation/Drive Interface - Commands (ADC)
This standard defines the model and command set extensions to facilitate operation of automation/drive interface devices. The clauses of this standard, implemented in conjunction with the applicable clauses of SPC-2 and SPC-3, fully specify the standard command set for automation/drive interface devices. The objective of this standard is to provide the following: a) Permit an application client to communicate over a SCSI service delivery subsystem, with a logical unit that declares itself to be an automation/drive interface device in the device type field of the INQUIRY command response data (see SPC-3); b) define commands unique to the automation/drive interface device type; and c) define commands and parameters to manage the operation of the automation/drive interface device type.

INCITS 404-2006 [S2016], Information technology - Fibre Channel Physical Interfaces - 2 (FC-PH-2)
This standard describes the point-to-point physical interface portions of Fibre Channel high performance electrical and optical link variants that support the higher level Fiber Channel protocols including FC-FS, HIPP, IPI, SCSI and others. This standard is recommended for new implementations but does not obsolete the existing Fibre Channel standards.
This standard defines the command set extensions to facilitate operation of SCSI direct-access block devices. The clauses of this standard, implemented in conjunction with the applicable clauses of SPC-3, fully specify the standard command set for SCSI direct-access block devices. The objective of this standard is to: a) permit an application client to communicate over a SCSI service delivery subsystem with a logical unit that declares itself to be a direct-access block device in the PERIPHERAL DEVICE TYPE field of the standard INQUIRY data (see SPC-3); and b) define commands unique to the direct-access block device type.

INCITS 406-2005 [R2015], Information technology - Automation/Drive Interface - Transport Protocol (ADT)

This standard specifies the transport requirements for the SCSI Automation/Drive interface device. This standard permits the SCSI Automation/Drive interface devices to attach to application clients and provides the definitions for their use.

INCITS 407-2005 [R2015], Information technology - BIOS Enhanced Disk Drive Services - 3 (EDD-3)

This standard assumes that the reader is familiar with the conventional INT 13h interface, the usage of the BIOS Device Parameter Table, and the basic operation of mass storage devices. This standard describes in detail BIOS functions and data structures that are used as an abstraction layer to allow higher-level applications to access mass storage devices in an interface and command-set independent manner. To comply with this standard, higher-level software shall call the INT functions using the data structures described herein, and system firmware shall provide the INT functions and data structures described herein. The storage industry has increased the capacity and functionality of many types of mass storage devices. This increase in capacity and functionality has required the development of a BIOS interface. This standard documents the BIOS interface that is supplied by many BIOS vendors. This standard defines solutions to the following INT 13h BIOS-specific issues: • The INT 13h interface has a limit of 528 megabytes (MB); • The INT 13h interface allows more than two devices to be attached to a system but has no consistent method for storing the additional configuration parameters; • The INT 13h interface does not define CHS-independent methods for addressing devices. The methods defined by the INT 13h interface are not device-geometry independent. A different method of address representation and operation is needed; • Methods of data transfer continue to be added to ATA devices. Capabilities such as, DMA modes, multisector data transfers and PIO modes are not reported to the operating system via the INT 13h interface; • Systems require more than two storage devices, and with this requirement comes the need to assign the order in which.

INCITS 407:2005/Erratum 1-2009 [R2014], Information technology - BIOS Enhanced Disk Drive Services - 3 (EDD-3) Erratum

Erratum to INCITS 407-2005

INCITS 409.4-2006 [R2016], Information technology - Biometric Performance Testing and Reporting - Part 4: Operational Testing Methodologies

This standard is Part 4 (Operational Testing Methodologies) of American National Standard for Information Technology Biometric Performance Testing and Reporting, INCITS 409. The objective of this standard is to establish requirements for operational performance-based biometric testing and reporting.

INCITS 409.5-2011 [R2016], Information Technology - Biometric Performance Testing and Reporting - Part 5: Framework for Testing and Evaluation of Biometric System(s) for Access Control

This standard is concerned solely with the scientific 'technical performance testing' of biometric system(s) and subsystem(s) to be used for access control.

INCITS 410-2015, Information Technology - Identification Cards - Limited Use (LU), Proximity Integrated Circuit Card (PICC)

This standard provides a physical specification with similar electronic characteristics to Proximity Integrated Circuit Cards (PICCs), such as those specified within ISO/IEC 14443-2 and -3. The physical card thickness (finished card body) formats, are defined within this specification and may also have references to both ISO/IEC 7810:2012 (ID1-identification cards), INCITS 440 (Card Life Cycle), and ISO/IEC 15457 for thin flexible cards and other thickness dimensions as called out in this standard. Construction attributes, pertaining to the materials, functionality, and environmental requirements and the targeted use of these cards are also specified.

INCITS 411:2007 [R2012], Information technology - iSCSI Management API, Version 1.1.6

This API provides interfaces to discover and manage iSCSI resources on a system. The intended audience is vendors that deliver drivers that provide these resources to a system.

INCITS 412-2006 [S2016], Information technology - SNIA Multipath Management API Specification, Version 1.0.1

This API provides management interfaces to standard capabilities defined in ANSI INCITS 408-2005 (SPC-3) and common vendor-specific extensions to the standard capabilities. The intended audience is vendors that deliver drivers that provide these capabilities. This standard relates to SCSI multipathing features and excludes multipathing between interconnect devices (such as Fibre Channel switches) and transport specific multipathing (such as iSCSI multiple connections per session).

INCITS 413:2007 [R2012], Information technology - RapidIO(TM) Interconnect Specification (version 1.3)

The Rapid architecture was developed to address the need for a high-performance low pin count packet-switched system level interconnect to be used in a variety of applications as an open standard. The architecture is targeted toward networking, telecom, and high performance embedded applications. It is intended primarily as an intra-system interconnect, allowing chip-to-chip and board-to-board communications at Gigabyte per second performance levels.

INCITS 414-2006 [S2016], Information technology - Fibre Channel Backbone - Generation 3 (FC-BB-3)

This standard defines the functions and mappings necessary to tunnel Fibre Channel links, or bridge Fibre Channel networks, across Wide Area Networks.


The primary purpose of this standard, Homeland Security Mapping Standard - Point Symbolology for Emergency Management, is to establish a common set of symbols for use by mapmakers in support of emergency managers and first responders. It will allow users to rapidly interpret map data and to be able to disseminate consistent, usable information. This American National Standard is applicable to all organizations that create maps or otherwise display features for the Emergency Management or First Responder communities. It is limited at this time to support portrayal of point features that relate to the emergency management and hazard mapping disciplines.

INCITS 417-2006 [S2016], Information technology - Serial Attached SCSI-2 (SAS-1.1)

This standard specifies the functional requirements for the Serial Attached SCSI (SAS) physical interconnect, which is compatible with the Serial ATA physical interconnect. It also specifies three transport protocols, one to transport SCSI commands, another to transport Serial ATA commands to multiple SATA devices, and a third to support interface management. This standard is intended to be used in conjunction with SCSI and ATA command set standards.

INCITS 418-2006 [R2016], Information technology - Switch Fabric - Generation 4 (FC-SW-4)

This standard describes the requirements for an interconnecting Fabric consisting of multiple Fabric Switch elements to support the INCITS Fibre Channel - Framing and Signaling (FC-FS) and INCITS Fibre Channel - Physical Interface (FC-PI) standards.
This standard consists of distinct Fibre Channel mappings resulting in the following models: - FC-BB_IP (FC over TCP/IP backbone network); - FC-BB_GFPT (FC over SONET/SDH/OTN/PDH backbone network using GFPT adaptation); - FC-BB_PW (FC over MPLS network using PW adaptation).


This part of the multi-part standard specifies the concepts, test types and conformance testing methodologies to test biometric data interchange records or computer algorithms that create biometric data interchange records. The biometric data interchange records are specified in the INCITS biometric data interchange format standards. It defines two types (A and B) and three levels (1, 2 and 3) of conformance testing, with a general description and methodology for each one.


This part of INCITS 423 specifies the tests required to assure a vendor’s application(s) or service(s) conform to the ANSI INCITS 378-2004 standard. For the purposes of this part of INCITS 423, of the two types (A and B) and three levels (1,2 and 3) of conformance testing as defined in INCITS 423.1, only Type A and Levels 1 and 2 are within the scope of this part of INCITS 423.


This standard is concerned with conformance testing of implementations claiming conformance to the Finger Pattern Data Interchange Format specification defined in ANSI INCITS 377-2004. More specifically, it is concerned with testing only of the Biometric Data Interchange Records (BDIR) requirements as defined in ANSI INCITS 423.1-2008.

INCITS 423.4-2009 [R2014], Information technology - Conformance Testing Methodology Standard for Biometric Data Interchange Format Standards - Part 4: Conformance Testing Methodology for INCITS 381: Finger Image Data Interchange Format

This part of ANSI INCITS 423 is concerned with conformance testing of implementations claiming conformance to the Finger Image-Based Data Interchange Format specification as per ANSI INCITS 381-2004. Further, this part of ANSI INCITS 423 is concerned with testing only of the Biometric Data Interchange Records (BDIR) requirements as defined in ANSI INCITS 381-2004. For the purposes of this part of ANSI INCITS 423, and as also described in Part 1: Generalized Conformance Testing Methodology of ANSI INCITS 423, conformance testing of the CBFEF requirements as set forth in ANSI INCITS 381-2004 is not within the scope of this part of ANSI INCITS 423.

INCITS 424:2007 [R2012], Information technology - Fibre Channel Framing and Signaling - 2 (FC-FS-2)

This standard describes the framing and signaling interface of a high performance serial link for support of FC-4s associated with upper level protocols (e.g., SCSI, IP, SBCCS, VI). This standard is based on FC-FS with subsequent modifications approved by the T11 committee. Extended Link Services (ELSs) are not specified in this standard. FC-LS should be consulted for the functional description of all ELSs referenced in this specification.


This amendment to FC-FS-2 describes the incremental framing and signaling requirements for scrambling frames on Fibre Channel links. The requirements for use of Frame Scrambling on specific link technologies are described in FC-FH-4. Future standards may also require Frame Scrambling.

INCITS 426:2007 [R2012], Information technology - Fibre Channel Security Protocols (FC-SP)

This standard is one of the Fibre Channel family of standards. This standard describes the protocols used to implement security in a Fibre Channel fabric. This standard includes the definition of protocols to authenticate Fibre Channel entities, protocols to set up session keys, protocols to negotiate the parameters required to ensure frame-by-frame integrity and confidentiality, and protocols to establish and distribute policies across a Fibre Channel fabric.

INCITS 427:2007 [R2012], Information technology - Fibre Channel Generic Services-5 (FC-GS-5)

This standard describes in detail the services accessed by well-known addresses defined in FC-FS-2. Generic Services described in this document are: a) Directory Service; b) Management Service; c) Event Service; and d) Alias Service.

INCITS 428:2007 [R2012], Information technology - Storage Management - Host Bus Adapter Application Programming Interface (SM-HBA)

This standard defines requirements and guidelines for specifying conformance test suites and related test methods for measuring conformance of Biometric Service Provider components to the BioAPI specification, and defines procedures to be followed before, during, and after conformance testing.

INCITS 430:2007 [R2012], Information technology - Multi-Media Commands - 5 (MMC-5)

This standard defines a set of SCSI command descriptor blocks that are useful in accessing and controlling devices with a peripheral device type set to 5. This command set is transport independent and may be implemented across a wide variety of environments for which a SCSI transport protocol has been defined. To date, these include Parallel SCSI, ATA/ATAPI, Serial ATA, Universal Serial Bus (USB versions 1.1 and 2.0), and High Performance Serial Bus (IEEE 1394, 1394A, and 1394B). The command set described has been selected for correct operation when the physical interface is ATA with the ATAPI command protocol.

INCITS 431:2007 [R2012], Information technology - SCSI/ATA Translation (SAT)

The set of SCSI standards specifies the interfaces, functions, and operations necessary to ensure interoperability between conforming SCSI implementations. This standard is a functional description. Conforming implementations may employ any design technique that does not violate interoperability. This standard defines the protocol requirements of the SCSI / ATA Translation Layer (SATL) to allow conforming SCSI/ATA translating elements to interoperate with ATA devices and SCSI application layers. The SATL covers the range of implementations that use ATA devices to emulate the behavior of SCSI devices as viewed by the SCSI application layer.
INCITS 432:2007 [R2012], Information technology - Fabric Application Interface Standard (FAIS)
This standard describes a set of functions and data structures in the C language abstracting the details of the FAIS_Platform from the implementation of a storage management application. This standard defines an API only in the C language. Functionally equivalent APIs may be implemented in other languages but these are beyond the scope of this standard. All functions provided to operate with function specifications defined in this standard shall use C-style calling conventions. This constraint does not limit the internal implementation of components of a FAIS_Provider.

INCITS 433:2007 [R2012], Information technology - Fibre Channel - Link Services (FC-LS)
FC-LS describes in detail the Fibre Channel Extended Link Services.

INCITS 434:2007 [R2012], Information technology - Tenprint capture using BioAPI
This standard specifies requirements for the use of ISO/IEC 19784-1, BioAPI Specification (also known as BioAPI 2.0), a software interface standard, for the purpose of performing a tenprint capture operation. This includes one or more of the following: 1. Identification of BioAPI functions to be utilized and the order (if any) in which they are to be called 2. Specification of values for function parameters 3. Definition of GUI (graphical user interface) events (for use with an application controlled GUI) 4. User interface specifications for use with a BSP (biometric service provider) controlled GUI 5. Sample calling sequences and example inputs/outputs.

INCITS 435:2007 [R2012], Information technology - Fibre Channel BaseT (FC-BaseT)
This standard describes extensions to the Fibre Channel signaling and physical layer requirements defined in ANSI INCITS 404-2005, Information Technology - Fibre Channel - Physical Interfaces 2, to transport Fibre Channel over the commonly available 4-pair balanced copper cabling specified in ISO/IEC 11801:2002 and TIA/EIA 568-B.2-2001. This standard is one of the Fibre Channel family of standards.

INCITS 437:2008 [R2013], Information technology - Fibre Channel SATA Tunneling Protocol (FC-SATA)
This standard specifies a Fibre Channel mapping layer (i.e., an FC-4) to enable the use of Fibre Channel topologies to attach Serial ATA devices to ATA host systems. The Serial ATA interface is defined in the ATA/ATAPI-7 set of standards (ANSI INCITS 397-2005).

This document lays the general framework for the Server Management Command Line Protocol (SM CLP). This specification is intended to guide developers of implementations of the SM CLP and optionally be used as a reference by system administrators and other users of SM CLP implementations.

INCITS 440-2015, Information technology - Card Durability / Service Life
This American National Standard defines a method to determine a card application class for the intended card use. Once the service life application is determined, the standard defines test methods and requirements for the card application.

INCITS 441:2008 [R2013], Information technology - Automation/Drive Interface - Commands-2 (ADC-2)
This standard defines the model and command set extensions to facilitate operation of automation/drive interface devices. The clauses of this standard, implemented in conjunction with the applicable clauses of SPC-3, fully specify the standard command set for automation/drive interface devices.

INCITS 442:2010 [R2015], Information Technology - Biometric Identity Assurance Services (BIAS)
BIAS defines biometric services used for identity assurance that are invoked over a services-based framework. It is intended to provide a generic set of biometric and identity-related functions and associated data definitions to allow remote access to biometric services. To allow BIAS to be flexible to the amount and types of biographic and biometric information available to and used by a system, the terms “biographic data” and “biometric data” as used in this standard are very general. The binding of these services to specific frameworks is not included in this project, but will be the subject of separate standards. The first such standard (for a Web services framework) is planned to be developed by OASIS by the BIAS Integration Technical Committee. Although focused on biometrics, this standard will necessarily include support for other related identity assurance mechanisms such as biographic and token capabilities. BIAS is intended to be compatible with and used in conjunction with other biometric standards as described in clause 3. Specification of single-platform biometric functionality (e.g., client-side capture, etc.) is not within the scope of this standard. Integration of biometric services as part of an authentication service or protocol is not within the scope of this standard; however, it is possible that some of the basic biometric services defined herein may be used by such an implementation in the future.

INCITS 443:2008 [R2013], Information technology - Fibre Channel Storage Network PING (SNPing)
This standard defines a Command Line Interface (CLI) for a storage networking management utility program that is equivalent to the IP Networking Ping function. The CLI may be directly useful to storage management personnel or it may be accessed via other applications (e.g., an SMI-S Client).

INCITS 444:2015, Information technology - Identifying Attributes for Named Physical and Cultural Geographic Features (Except Roads and Highways) of the United States, Its Territories, Outlying Areas, and Freely Associated Areas, and the Waters of the Same to the Limit
This standard applies to selected named physical and cultural geographic features, geographic areas, and locational entities, except roads and highways, that are generally recognizable and locatable by name (i.e., have achieved some landmark status) and are of interest to any level of government and to the public for any purpose that would lead to the representation of the feature in printed or electronic maps and/or geographic information systems.

INCITS 447:2008 [R2013], Information technology - SCSI Architecture Model - 4 (SAM-4)
The set of SCSI (Small Computer System Interface) standards consists of this standard and the SCSI implementation standards described in 1.3. This standard defines a reference model that specifies common behaviors for SCSI devices, and an abstract structure that is generic to all SCSI I/O system implementations. The set of SCSI standards specifies the interfaces, functions, and operations necessary to ensure interoperability between conforming SCSI implementations. This standard is a functional description. Conforming implementations may employ any design technique that does not violate interoperability.

INCITS 449:2008 [R2013], Information technology - Fabric Application Interface Standard - 2 (FAIS-2)
This standard describes a set of functions and data structures in the C language abstracting the details of the FAIS_Platform from the implementation of a storage management application. This standard defines an API only in the C language. Functionally equivalent APIs may be implemented in other languages but these are beyond the scope of this standard. All functions provided to operate with function specifications defined in this standard shall use C-style calling conventions. This constraint does not limit the internal implementation of components of a FAIS_Provider.

INCITS 45-1982 [S2007], Information Systems - Character Set for Handprinting
Prescribes shapes and sizes of handprinted characters to be used in Optical Character Recognition (OCR) systems and shapes of handprinted characters for man-to-man communication. The standard encompasses international requirements.

INCITS 450-2009 [R2014], Information technology - Fibre Channel - Physical Interfaces - 4 (FC-Pi-4)
This international standard describes the physical interface portions of high performance electrical and optical link variants that support the higher level Fibre Channel protocols including FC-FS-2 and the higher Upper Level Protocols (ULPs) associated with HIPPI, SCSI, IP and others.
INCITS 451:2008 [R2013], Information technology - AT Attachments-8 ATA/ATAPI Architecture Model (ATA8-AAM)
The set of AT Attachment standards consists of this standard and the ATA implementation standards described in 1.3. This standard defines a reference model that defines common behaviors for ATA hosts and devices and an abstract structure that is generic to all ATA I/O system implementations.

INCITS 452-2009 [R2014], Information technology - AT Attachment-8 ATA/ATAPI Command Set (ATA8-ACS)
The set of AT Attachment standards consists of this standard and the ATA implementation standards described in AT Attachment - 8 ATA/ATAPI Architecture Model (ATA8-AAM). The AT Attachment ATA Command Set (ATA8-ACS) specifies the command set host systems use to access storage devices. It provides a common command set for systems manufacturers, system integrators, software suppliers, and suppliers of intelligent storage devices. Figure 1 shows the relationship of this standard to the other standards and related projects in the ATA and SCSI families of standards and specifications.

INCITS 452-2009/AM 1:2010 [R2015], Information technology - AT Attachment-8 ATA/ATAPI Command Set (ATA8-ACS) - Amendment 1
The project corrects defects in INCITS 452.

The North American Profile of ISO 19115:2003, Geographic information - Metadata, is intended to identify geospatial metadata that are needed for North American organizations to describe their geospatial data, including dataset and dataset series, and related Web services. It is based on ISO 19115:2003, Geographic information - Metadata, and ISO 19106:2004, Geographic information - Profiles.

INCITS 454-2009 [R2014], Information technology - Codes for the Identification of Metropolitan and Micropolitan Statistical Areas and Related Statistical Areas of the United States and Puerto Rico
This standard establishes a structure for the assignment of data codes by which to uniquely identify metropolitan and micropolitan statistical areas generically referred to as &##44;core based statistical areas&##44; and related statistical areas i e metropolitan divisions combined statistical areas New England city and town areas NECTAs NECTA divisions and combined NECTAs of the United States and Puerto Rico for the purpose of information interchange among data processing systems.

INCITS 455-2009 [R2014], Information technology - Codes for the Identification of Congressional Districts and Equivalent Areas of the United States, Puerto Rico, and the Insular Areas
This standard establishes a structure for the assignment of identifying data codes to congressional districts of the United States and its insular and associated areas, for the purpose of information interchange among data processing systems.

INCITS 457-2010 [R2015], Information technology - Serial Attached SCSI - 2 (SAS-2)
The SCSI family of standards provides for many different transport protocols that define the rules for exchanging information between different SCSI devices. This standard defines the rules for exchanging information between SCSI devices using a serial interconnect. Other SCSI transport protocol standards define the rules for exchanging information between SCSI devices using other interconnects.

INCITS 458-2011 [R2016], Information technology - SCSI Object-Based Storage Device Commands-2 (OSD-2)
Defines the command set extensions to control operation of Object-Based Storage devices. The clause(s) of this standard pertaining to the SCSI Object-Based Storage Device class, implemented in conjunction with the applicable clauses of the ISO/IEC 14776-43 SCSI Primary Commands - 4 (SPC-4), specify the standard command set for SCSI Object-Based Storage devices.

INCITS 459-2011 [R2016], Information Technology - Requirements for the Implementation and Interoperability of Role Based Access Control
Specifies the implementation of RBAC systems. It describes the packaging of features through the selection of functional components and feature options within a component, beginning with a core set of RBAC features that shall be included in all packages.

INCITS 460-1974 [S2007], Unrecorded Magnetic Six-Disk Pack (General, Physical, and Magnetic Characteristics)
Specifies the general, physical and magnetic requirements for interchangeability of the magnetic six-disk pack, as required to achieve unrecorded pack interchange between disk storages and associated information processing systems.

INCITS 460-2011 [R2016], Information technology - Fibre Channel - Physical Interface - 3 (FC-Pi-3)
Describes the physical interface portions of a high performance serial link based on the work of the XFP MSA. FC-Pi-3 applies only to the variant described in FC-Pi-3 and does not affect or supersede any requirements in any other FC standard or technical report. defines the electrical interfaces called XFI+ based on INF-8077(XFI) the XFP MSA for high-speed serial operation from 9.95-11.1 Gigabaud.

INCITS 461-2010 [R2015], Information technology - Fibre Channel - Switch Fabric - 5 (FC-SW-5)
This standard describes the operation and interaction of Fibre Channel Switches. This standard includes: a) E_Port Operation and Fabric Configuration; b) Path selection (FSPF); c) Bridge Port (B_Port) Operation; d) Distributed server interaction and communication; e) Exchange of information between Switches to support zoning; f) Distribution of Event Notifications between Switches; g) Virtual Fabrics Switch Support; h) Enhanced Commit Service; i) Virtual Channels.

INCITS 462-2010 [R2015], Information technology - Fibre Channel - Backbone - 5 (FC-BB-5)
This standard consists of distinct Fibre Channel mappings resulting in the following models: –FC-BB_IP (FC over TCP/IP backbone network) – Transparent FC-BB consisting of: –FC-BB_GFPT (FC over SONET/SDH/OTN/PDH backbone network using GFPT adaptation) –FC-BB_PW (FC over MPLS network using PW adaptation) –FC-BB_FB (FC over Ethernet)

INCITS 462-2010/AM1:2012, Information technology - Fibre Channel - Backbone - 5 AMENDMENT 1 (FC-BB-5/AM 1)
This is Amendment 1 to INCITS 462-2011 which has been issued in response to questions that have been raised regarding certain specifications contained in the content of: INCITS 462-2010, Information technology - Fibre Channel Backbone - 5 (FC-BB-5)

INCITS 463-2010 [R2015], Information technology - Fibre Channel - Generic Services - 6 (FC-GS-6)
This standard describes in detail the services accessed by well-known addresses defined in FC-FS-3. Generic Services described in this document are: a) Directory Service; b) Management Service; and c) Event Service. In addition, to the aforementioned Generic Services, the Common Transport (CT) protocol is described. The Common Transport service provides a common FC-4 for use by Generic Services. The following commands, parameter data, and features defined in previous versions of this standard are made obsolete by this standard: a) RDF_ID (Register FC-4 Descriptor); b) GFD_ID (Get FC-4 Descriptors); c) RPN_ID (Register Port Name); d) RPT_ID (Register Port Type) e) Third-Party registrations; f) Unsolicited transaction modes; g) Asynchronous transaction mode; h) Alias Server; i) Multicast Server; j) Class 1 and associated functionality, and k) Class 6 and associated functionality.
This part of the XAM™ standard is a normative specification of the general architecture and semantics of the XAM API. It applies to programmers who are generating XAM applications in any programming language. It also applies to storage system vendors who are creating vendor interface modules (VIMs). This document uses an object model to describe syntax in examples; these examples are informative only. It is not a normative specification of the syntax of the XAM interfaces in any language binding. The normative specification of the syntax of the Java language binding is defined in the XAM Java API Specification [XAM-JAVA-API].

The set of SCSI standards specifies the interfaces, functions, and operations necessary to ensure interoperability between conforming SCSI implementations. This standard is a functional description. Conforming implementations may employ any design technique that does not violate interoperability. This standard defines the protocol requirements of the SCSI / ATA Translating Layer (SATL) to allow conforming SCSI / ATA translating components to interoperate with ATA devices and SCSI application layers.

This document describes a communication interface between a channel and I/O control units that utilize the Single-Byte Command Code Sets (SBCCS) as implemented in a wide range of data processing systems.

Defines the command set extensions to facilitate operation of the sequential-access device type. This standard, implemented in conjunction with the requirements of the SCSI Architecture Model - 4 standard and the applicable clauses of the SCSI Primary Commands - 4 standard, fully specify the standard command set for the sequential-access device type.

This standard defines a set of SCSI command descriptor blocks that are useful in accessing and controlling devices with a peripheral device type set to 5.

This standard specifies the concepts test types and a conformance testing methodology to test conformance of CBEEF Biometric Information Records BIR claiming to be conformant to patron formats A the BioAPI BIR or the NIST 1TL Type 99 data record specified in INCITS 398 2008 annexes as well as the LDS patron format for applications other than MRTD and other ICAO applications.

This standard defines a set of SCSI command descriptor blocks that are useful in accessing and controlling devices with a peripheral device type set to 5.
This amendment updates ANSI INCITS 479-2011, FC-PI-5, to allow for forward error correction on 16GFC EL variants.

INCITS 48-1986/TC 1:1995 [S2016], Information Systems - Magnetic Tape Cassette for Information Interchange (3.81 mm, 0.150 inch) Tape at 32 bpm (800 BPI), Phase Enclosed - Technical Corrigendum 1

This American National Standard for unrecorded and recorded cassettes containing 3.81-mm (0.150-in) - wide magnetic tape presents the minimum requirements for mechanical and magnetic interchangeability of the cassette and for data interchange between information processing systems, which are capable of utilizing a standard code for information interchange as agreed upon by the interchange parties, using a data density of 32 bpi (800 bpi).

INCITS 480-2011 [R2016], Information technology - BIOS Enhanced Disk Drive Services - 4 (EDD-4)

This document contains all the requirements specified in FC-Pi, FC-PI-2 and SM-LL-V that are recommended for new designs, plus requirements for 800 MB/s.

INCITS 480-2011/AM1-2015, Information technology - BIOS Enhanced Disk Drive Specification - 4 (EDD-4) - Amendment 1

This project would be an amendment to ANSI INCITS 480-2011 Information Technology - BIOS Enhanced Disk Drive Services - 4 (EDD-4). The project would: 1. Add device interface and device path information for new interfaces to ANSI INCITS 480-2011 Information technology - BIOS Enhanced Disk Drive Services - 4 (EDD-4).

INCITS 481-2011 [R2016], Information technology - Fibre Channel Protocol for SCSI - 4 (FCP-4)

FCP-4 defines the fourth generation Fibre Channel Protocol to be used to transport SCSI commands over the T11 Fibre Channel interface.

INCITS 482-2012, Information technology - ATA/ATAPI Command Set - 2 (ACS-2)

The set of AT Attachment standards consists of this standard and the ATA implementation standards described in AT Attachment - 8 ATA/ATAPI Architecture Model (ATA8-AAM). The ATA/ATAPI Command Set - 2 (ACS-2) standard specifies the command set host systems use to access storage devices. It provides a common command set for systems manufacturers, system integrators, software suppliers, and suppliers of intelligent storage devices.

INCITS 483-2012, Information technology - Virtualization Management Specification

The Virtualization Management Specification describes an open, secure, portable, efficient and extensible infrastructure for management of virtualized systems.

INCITS 484-2012, Information technology - SCSI Media Changer Command Set - 3 (SMC-3)

Defines the command set extensions to facilitate operation of SCSI media changer devices. The clauses of this standard, implemented in conjunction with the requirements of the SCSI Architecture Model - 4 standard and SPC-4, fully specify the standard command set for SCSI media changer devices.


This project proposal recommends the development of a set of technical additions and clarifications to INCITS 466-2011, Fibre Channel - Single-Byte Command Code Sets - 4 Mapping Protocol (FC-SB-4) to define enhancements to the link-control and transport-mode protocols to expand the capabilities and increase the efficiency of transport-mode operations.

INCITS 488-2016, Information technology - Fibre Channel Framing and Signaling 4 (FC-FS-4)

This standard describes the framing and signaling interface of a high performance serial link for support of FC-As associated with upper level protocols (e.g., SCSI, IP, SBCS, VI). This standard is based on FC-FS-3 (INCITS 470-2011) with subsequent modifications approved by the member body that originally authored and approved FC-FS-3.

INCITS 489-2014, Information technology - SCSI over PCI(RTM) architecture (SOP)

The SCSI family of standards provides for many different transport protocols that define the rules for exchanging information between different SCSI devices. This standard defines the rules for exchanging information between SCSI devices using a PCI Express queuing layer. Other SCSI transport protocol standards define the rules for exchanging information between SCSI devices using other interconnects.

INCITS 49-1975 [S2007], Character Set for Optical Character Recognition (OCR-B)

Describes nominal shapes, sizes, and printing positions of OCR-B alphanumeric characters and symbols for optical character recognition (OCR-B) systems.

INCITS 490-2014, Information technology - PCIe (RTM) architecture Queuing Interface (PQI)

The SCSI family of standards provides for different transport protocols that define the methods for exchanging information between SCSI devices. This standard defines the transport methods for exchanging information between SCSI devices using a PCI Express interconnect. This standard defines a queuing layer, used by SOP. Other SCSI transport protocol standards define the methods for exchanging information between SCSI devices using other interconnects. Figure 1 shows the relationship of this standard to the other standards and related projects in the SCSI family of standards.

INCITS 492-2015, Information technology - SAS Protocol Layer - 3 (SPL-3)

SAS Protocol Layer - 3 is the next generation of the protocol portion of current Serial Attached SCSI. It follows SPL-2, SPL, and the protocol portions of SAS-2, SAS-1.1, and SAS. The following items should be considered for inclusion in Serial Attached Protocol - 3: a) enhancements to the protocol; b) corrections and clarifications; and c) other capabilities that may fit within the scope of this project.

INCITS 493-2012, Information technology - AT Attachment 8 - ATA/ATAPI Serial Transport (ATA8-AST)

The set of AT Attachment standards consists of this standard and the ATA implementation standards described in AT Attachment - 8 ATA/ATAPI Architecture Model (ATA8-AAM). This standard defines the ATA Serial ATA transport by: (a) referencing the Serial ATA specifications published by the SATA-IO organization; and (b) documenting the transport-dependent components found in ATA8 family of standards.

INCITS 494-2012, Information technology - Role Based Access Control - Policy Enhanced

This RBAC Policy-Enhanced standard (to be referenced as RPE) provides a framework and functional specifications to handle the relationship between roles and dynamic constraints. Some of the administrative and user permission review advantages of RBAC are retained while allowing the access control system to work in a rapidly changing environment.

INCITS 495-2012, Information technology - Platform Management

The Platform Management specification defines platform-independent, interoperable, industry standard management information models and profiles for managing the physical aspects of platforms. Examples of physical platforms include, but are not limited to, the following: desktop platform mobile platforms, blade PCs, servers spanning the spectrum of: stand-alone, blades and partitionable systems, enterprise and Telco, low cost to mission critical, etc. .

INCITS 496-2012, Information Technology - Fibre Channel - Security Protocols (FC-SP-2)

This standard is one of the Fibre Channel family of standards. This standard describes the protocols used to implement security in a Fibre Channel fabric. This standard includes the definition of protocols to authenticate Fibre Channel entities, protocols to set up session keys, protocols to negotiate the parameters required to ensure frame-by-frame integrity and confidentiality, and protocols to establish and distribute policies across a Fibre Channel fabric.

INCITS 496-2012/AM1-2015, Information technology - Fibre Channel - Security Protocols - 2 Amendment 1 (FC-SP-2/AM1)

This amendment updates ANSI INCITS 496-2012, FC-SP-2, to support additional cryptographic algorithms.
This standard defines the model and command set extensions to facilitate operation of automation/drive interface devices. The clauses of this standard, implemented in conjunction with the applicable clauses of SPC-4, fully specify the standard command set for automation/drive interface devices.

**INCITS 498-2012, Information technology - CIM Representations for Management**

This proposed standard defines a standard for the representation of CIM elements and messages in XML. The Extensible Markup Language (XML) is a simplified subset of SGML that offers powerful and extensible data modeling capabilities. An XML document is a collection of data represented in XML. An XML schema is a grammar that describes the format of an XML document. An XML document is described as valid if it has an associated XML schema to which it conforms. The Common Information Model (CIM) is an object-oriented information model defined by the DMTF that provides a conceptual framework for describing management data.

**INCITS 499-2013, Information technology - Next Generation Access Control - Functional Architecture (NGAC-FA)**

Next Generation Access Control (NGAC) is a fundamental reworking of traditional access control into a form that suits the needs of the modern distributed interconnected enterprise. Access control is both an administrative and an automated process of defining and restricting which users and their processes can perform which operations on which system resources. The information that provides the basis by which access requests are granted or denied is known as a policy, and a wide variety of types of policies have been created to address different situations.

**INCITS 500-2012, Information technology - Database Language SQL - Row Pattern Recognition (SQL/RPR)**

This proposed standard specifies the syntax and semantics of database language facilities that support row pattern matching using regular expressions. The database language facilities that support row pattern recognition include: - A subset of regular expression syntax; - Row pattern variables that span subsequences of rows, defined using conditions on individual rows and on aggregates of rows; and - A major new syntax element, the MATCH_RECOGNIZE clause, that can be applied to table expressions and can be used in definitions of windows.

**INCITS 501-2016, Information technology - Security Features for SCSI Commands (SFSC)**

The set of SCSI standards specifies the interfaces, functions, and operations necessary to ensure interoperability between conforming SCSI implementations. This standard is a functional description. Conforming implementations may employ any design technique that does not violate interoperability. This standard defines security features for use by all SCSI devices. This standard defines the security model that is basic to every device model and the parameter data that may apply to any device model.

**INCITS 504-4-2013, Information Technology - Generic Identity Command Set Part 4: Card Application Profile Template**

The Card Application profile template is to define the template to use to describe the data model of the GICS card application.


The SCSI family of standards provides for many different transport protocols that define the rules for exchanging information between different SCSI devices. This standard defines the rules for exchanging information between SCSI devices using a serial interconnect. Other SCSI transport protocol standards define the rules for exchanging information between SCSI devices using other interconnects.

**INCITS 507-2016, Information technology - PCIe® architecture Queuing Interface - 2 (PQI-2)**

The SCSI family of standards provides for different transport protocols that define the methods for exchanging information between SCSI devices. This standard defines the transport methods for exchanging information between SCSI devices using a PCI Express interconnect. This standard defines a queuing layer, used by SOP. Other SCSI transport protocol standards define the methods for exchanging information between SCSI devices using other interconnects.

**INCITS 508-2014, Information technology - Storage Management - HBA - 2nd Generation (SM-HBA-2)**

A standard application programming interface (API) defines a scope within which, and a grammar by which it is possible to write application software without attention to vendor-specific infrastructure behavior. This standard specifies a standard API the scope of which is management of Fibre Channel (FC) and Serial Access SCSI (SAS) HBAs, and the use of FC and SAS capabilities for discovery and management of the components of the respective fabric or domain.
INCITS 509-2014, Information technology - Fibre Channel - Backbone - 6
This standard consists of distinct Fibre Channel mappings resulting in the following models: - FC-BB_IP (FC over TCP/IP backbone network) - Transparent FC-BB consisting of: - FC-BB_GFPT (FC over SONET/SDH/OTN/POH backbone network using GFPT adaptation) - FC-BB_PW (FC over MPLS network using PW adaptation) - FC-BB_E (FC over Ethernet)

INCITS 511-2016, Information Technology - Fibre Channel - Switch Fabric - 6 (Fc-Sw-6)
FC-SW-6 describes the requirements for an interconnecting Fabric consisting of multiple Fabric Switch elements to support the ANSI/INCITS Fibre Channel - Framing and Signaling (FC-FS-2) and INCITS Fibre Channel - Physical Interface (FC-PI-4) standards.

INCITS 512-2015, Information technology - Fibre Channel - Switch Fabric - 6 (FC-SW-6)
FC-SW-6 describes the requirements for an interconnecting Fabric consisting of multiple Fabric Switch elements to support the ANSI/INCITS Fibre Channel - Framing and Signaling (FC-FS-2) and ANSI/INCITS Fibre Channel - Physical Interface (FC-PI-4) standards.

INCITS 513-2015, Information technology - SCSI Primary Commands-4
The SCSI Primary Commands - 4 standard will be based on the SCSI Primary Commands - 3 standard that defines a SCSI commands that apply to all SCSI device types. Technological advances require continuing improvements in the set of SCSI commands employed by all SCSI device types. After the publication of SPC-3, SPC-3 will provide the vehicle for standardizing the needed improvements. SPC-4 will maintain a high degree of compatibility with the present SPC-3 standard, which is nearing completion of its development cycle.

INCITS 514-2014, Information technology - SCSI Block Commands - 3 (SBC-3)
This standard defines the command set extensions to facilitate operation of SCSI direct access block devices. The clauses in this standard, implemented in conjunction with the applicable clauses of SPC-4, specify the standard command set for SCSI direct access block devices.

INCITS 515-2016, Information technology - SCSI Architecture Model - 5 (SAM-5)
The set of Small Computer System Interface (SCI) standards consists of this standard and the SCI implementation standards described in 4.2. This standard defines a reference model that specifies common behaviors for SCI devices, and an abstract structure that is generic to all SCI I/O system implementations. The set of SCI standards specifies the interfaces, functions, and operations necessary to ensure interoperability between conforming SCI implementations. This standard is a functional description. Conforming implementations may employ any design technique that does not violate interoperability. The following concepts from previous versions of this standard are made obsolete by this standard: a) support for the SCI-5 SCI transport protocol; b) Contingent Allegiance; c) the TARGET RESET task management function; d) basic task management model; e) untagged tasks; and f) linked command function.

INCITS 516-2013, Information Technology - SCI Stream Commands (SSC-4)
The SCI Stream Commands - 4 standard will be based on the SCI Stream Commands - 3 standard that provides the model and command sets for the sequential-access device type. The model and command sets may be implemented on multiple transport protocols. The following items should be considered for inclusion into SSC-4: 1) continuation and enhancement of the sequential-access device type model; 2) continuation and enhancement of the explicit address command set; 3) enhancement of the implicit address command set; 4) continuation of TapeAlert standardization, etc.

INCITS 517-2015, Information Technology - SCI /ATA Translation - 3 (SAT-3)
The set of SCI standards specifies the interfaces, functions, and operations necessary to ensure interoperability between conforming SCI implementations. This standard is a functional description. Conforming implementations may employ any design technique that does not violate interoperability. This standard defines the protocol requirements of the SCI /ATA Translation Layer (SATL) to allow conforming SCI /ATA translating components to interoperate with ATA devices,SCI transports, and SCI application layers.

INCITS 519-2014, Information technology - Serial Attached SCSI-3 (SAS-3)
The SCI family of standards provides for many different transport protocols that define the rules for exchanging information between different SCI devices. This standard specifies the functional requirements for the Serial Attached SCSI (SAS) physical interconnect, which is compatible with the Serial ATA physical interconnect. The SAS Protocol Layer - 3 (SPL-3) standard documents the SAS protocol layer corresponding to the Serial Attached SCSI - 3 (SAS-3), defining the rules for exchanging information between SCI devices using a serial interconnect.

INCITS 520-1976 [S2007], Unrecorded Single Disk Cartridge (Front Loading, 22000 BPI), General, Physical, and Magnetic Requirements
Specifies the general, physical, and magnetic requirements for interchangeability of the single-disk cartridge (front loading) as required to achieve unrecorded cartridge interchange between disk storage drive and associated information processing systems.

INCITS 522-2014, Information technology - ATA/ATAPI Command Set - 3 (ACS-3)
The set of AT Attachment standards consists of this standard and the ATA implementation standards described in AT Attachment - 8 ATA/ATAPI Architecture Model (ATA8-AAM). The ATA/ATAPI Command Set - 2 (ACS-2) standard specifies the command set host systems use to access storage devices. It provides a common command set for systems manufacturers, system integrators, software suppliers, and suppliers of intelligent storage devices. Figure 1 shows the relationship of this standard to the other standards and related projects in the ATA and SCSI families of standards and specifications.

INCITS 524-2016, Information Technology - AT Attachment 8 - ATA/ATAPI Parallel Transport (ATA8-AP)
This standard specifies the mandatory and optional operating features of a parallel bus transport for ATA commands described in the AT Attachment 8 - Command Set (ATA8-ACS) standard. It provides a common attachment interface for systems manufacturers, system integrators, software suppliers, and suppliers of intelligent storage devices. This document specifies the connectors, cables, electrical, and logic parameters for the interconnect between a device and the host, and the transport protocols for transporting commands, data, status, and other relevant communications across a parallel bus interface. This document also describes the mapping of command parameters from ATAB-ACS to registers and interface actions on the parallel transport.

INCITS 526-2016, Information technology - Next Generation Access Control - Generic Operations and Data Structures (NGAC-GOADS)
This standard provides a detailed refinement of the definitions and concepts in the access control architecture and framework defined by the NGAC-FA standard. To provide a precise specification of the abstractions involved, the refinements are based on the mathematics of set theory and predicate calculus in consonance with the Z notation. By capturing the essential properties of NGAC mathematically, free from constraints on how these properties are achieved, NGAC-GOADS serves as a formal, conceptual model for the composition and working of NGAC.

INCITS 528-2013, Information technology - Common Building Blocks Specification
The Common Building Blocks Specification describes an open, secure, portable, efficient and extensible infrastructure for management of desktop, mobile, server, virtualized and storage systems.
INCITS 53-1976 [S2008], Programming Language PL/I

Specifications both the form and interpretation of computer programs written in PL/I. It is intended to provide a high degree of machine independence and thereby facilitate program exchange among a variety of computing systems. The standard serves as an authoritative reference rather than as a tutorial exposition.

INCITS 530-2013, Information technology - Architecture for Managed Computing Systems

The architecture for Managed Computing Systems defines and documents the architecture and language infrastructure that is the foundation for DMTF management profiles, registries, protocols and schemas. The key properties of Architecture for Managed Computing Systems are as follows:

- Specification of the CIM Infrastructure, (meta-model and qualifiers, and the MOF language)
- Specification of Standard Message infrastructure...etc.

INCITS 531-2013, Information technology - Systems Management Discovery for Managed Computer Systems

The Systems Management Discovery for Managed Computer Systems describes an open, secure, portable, efficient and extensible infrastructure for management of computer systems. The key properties of Systems Management Discovery for Managed Computer Systems are as follows:

- provide a mechanism that allows WBEM Clients to discover WBEM Servers - use existing standards and protocols for rapid development and deployment - provide a mechanism that scales from small environments to enterprise environments...etc.

INCITS 532-2014, Information technology - Vocabulary description and management

This standard addresses the description and management of open vocabularies. The main purposes of this is to support data interchange and data interoperability across organizations, systems, subject, time, and geography. This standard specifies three main ideas: 

- a model for the contents of a vocabulary (clause 4) 
- a model for a registry of vocabularies (clause 5) 
- a set of procedures for managing a vocabulary registration process (clause 6)

INCITS 533-2016, Information technology – Fibre Channel – Physical Interfaces – 6P 128GFC Four Lane Parallel (FC-P1-6P)

This standard will define the requirements for new physical layer variants that operate at FC-P1-6 line rate on a four lane physical variant. It is desirable that new variants operate at similar distances as those of the corresponding variants specified in FC-P1-6. This standard will consider all aspects of transmit, receive and cable-plant performance requirements for optical and electrical links. The standard will enable interoperability of transmitter devices, receiver devices, interconnects, and components among different manufacturers.

INCITS 536-2016, Information technology – Zoned Block Commands (ZBC)

This standard defines the model and command set extensions to facilitate operation of zoned block devices. The clauses in this standard, implemented in conjunction with the applicable clauses of SPC-5 and SBC-4, specify the standard command set for zoned block devices.

INCITS 537-2016, Information technology – Zoned-device ATA Commands (ZAC)

The set of AT Attachment standards consists of this standard and the ATA implementation standards described in AT Attachment - 8 ATA/ATAPI Architecture Model (ATA8-DMM). This standard specifies the command set that host systems use to access storage devices that implement the Host Aware Zones feature set (see 4.3) or the Host Managed Zones feature set (see 4.4). This standard provides a common command set for systems manufacturers, system integrators, software suppliers, and suppliers of storage devices that provide one of the zones feature sets.

INCITS 539-2016, Information technology – Management of Security Credentials Specification

The Management of Security Credentials Specification describes an open, secure, portable, efficient and extensible infrastructure for management of systems. The key properties of Management of Security Credentials Specification are as follows:

- It provides a CIM based top-level object model needed for the representation of security management interfaces.  
- It specifies services for the security management, including operations for local user account modification, role and privilege assignment, certificate importation and exportation, and certificate signing request creation.  
- It provides an object model for the security principal, local and third party user accounts, privileges, roles, security keys, keystores, certificates and CRLs

INCITS 54-1986 [S2007], Recorded Magnetic Tape for Information Interchange (6250 CPI, Group Coded Recording)

Provides specifications for a 1/2-inch (12.7 mm), 9-track magnetic tape to be used for information interchange among information processing systems, communication systems, and associated equipment utilizing a standard code as agreed upon by the interchange parties. This standard deals solely with recording on magnetic tape and support and complements American National Standard for Unrecorded Magnetic Tape for Information Interchange (9-Track 800 CPI, NRZI; 1600 CPI, PE; and 6250 CPI, GCR), ANSI X3.40:1983.

INCITS 55-1992 [S2007], Information Systems – Unrecorded Magnetic Tape Cartridge for Information Interchange – 0.250 Inch (6.30 mm), 1600 bpi (63 bppm), Phase Encoded

This standard for an unrecorded cartridge containing 0.250-inch (6.30 mm) magnetic tape presents the minimum requirements for the mechanical and magnetic interchangeability of the cartridge between information processing systems, communications systems, and associated equipment using the American National Standard Code for Information Interchange, ANSI X3.4:1977 (ASCII).

INCITS 56-1986 [S2007], Recorded Magnetic Tape Cartridge for Information Interchange (4-Track, 0.250 Inch, 1600 BPI, Phase Encoded)

Provides a format and recording standard for a 0.250-in (6.30-mm) wide 4-track, magnetic tape in a cartridge to be used for information interchange between information processing systems, communication systems, and associated equipment utilizing a standard code, as agreed upon by the interchange parties.


Specifies the general, physical and magnetic requirements for the physical interchange of magnetic eleven-disk packs for use in electronic data processing systems.


Incorporates new wording for subclause 3.5.2 to better reflect the present state and practical use of OCR papers and equipment, as well as incorporate procedures from existing recognized standards.

INCITS 62-1987/AM1-1999 [S2007], Information Systems - Optical Character Recognition (OCR) - Paper Used in OCR Systems Amendment 1

Contains basic definitions, measurement requirements, specifications, and recommendations for papers used with optical character recognition readers.

INCITS 72-1981 [S2008], Recorded Magnetic Tape Cartridge for Information Interchange, 4 Track, 0.250 Inch (6.30 mm), 1600 BPI (63 BPPM), Phase Encoded, Parallel

This American National Standard is intended to provide a format and recording standard for a 0.250-inch (6.30-mm) wide, 4-track magnetic tape in a cartridge to be used for information interchange between information processing systems, communication systems and associated equipment utilizing the American National Standard Code for Information Interchange, ANSI X3.4-1977 (ASCII).
INCITS 73-1980 [S2007], Cartridge, Single-Sided Unformatted Flexible Disk (for 6631 BPR Use)

This standard specifies the general, physical, and magnetic requirements for interchangeability of the single-sided flexible disk cartridge - for use at 6631 bits per radian (BPR) - as required to achieve unformatted disk cartridge interchange among disk drives and associated information processing systems.

INCITS 74-1987 [S2008], Information Systems - Programming Language - PL/I General-Purpose Subset

Defines the computer programming language PL/I General Purpose Subset. Is intended to serve as an authoritative reference rather than as a tutorial introduction.

INCITS 76-1981 [S2007], Unformatted Single Disk Cartridge (Top Loading, 200 TPI, 4400 BPI) – General, Physical, and Magnetic Requirements

 Specifies the general, physical, and magnetic requirements for interchangeability of the single-disk cartridge (top loading) as required to achieve unrecorded cartridge interchange between disk storages and associated information processing systems.

INCITS 82-1980 [S2011], One-Sided Single-Density Unformatted 5.25 Inch Flexible Disk Cartridge

Specifies the general, physical, and magnetic requirements for interchangeability of the one-sided 5.25 inch (nominal) flexible disk cartridge - for use at 3979 bits per radian (BPR) - as required to achieve unformatted disk cartridge interchange among disk drives using 35 tracks (can be negotiated between concerned parties for use in drives using up to 40 tracks) and associated information processing systems.

INCITS 83:1995 [R2015], Information Systems - ISO Registration According to ISO 2375 - ANSI Sponsorship Procedures

Specifies the procedure to be followed in submitting proposals for character sets for ANSI sponsorship for submission to the ISO Registration Authority for processing in accordance with the ISO procedure for registration.

INCITS 85-1981 [S2008], One Half Inch Magnetic Tape Interchange Using a Self-Loading Cartridge

This standard provides the information necessary to allow physical interchange of a self-loading cartridge to be used with 1/2-inch-wide magnetic tape, as described in American National Standard for Unrecorded Magnetic Tape for Information Interchange (9-Track 200 and 800 CPI, NRZ), 1600 CPI, PE), ANSI x3.40-1976, and modified herein, when contained in a self-loading cartridge.

INCITS 86-1980 [S2007], Inks, Optical Character Recognition (OCR)

Specifies optical character recognition (OCR) inks by their spectral characteristics for different users with the OCR community. It includes definitions, test methods, and information needed to apply this standard.

INCITS 89-1981 [S2007], Unrecorded Single-Disk Double-Density Cartridge (Front Loading, 2200 BPI, 200 TPI), General, Physical, and Magnetic Requirements for

 Specifies the general, physical, and magnetic requirements for interchangeability of the single-disk cartridge (front loading) as required to achieve unrecorded cartridge interchange between disk storages and associated information processing systems.

INCITS 93M-1981 [S2007], Optical Character Recognition Positioning

Specifies the location of OCR-A and OCR-B characters in relationship to other characters on a document or page and to reference points of the document or page.

INCITS 94-1985 [S2007], Programming Aid to Numerically Controlled Manufacturing (PANCM)

Standardizes the language features of the SPLIT, ACTION, and COMPACT II languages, to ensure compatibility of language enhancements and to promote portability of part programs between implementations.


 Specifies sizes for single-part continuous business forms for use in handwritten or machine applications, or both. Such forms are continuous lengths of forms that have sprocket feed holes in both the left and right margins.

INCITS 99-1983 [S2007], Optical Character Recognition (OCR) Print Quality, Guideline for

Describes the print quality parameters and measuring techniques for determining the quality of machine-printed characters to maximize the likelihood that they can be read by electro-optical means.

INCITS X4.6-1979 [S2008], 10-Key Keyboard for Adding and Calculating Machines

Prescribes the arrangement of the 10 numeric keys, one through zero, for adding and calculating machines of the 10-key type.

INCITS/ISO 1860:1986 [S2015], Information processing - Precision reels for magnetic tape used in interchange instrumentation applications

This Standard defines the recorder/reproducer interface or envelope requirements for precision reels with 76 mm (3 in) centre hole, designed for use in magnetic tape interchange instrumentation applications.


Defines the reference model for standardization in the field of geographic information. This reference model describes the notion of interoperability and sets forth the fundamentals by which this standardization takes place. Although structured in the context of information technology and information technology standards, ISO 19101-1:2014 is independent of any application development method or technology implementation approach.

INCITS/ISO 19101-2002 [R2012], Geographic information - Reference Model

This International Standard defines the framework for standardization in the field of geographic information and sets forth the basic principles by which this standardization takes place. This framework identifies the scope of the standardization activity being undertaken and the context in which it takes place. The framework provides the method by which what is to be standardized can be determined and describes how the contents of the standards are related.

INCITS/ISO 19103:2015 [2017], Geographic information - Conceptual schema language

Provides rules and guidelines for the use of a conceptual schema language within the context of geographic information. The chosen conceptual schema language is the Unified Modeling Language (UML). Provides a profile of the Unified Modelling Language (UML). The standardization target type of this standard is UML schemas describing geographic information.

INCITS/ISO 19105:2000 [R2016], Geographic information - Conformance and testing

Specifies the framework, concepts and methodology for testing and criteria to be achieved to claim conformance to the family of ISO geographic information standards. It provides a framework for specifying abstract test suites (ATS) and for defining the procedures to be followed during conformance testing. Conformance may be claimed for data or software products or services or by specifications including any profile or functional standard.

INCITS/ISO 19106:2004 [R2015], Geographic information - Profiles

This standard is intended to define the concept of a profile of the ISO geographic information standards developed by ISO/TC 211 and to provide guidance for the creation of such profiles. Only those components of specifications that meet the definition of a profile contained herein can be established and managed through the mechanisms described in this International Standard. These profiles can be standardized internationally using the ISO standardization process. This document also provides guidance for establishing, managing, and standardizing at the national level (or in some other forum).
INCITS/ISO 19107-2003 [R2013], Geographic Information - Spatial schema

ISO 19107-2003 specifies conceptual schemas for describing the spatial characteristics of geographic features, and a set of spatial operations consistent with these schemas. It treats vector geometry and topology up to three dimensions. It defines standard spatial operations for in access, query, management, processing, and data exchange of geographic information for spatial (geometric and topological) objects of up to three topological dimensions embedded in coordinate spaces of up to three axes.

INCITS/ISO 19108-2002 [R2013], Geographic information - Temporal schema

ISO 19108:2002 defines concepts for describing temporal characteristics of geographic information. It depends upon existing information technology standards for the interchange of temporal information. It provides a basis for defining temporal feature attributes, feature operations, and feature associations, and for defining the temporal aspects of metadata about geographic information. Since this International Standard is concerned with the temporal characteristics of geographic information as they are abstracted from the real world, it emphasizes valid time rather than transaction time.

INCITS/ISO 19108:2002/COR 1:2006 [R2015], Geographic information - Temporal schema Technical Corrigendum 1

INCITS/ISO 19110:2005 [R2015], Geographic information - Methodology for feature cataloguing

This standard defines the methodology for cataloguing feature types and specifies how the classification of feature types is organized into a feature catalogue and presented to the users of a set of geographic data. ISO 19110:2005 is applicable to creating catalogues of feature types in previously uncatalogued domains and to revising existing feature catalogues to comply with standard practice. ISO 19110:2005 applies to the cataloguing of feature types that are represented in digital form. Its principles can be extended to the cataloguing of other forms of geographic data. This standard is applicable to the definition of geographic features at the type level. ISO 19110:2005 is not applicable to the representation of individual instances of each type and excludes spatial, temporal, and portrayal schemas as specified in ISO 19107, ISO 19108, and the future ISO 19117, respectively. It also excludes collection criteria for feature instances. This standard may be used as a basis for defining the universe of discourse being modelled in a particular application, or to standardize general aspects of real world features being modelled in more than one application.

INCITS/ISO 19111-2:2009 [R2015], Geographic information - Spatial referencing by coordinates - Part 2: Extension for parametric values

This standard specifies the conceptual schema for the description of spatial referencing using parametric values or functions. It applies the schema of ISO 19111 to combine a position referenced by coordinates with a parametric value to form a spatial&\#8209;parametric coordinate reference system (CRS). The spatial&\#8209;parametric CRS can optionally be extended to include time. The intended users of ISO 19111-2:2009 are producers and users of environmental information. Parameters which are attributes of spatial locations or features, but which are not involved in their spatial referencing, are not addressed by ISO 19111-2:2009.

INCITS/ISO 19111:2007 [R2012], Geographic information - Spatial referencing by coordinates

Defines the conceptual schema for the description of spatial referencing by coordinates, optionally extended to spatio-temporal referencing. It describes the minimum data required to define one-, two- and three-dimensional spatial coordinate reference systems with an extension to merged spatial-temporal reference systems. It allows additional descriptive information to be provided. It also describes the information required to change coordinates from one coordinate reference system to another.

INCITS/ISO 19112:2003 [R2014], Geographic information - Spatial referencing by geographic identifiers

ISO 19912:2003 defines the conceptual schema for spatial references based on geographic identifiers. It establishes a general model for spatial referencing using geographic identifiers, defines the components of a spatial reference system and defines the essential components of a gazetteer. Spatial referencing by coordinates is not addressed in this document; however, a mechanism for recording complementary coordinate references is included.


ISO 19115-1:2014 defines the schema required for describing geographic information and services by means of metadata. It provides information about the identification, the extent, the quality, the spatial and temporal aspects, the content, the spatial reference, the portrayal, distribution, and other properties of digital geographic data and services. ISO 19115-1:2014 is applicable to: - the cataloguing of all types of resources, clearinghouse activities, and the full description of datasets and services; - geographic services, geographic datasets, dataset series, and individual geographic features and feature properties.

INCITS/ISO 19115-2:2009 [R2014], Geographic information - Metadata - Part 2: Extensions for imagery and gridded data

ISO 19115-2:2009 extends the existing geographic metadata standard by defining the schema required for describing imagery and gridded data. It provides information about the properties of the measuring equipment used to acquire the data, the geometry of the measuring process employed by the equipment, and the production process used to digitize the raw data. This extension deals with metadata needed to describe the derivation of geographic information from raw data, including the properties of the measuring system, and the numerical methods and computational procedures used in the derivation.

INCITS/ISO 19116:2004 [R2015], Geographic information - Positioning services

This standard specifies the data structure and content of an interface that permits communication between position-providing device(s) and position-using device(s) so that the position-using device(s) can obtain and unambiguously interpret position information and determine whether the results meet the requirements of the use. A standardized interface of geographic information with position allows the integration of positional information from a variety of positioning technologies into a variety of geographic information applications, such as surveying, navigation and intelligent transportation systems. ISO 19116:2004 will benefit a wide range of applications for which positional information is important.

INCITS/ISO 19117:2012 [2013], Geographic information -- Portrayal

ISO 19117:2012 specifies a conceptual schema for describing symbols, portrayal functions that map geospatial features to symbols, and the collection of symbols and portrayal functions into portrayal catalogues. This conceptual schema can be used in the design of portrayal systems. It allows feature data to be separate from portrayal data, permitting data to be portrayed in a dataset independent manner.

INCITS/ISO 19119-2005, AM 1-2008 [R2013], Geographic information - Services - Amendment 1: Extensions of the service metadata model

This is the first amendment to ISO 19119-2005 that identifies and defines the architecture patterns for service interfaces used for geographic information, defines its relationship to the Open Systems Environment model, presents a geographic services taxonomy and a list of example geographic services placed in the services taxonomy. It also prescribes how to create a platform-neutral service specification, how to derive conformance platform-specific service specifications, and provides guidelines for the selection and specification of geographic services from both platform-neutral and platform-specific perspectives.
INCITS/ISO 19119:2005 [R2015], Geographic information - Services
This standard identifies and defines the architecture patterns for service interfaces used for geographic information, defines its relationship to the Open Systems Environment model, presents a geographic services taxonomy and a list of example geographic services placed in the services taxonomy. It also prescribes how to create a platform-neutral service specification, how to derive conformant platform-specific service specifications, and provides guidelines for the selection and specification of geographic services from both platform-neutral and platform-specific perspectives.

INCITS/ISO 19123:2005 [R2016], Geographic information - Schema for coverage geometry and functions
Defines a conceptual schema for the spatial characteristics of coverages. Coverages support mapping from a spatial, temporal or spatiotemporal domain to feature attribute values where feature attribute types are common to all geographic positions within the domain. A coverage domain consists of a collection of direct positions in a coordinate space that may be defined in terms of up to three spatial dimensions as well as a temporal dimension.

INCITS/ISO 19125-1:2004 [R2015], Geographic information - Simple feature access - Part 1: Common architecture
This standard establishes a common architecture for geographic information and defines terms to use within the architecture. It also standardizes names and geometric definitions for Types for Geometry. This standard does not place any requirements on how to define the Geometry Types in the internal schema nor does it place any requirements on when or how or who defines the Geometry Types. ISO 19125-1:2004 does not attempt to standardize and does not depend upon any part of the mechanism by which Types are added and maintained.

INCITS/ISO 19125-2:2004 [R2015], Geographic information - Simple feature access - Part 2: SQL option
This standard specifies an SQL schema that supports storage, retrieval, query and update of simple geospatial feature collections via the SQL Call Level Interface (SQL/CLI) and establishes an architecture for the implementation of feature tables. It defines terms to use within the architecture. of geographic information and defines a simple feature profile of ISO 19107. In addition, this part of ISO 19125:2004 describes a set of SQL Geometry Types together with SQL functions on those types. The Geometry Types and Functions described represent a profile of ISO 13249-3. It standardizes the names and geometric definitions of the SQL Types for Geometry and the names, signatures and geometric definitions of the SQL Functions for Geometry.

INCITS/ISO 19128:2005 [R2015], Geographic information - Web map server interface
This standard specifies the behaviour of a service that produces spatially referenced maps dynamically from geographic information. It specifies operations to retrieve a description of the maps offered by a server, to retrieve a map, and to query a server about features displayed on a map. ISO 19128:2005 is applicable to pictorial renderings of maps in a graphical format; it is not applicable to retrieval of actual feature data or coverage data values.

INCITS/ISO 19131:2007 [2017], Geographic information - Data product specifications
Specifies requirements for the specification of geographic data products, based upon the concepts of other ISO 19100 International Standards. It also provides help in the creation of data product specifications, so that they are easily understood and fit for their intended purpose.

This is the first Amendment to ISO 19131:2007 that specifies requirements for the specification of geographic data products, based upon the concepts of other ISO 19100 International Standards. It also provides help in the creation of data product specifications, so that they are easily understood and fit for their intended purpose.

INCITS/ISO 19132:2007 [R2013], Geographic information - Location Based Services - Reference model
ISO 19132:2007 defines a reference model and a conceptual framework for location-based services (LBS), and describes the basic principles by which LBS applications may interoperate. This framework contains an ontology, a taxonomy, a set of design patterns and a core set of LBS service abstract specifications in UML. ISO 19132:2007 further specifies the framework’s relationship to other frameworks, applications and services for geographic information and to client applications.

INCITS/ISO 19133:2005 [R2016], Geographic information - Location Based Services - Tracking and navigation
Describes the data types, and operations associated with those types, for the implementation of tracking and navigation services. It is designed to specify web services that can be made available to wireless devices through web-resident proxy applications, but is not restricted to that environment.

INCITS/ISO 19134:2007 [R2012], Geographic information - Location Based Services - Multimodal routing and navigation
ISO 19134:2006 specifies the data types and their associated operations for the implementation of multimodal location-based services for routing and navigation. It is designed to specify web services that may be made available to wireless devices through web-resident proxy applications, but is not limited to that environment.

INCITS/ISO 19135:2005 [R2016], Geographic information - Procedures for registration of geographical information items
Specifies procedures to be followed in establishing, maintaining and publishing registers of unique, unambiguous and permanent identifiers, and meanings that are assigned to items of geographic information. In order to accomplish this purpose, this standard specifies elements of information that are necessary to provide identification and meaning to the registered items and to manage the registration of these items.

INCITS/ISO 19136-2:2015[2017], Geographic information - Geography Markup Language (GML) - Part 2: Extended schemas and encoding rules
This standard is an XML encoding in compliance with ISO 19118 for the transport and storage of geographic information modelled in accordance with the conceptual modelling framework used in the ISO 19100 series of International Standards and including both the spatial and non-spatial properties of geographic features. This standard defines the XML Schema syntax, mechanisms and conventions that provide an open, vendor-neutral framework for the description of geospatial application schemas for the transport and storage of geographic information in XML; allow profiles that support proper subsets of GML framework descriptive capabilities; support the description of geospatial application schemas for specialized domains and information communities; enable the creation and maintenance of linked geographic application schemas and datasets; support the transport and storage of application schemas and datasets; increase the ability of organizations to share geographic application schemas and the information they describe. Implementers may decide to store geographic application schemas and information in GML, or they may decide to convert from some other storage format on demand and use GML only for schema and data transport.

INCITS/ISO 19137-2007 [R2012], Geographic information - Core profile of the spatial schema
This International Standard defines a core profile of the spatial schema specified in ISO 19107 that specifies, in accordance with ISO 19106, a minimal set of geometric elements necessary for the efficient creation of application schemata. This International Standard supports many of the spatial data formats and description languages already developed and in broad use within several nations or liaison organizations. NOTE Data modelled with this International Standard are consistent with spatial models already developed and used by a number of organizations; see Annex A.
INCITS/ISO 19141-2008 [R2013], Geographic information - Schema for moving features
ISO 19141:2008 defines a method to describe the geometry of a feature that moves as a rigid body. Such movement has the following characteristics. The feature moves within any domain composed of spatial objects as specified in ISO 19107. The feature may move along a planned route, but it may deviate from the planned route. Motion may be influenced by physical forces, such as orbital, gravitational, or inertial forces.

INCITS/ISO 19142:2010 [R2016], Geographic information -- Web Feature Service
Specifies the behaviour of a web feature service that provides transactions on and access to geographic features in a manner independent of the underlying data store. It specifies discovery operations, query operations, locking operations, transaction operations and operations to manage stored parameterized query expressions.

INCITS/ISO 19143:2010 [R2016], Geographic information - Filter encoding
Describes an XML and KVP encoding of a system neutral syntax for expressing projections, selection and sorting clauses collectively called a query expression. These components are modular and intended to be used together or individually by other International Standards which reference ISO 19143:2010. ISO 19143:2010 defines an abstract component, named AbstractQueryExpression, from which other specifications can subclass concrete query elements to implement query operations.

INCITS/ISO 19144-1-2010/Cor 1-2013, Geographic information -- Classification systems -- Part 1: Classification system structure, Technical Corrigendum 1
This Technical Corrigendum affect Part 1 of ISO 19144-1 which establishes the structure of a geographic information classification system, together with the mechanism for defining and registering the classifiers for such a system. It specifies the use of discrete coverages to represent the result of applying the classification system to a particular area and defines the technical structure of a register of classifiers in accordance with ISO 19135.

INCITS/ISO 19144-1:2009 [R2015], Geographic information - Classification systems - Part 1: Classification system structure
This standard establishes the structure of a geographic information classification system, together with the mechanism for defining and registering the classifiers for such a system. It specifies the use of discrete coverages to represent the result of applying the classification system to a particular area and defines the technical structure of a register of classifiers in accordance with ISO 19135.

INCITS/ISO 19144-2:2012 [2013], Geographic information - Classification systems -- Part 2: Land Cover Meta Language (LCML)
This part of ISO 19144 specifies a Land Cover Meta Language (LCML) expressed as a UML metamodel that allows different land cover classification systems to be described based on the physiognomic aspects. This part of ISO 19144 also specifies the detailed structure of a register for the extension of LCML but does not specify the maintenance of the register. This part of ISO 19144 recognizes that there exist a number of land cover classification systems. It provides a common reference structure for the comparison and integration of data for any generic land cover classification system, but does not intend to replace those classification systems.

INCITS/ISO 19146-2010 [R2016], Geographic information -- Cross-domain vocabularies
Defines a methodology for cross-mapping technical vocabularies that have been adopted by industry-specific geospatial communities. It also specifies an implementation of ISO 19135 for the registration of geographic information concepts for the purpose of integrating multiple domain-based vocabularies.

INCITS/ISO 19148:2012 [2012], Geographic information - Linear referencing
ISO 19148:2012 specifies a conceptual schema for locations relative to a one-dimensional object as measurement along (and optionally offset from) that object. It defines a description of the data and operations required to use and support linear referencing. ISO 19148:2012 is applicable to transportation, utilities, location-based services and other applications which define locations relative to linear objects.

INCITS/ISO 19149:2011 [2012], Geographic information -- Rights expression language for geographic information -- GeoREL
ISO 19149:2011 defines an XML-based vocabulary or language to express rights for geographic information in order that digital licenses can be created for such information and related services. This language, GeoREL, is an extension of the rights expression language in ISO/IEC 21000-5 and is to be used to compose digital licenses. Each digital license will unambiguously express those particular rights that the owners (or their agent) of a digital geographic resource extend to the holders of that license. The digital rights management system in which these licenses are used can then offer ex ante (before the fact) protection for all such resources.

INCITS/ISO 19150-2:2015 [2017], Geographic information - Ontology - Part 2: Rules for developing ontologies in the Web Ontology Language (OWL)
Defines rules and guidelines for the development of ontologies to support better the interoperability of geographic information over the Semantic Web. The Web Ontology Language (OWL) is the language adopted for ontologies. It defines the conversion of the UML static view modeling elements used in the ISO geographic information standards into OWL. It further defines conversion rules for describing application schemas based on the General Feature Model defined in ISO 19109 into OWL. It does not define semantics operators, rules for service ontologies, and does not develop any ontology.

ISO 19153:2014 is a reference model for digital rights management (DRM) functionality for geospatial resources (GeoDRM). As such, it is connected to the general DRM market in that geospatial resources shall be treated as nearly as possible like other resources, such as music, text, or services. It is not the intention to reinvent a market nor the technology that already exists and is thriving, but to make sure that a larger market has access to geospatial resources through a mechanism that it understands and that is similar to and consistent with the ones already in use.

INCITS/ISO 19156:2011 [2012], Geographic information -- Observations and measurements
ISO 19156:2011 defines a conceptual schema for observations, and for features involved in sampling when making observations. These provide models for the exchange of information describing observation acts and their results, both within and between different scientific and technical communities.

INCITS/ISO 19157:2013[2014], Geographic information -- Data quality
ISO 19157:2013 establishes the principles for describing the quality of geographic data. It defines components for describing data quality; specifies components and content structure of a register for data quality measures; describes general procedures for evaluating the quality of geographic data; establishes principles for reporting data quality.

Defines a conceptual model for address information (address model), together with the terms and definitions that describe the concepts in the model. Lifecycle, metadata, and address aliases are included in the conceptual model. The model is presented in the Unified Modeling Language (UML). The model provides a common representation of address information, independent of actual addressing implementations. It is not intended to replace conceptual models proposed in other specifications, but provides a means to cross-map between different conceptual models for address information and enables the conversion of address information between specifications.

INCITS/ISO 19162:2015 [2017], Geographic information - Well-known text representation of coordinate reference systems

This standard defines the structure and content of a text string implementation of the abstract model for coordinate reference systems described in ISO 19111:2007 and ISO 19111-2:2009. The string defines frequently needed types of coordinate reference systems and coordinate operations in a self-contained form that is easily readable by machines and by humans. The essence is its simplicity; as a consequence there are some constraints upon the open content allowed in ISO 19111:2007. To retain simplicity in the well-known text (WKT) description of coordinate reference systems and coordinate operations, the scope of this Standard excludes parameter grouping and pass-through coordinate operations. The text string provides a means for humans and machines to correctly and unambiguously interpret and utilise a coordinate reference system definition with look-ups or cross references only to define coordinate operation mathematics. Because it omits metadata about the source of the data and may omit metadata about the applicability of the information, the WKT string is not suitable for the storage of definitions of coordinate reference systems or coordinate operations.

INCITS/ISO 2033-1983 [R2013], Information processing - Coding of machine readable characters for OCR & MICR

 Defines the coded representation of printed characters recognized by reading equipment. Includes the fonts £ 13 B; CMC 7; OCR-A; OCR-B. Assigns bit-patterns to characters recognized by reading equipment. This information is then given to the recipient by different media and can be used by printing devices. Single-font reader and multiple-font reader are considered as applications. References: ISO 646; 1004; 1073; 2022.

INCITS/ISO 2382-21-1985 [S2011], Information technology -- Vocabulary - Part 21: Interfaces between process computer systems and technical processes

Enables the international communication in information processing. Provides selected English and French terms and their definitions in the field of the links between the technical processes and the process computer systems, especially the process interface system the process control equipment and its interaction.


This International Standard is intended to facilitate international communication in information processing. It presents, in two languages, terms and definitions of selected concepts relevant to the field of information processing and identifies relationships between the entries. In order to facilitate their translation into other languages, the definitions are drafted so as to avoid, as far as possible, any peculiarity attached to a language. This part of ISO 2382 (which will comprise some twenty-five parts) deals with calculators. It concerns the main operating processes and types of machines used, their functions and technical parts.

INCITS/ISO 3275-1974 [R2013], Implementation of the 7-bit coded character set and its 7-bit and 8-bit extensions on 3.81 mm magnetic cassette for data interchange

Defines the implementation of the 7-bit coded character set and of its 7-bit and 8-bit extensions for the interchange of data on 3.81 mm magnetic tape cassette. References: ISO 646; 2022; 3407.

INCITS/ISO 3562-1976 [R2015], Information processing - Interchangeable magnetic single-disk cartridge (top loaded) - Physical and magnetic characteristics

Includes the general, physical and magnetic characteristics for the interchange of magnetic single disk cartridges (top loaded) in order to facilitate the interchange of data between electronic data processing systems.


This International Standard specifies the basic layout of numerals and symbols on keyboards intended to be used in applications where the data are generally numeric.


Specifies file structures for data interchange on magnetic tape cassettes. To provide for the range of sophistication in equipment and applications, the basic, compact, and extended systems are specified. This standard is not limited to the 3, 81 mm magnetic tape cassette described in ISO 3407 but could also be applied to higher capacity cassettes or cartridges.

INCITS/ISO 5138-1-1978 [S2009], Information technology - Office Machines - Office Machines - Vocabulary - Part 01: Dictation Equipment

Includes bilingual vocabulary serves for facilitating international communication in the field of office machines. Establishes reference between entries. Covers vocabulary of dictation machines.

INCITS/ISO 5138-2-1980 [S2009], Information technology - Office Machines - Vocabulary - Part 02: Duplicators

Includes bilingual vocabulary is intended to facilitate international communication in the field of office machines. Establishes references between entries. Covers vocabulary of duplicators.

INCITS/ISO 5138-3-1981 [S2009], Information technology - Office Machines - Vocabulary - Part 03: Addressing Machines

Includes bilingual vocabulary is intended to facilitate international communication in the field of office machines. Establishes references between entries. Covers vocabulary of addressors.

INCITS/ISO 5138-4-1981 [S2009], Office Machines - Vocabulary - Part 04: Letter Opening Machines

Includes bilingual vocabulary serves for facilitating international communication in the field of office machines. Establishes references between entries. Covers vocabulary of letter opening machines.

INCITS/ISO 5138-5-1981 [S2009], Information technology - Office equipment - Part 05: Letter Folding Machines

Outlines terms used for letter folding machines, their main functions and types, in order to facilitate international exchange. Contains bilingual (English, French) collection of words and definitions and indicates references between them.

INCITS/ISO 5138-9-1984 [S2009], Information technology - Office machines - Part 9: Typewriters

Is aimed at simplifying international communication in the field of office machines. Provides English and French terms and definitions of selected concepts and establishes connections between entries. Deals with their operating processes, types, functions and parts.

INCITS/ISO 5654-1-1984 [R2015], Information processing - Data interchange on 200 mm (8 in) flexible disk cartridges using two-frequency recording at 13 262 fprad, 1,9 tppm (48 tpi), on one side - Part 1: Dimensional, physical and magnetic characteristics

This Standard Defines dimensional, physical and magnetic characteristics of the 200 mm (8 in) flexible disk cartridges using two-frequency recording at 13 262 fprad on one side so as to provide physical interchangeability between data processing systems.

INCITS/ISO 6586-1980 [R2013], Data processing Implementation of the ISO 7-Bit and 8-Bit Coded Character Sets on Punched Cards

Defines implementation of ISO 7-bit and 8-bit coded character sets on punched cards as well as the representation of 7-bit and 8-bit combinations on 12-row punched cards. This representation is derived from, and compatible with, the Hollotith Code. Ensures widely compatibility with existing punched card files. Intended for general interchange of information among data processing systems.
INCITS/ISO 6596-1:1985 [R2015], Information processing - Data interchange on 130 mm (5.25 in) flexible disk cartridges using two-frequency recording at 7 958 ftpm, 1.9 tpmm (48 tpi), on one side - Part 1: Dimensional, physical and magnetic characteristics
This Standard shows dimensional, physical and magnetic characteristics of 130 mm (5.25 in) flexible disk cartridges recorded at 7 958 ftpm on one side using two frequency so as to provide physical interchangeability between data processing systems. Applicable in conformance with ISO 646, 2022, 4873, 7665

INCITS/ISO 6709-2008 [R2013], Standard representation of geographic point locations by coordinates
ISO 6709:2008 is applicable to the interchange of coordinates describing geographic point location. It specifies the representation of coordinates, including latitude and longitude, to be used in data interchange. It additionally specifies representation of horizontal point location using coordinate types other than latitude and longitude. It also specifies the representation of height and depth that can be associated with horizontal coordinates. Representation includes units of measure and coordinate order.

INCITS/ISO 6709-2008/COR 1:2009 [R2015], Standard representation of geographic point location by coordinates - Technical Corrigendum 1
Technical Corrigendum 1

INCITS/ISO 6936:1988 [R2014], Information processing - Conversion between the two coded characters sets of ISO 646 and ISO 6937-2 and the CCITT international telegraph alphabet No. 2 (ITA 2)
Lays down rules for converting between 58 characteristics of CCITT International Telegraph Alphabet No. 2 (Recommendation F.1) and the characters according to the ISO 646 and 6937-2 coded sets. Serves for interaction between international telex service and terminals in data networks if telex character repertoire is sufficient.

INCITS/ISO 7064:2003 [S2013], Information technology - Security techniques - Check character systems
This International Standard specifies a set of check character systems capable of protecting strings against errors which occur when people copy or type data. The strings may be of fixed or variable length and may have character sets which are a) numeric (10 digits: 0 to 9); b) alphabetic (26 letters: A to Z); and c) alphanumeric (letters and digits).

INCITS/ISO 7487-2-1985 [S2012], Information Processing - Data interchange on 130 mm (5.25 in) Flexible Disk Cartridges Using Modified Frequency Modulation Recording at 7 958 ftpm, 1.9 tpmm (48 tpi), on Both Sides - Part 2: Track Format A
This part of ISO 7487 specifies the quality of recorded signals, the track layout, and a track format to be used on such a flexible disk cartridge, which is intended for data interchange between data processing systems.

INCITS/ISO 8378-3-1986 [S2008], Information Processing - Data interchange on 130 mm (5.25 in) Flexible Disk Cartridges Using Modified Frequency Modulation Recording at 7 958 ftpm, 3.8 tpmm (96 tpi), on Both Sides - Part 3: Track Format B
Specifies the quality of recorded signals, the track layout, and a track format to be used on 130 mm (5.25 in) flexible disk cartridges intended for data interchange between data processing systems.

INCITS/ISO 8485-1989 [S2011], Programming languages - APL
This Standard defines the programming language APL and the environment in which APL programs are executed. Its purpose is to facilitate interchange and promote portability of APL programs and programming skills.

INCITS/ISO 8630-1:1987 [R2015], Information processing - Data interchange on 130 mm (5.25 in) flexible disk cartridges using modified frequency modulation recording at 13 262 ftpm, on 80 tracks on each side - Part 1: Dimensional, physical and magnetic characteristics
This standard defines the dimensional, physical and magnetic characteristics of the cartridge so as to provide physical interchangeability between data processing systems. Provides for full data interchange between data processing systems and provides an alternative method of full data interchange between data processing systems. To be used in conformance with ISO 646; ISO 2022; ISO 4873; ISO 7665; ISO 9293.

This International Standard specifies an abstract syntax known as the Standard Generalized Markup Language (SGML). The language expresses the description of a document's structure and other attributes, as well as other information that makes the markup interpretable.

This International Standard: Specifies an abstract syntax known as the Standard Generalized Markup Language (SGML). The language expresses the description of a document's structure and other attributes, as well as other information that makes the markup interpretable. Specifies a reference concrete syntax that binds the abstract syntax to specific characters and numeric values, and criteria for defining variant concrete syntaxes. Defines conforming documents in terms of their use of components of the language.

INCITS/ISO 9036-1987 [R2013], Information processing - Arabic 7-bit coded character set for information interchange
A set of mandatory 120 characters is described with the coded representation. This set is intended for interchange of information using Arabic language and includes control characters for code extensions. Procedures for using these control characters are specified in ISO 2022. References: ISO 646; ISO 2022; Arab Standard ASMO 449.

This Standard specifies a data structure known as the SGML Document Interchange Format (SDIF). SDIF enables a document conforming to ISO 8879, which might be stored in several entities, to be packed into a data stream for interchange in a manner that will permit the recipient to reconstitute the separate entities. SDIF also allows related documents to be included in the data stream, such as covering letters, transmittal forms, catalog cards, formatting procedures, or the "document profile" required by a document architecture.

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ISO/IEC 9075-14:2011 defines ways in which SQL can be used in conjunction with XML. It defines ways of importing and storing XML data in an SQL database, manipulating it within the database and publishing both XML and conventional SQL data in XML form.
INCITS/ISO 9529-2:1989 [S2012], Information Processing Systems - Data Interchange on 90 mm (3.5 in) Flexible Disk Cartridges Using Modified Frequency Modulation Recording at 15 916 Itrads on 80 tracks on Each Side - Part 2: Track Format

This part of ISO/IEC 9529 specifies the track layout, the track format and the characteristics of the recorded signals.


Specifies a) procedures for transmission of multicast announcement, multicast address mapping and group composition information between Network entities residing in End Systems and Network entities residing in Intermediate Systems; b) the encoding of the protocol data units used for multicast announcement, multicast address mapping and group composition information.

INCITS/ISO 962-1974 [R2013], Implementation of the 7-bit coded character set and its 7-bit and 8-bit extensions on 9-track 12.7 mm (0.5 in) magnetic tape

Provides the PICS proforma for the Distributed Transaction Processing: Protocol Implementation Conformance Statement (PICS) proforma

This part of ISO/IEC 10026 provides the PICS proforma for the Distributed Transaction Processing Protocol as specified in ITU-T Rec. X.862 ISO/IEC 10026-3 in compliance with the relevant requirements, and in accordance with the relevant guidance, given in CCITT Rec. X.291 ISO/IEC 9646-2.
INCITS/ISO 10089:1991 [S2009],
Information Technology - 130 mm Rewritable Optical Disk Cartridge for Information Interchange

This International Standard specifies definitions of the essential concepts; the environment in which the characteristics are to be tested; the environments in which the cartridge are to be operated and stored; the mechanical, physical and dimensional characteristics of the case and of the optical disk; the magneto-optical characteristics and the recording characteristics for recording the information, for reading the information and for erasing it many times, so as to provide physical interchangeability between data processing systems; two formats for the physical disposition of the tracks and sectors, the error correction codes.

INCITS/ISO/IEC 10090:1992 [S2009],
Information Technology - 90 mm Optical Disk Cartridges, Rewritable and Read Only, for Data Interchange

Specifies the conditions for conformance testing and the Reference Drive, the mechanical and physical characteristics of the cartridge, so as to provide mechanical interchangeability between data processing systems; the format of the information on the disk, both embossed and user-written; the characteristics of the embossed information on the disk; the magneto-optical characteristics of the disk, enabling data processing systems to write data onto the disk; the minimum quality of user-written data on the disk, enabling data processing systems to read data from the disk.

INCITS/ISO/IEC 10116-2008 [R2013],
Information technology - Security techniques - Modes of operation for an n-bit block cipher

This International Standard establishes five modes of operation for applications of an n-bit block cipher (e.g. protection of data transmission, data storage). The defined modes only provide protection of data confidentiality. Protection of data integrity and requirements for padding the data are not within the scope of this International Standard. Also most modes do not protect the confidentiality of message length information.

INCITS/ISO/IEC 10116:2006/COR1:2008 [R2014], Information technology - Security Techniques - Modes of operation for an n-bit block cipher - Corrigendum 1

This is the first Corrigendum to ISO/IEC 10116:2006

INCITS/ISO/IEC 10118-1:2000 [R2014],
Information technology - Security techniques - Hash-functions - Part 1: General

ISO/IEC 10118 specifies hash-functions and is therefore applicable to the provision of authentication, integrity and non-repudiation services. Hash-functions map arbitrary strings of bits to a fixed-length strings of bits, using a specified algorithm. They can be used for reducing a message to a short imprint for input to a digital signature mechanism, and committing the user to a given string of bits without revealing this string.

INCITS/ISO/IEC 10118-2:2010 [R2016],
Information technology -- Security techniques -- Hash-functions -- Part 2: Hash-functions using an n-bit block cipher

Specifies hash-functions which make use of an n-bit block cipher algorithm. They are therefore suitable for an environment in which such an algorithm is already implemented.

INCITS/ISO/IEC 10118-3:2004 [R2014],
Information technology - Security techniques - Hash-functions - Part 3: Dedicated hash-functions

This part of ISO/IEC 10118 specifies dedicated hash-functions, i.e., specially designed hash-functions. The hash-functions in this part of ISO/IEC 10118 are based on the iterative use of a round-function. Seven distinct round-functions are specified, giving rise to distinct dedicated hash-functions. The first and third dedicated hash-functions in clauses 7 and 9 respectively provide hash-codes of lengths up to 160 bits; the second in clause 8 provides hash-codes of lengths up to 128 bits; the fourth in clause 10 provides hash-codes of lengths up to 256 bits; the sixth in clause 12 provides hash-codes of a fixed length, 384 bits.


This is the first Amendment to INCITS/ISO/IEC 10118-3:2004

INCITS/ISO/IEC 10118-4:1998 [S2013],
Information Technology - Security techniques - Hash-functions: Part 4: Hash functions using modular arithmetic

This part of ISO/IEC 10118 specifies two hash-functions which make use of modular arithmetic. These hash-functions, which are believed to be collision-resistant, compress messages of arbitrary but limited length to a hash-code whose length is determined by the length of the prime number used in the reduction-function defined in 7.3. Thus, the hash-code is easily scaled to the input length of any mechanism (e.g., signature algorithm, identification scheme).

INCITS/ISO/IEC 10149:1995 [R2014],
Information technology - Data interchange on read-only 120 mm optical data disks (CD-ROM)

Specifies the characteristics of 120 mm optical disks (CD-ROM) for information interchange between information processing systems and for information storage.

INCITS/ISO/IEC 10175-1:1996 [R2013],
Information Technology - Text and Office Systems - Document Printing Application (DPA) - Part 1: Abstract Service Definition and Procedures

Specifies a client-server model of printing in accordance with the Distributed-office-applications Model (ISO/IEC 10031-1). Together, the capabilities provided can enable users to create and produce high-quality office documents in a consistent and unambiguous manner within a distributed open system environment.

INCITS/ISO/IEC 10175-2:1996 [R2013],
Information technology -- Text and office systems -- Document Printing Application (DPA) -- Part 2: Protocol specification

Specifies the abstract syntax of the Document Printing Application (DPA) access protocol, how this protocol supports the DPA abstract service, the mapping of the DPA onto the services used and the requirements for conformance with the DPA access protocol.

INCITS/ISO/IEC 10179:1996 [S2014],
Information technology - Text Composition: Document Style Semantics and Specification Language (DSSSL)

Specifies the processing of valid Standard Generalized Markup Language (SGML) documents. Document Style Semantics and Specification Language (DSSSL) defines the semantics, syntax, and processing model of languages for the specification of documentation processing. Provides means for externalization of style characteristics and other techniques for associating style information with an SGML document.


Amendment 2 to ISO/IEC 10179:1996


Technical Corrigendum 1
INCITS/ISO/IEC 10180:1995 [S2014],
Information technology - Text Composition - Standard Page Description Language (SPDL)
Defines a language for the specification of electronic documents, comprised of black and white, gray scale, or full color text, images, and geometric graphics, in a form suitable for presentation (printing or displaying on other suitable media).


INCITS/ISO/IEC 10206:1991 [S2008],
Information Technology - Programming Languages - Extended Pascal
Specifies the syntax and semantics of the programming language by specifying requirements for a processor and for a conforming program. Includes an alphabetical index. Annexes A to G are for information only.

INCITS/ISO/IEC 10279:1991 [S2010],
Information technology - Programming languages - Full BASIC
Specifies the programming language which is derived from the ANSI X3.113-1987. For details of the syntax and semantics see ANSI X3.113-1987. Annexes A and B are for information only.

INCITS/ISO/IEC 10367-1991 [R2013],
Information technology - Standardized coded graphic character sets for use in 8-bit codes
Specifies a unique coded character set for use as G0 set and a series of coded character sets of up to 96 characters for use as G1, G2 and G3 sets in versions of ISO/IEC 4873.

INCITS/ISO/IEC 10373-1:2006 [R2016],
Identification cards - Test methods - Part 1: General characteristics tests
Defines test methods for characteristics of identification cards according to the definition given in ISO/IEC 7810. Each test method is cross-referenced to one or more base standards, which may be ISO/IEC 7810 or one or more of the supplementary standards that define the information storage technologies employed in identification card applications. This part of ISO/IEC 10373 defines test methods which are common to one or more ICC technologies and other parts deal with other technology-specific tests.

INCITS/ISO/IEC 10373-2:2015 [2016],
Identification cards - Test methods - Part 2: Magnetic strip technologies
Defines test methods for characteristics of identification cards according to the definition given in ISO/IEC 7810. Each test method is cross-referenced to one or more base standards, which may be ISO/IEC 7810 or one or more of the supplementary standards that define the information storage technologies employed in identification card applications. Defines test methods which are specific to magnetic stripe technology.

INCITS/ISO/IEC 10373-3:2010 [R2016],
Identification cards -- Test methods -- Part 3: Integrated circuit cards with contacts and related interface devices
Defines test methods for characteristics of integrated circuit cards with contacts and related interface devices according to the definition given in ISO/IEC 7816.

INCITS/ISO/IEC 10373-5:2006 [R2012],
Identification cards - Test methods - Part 5: Optical memory cards
ISO/IEC 10373 defines test methods for characteristics of identification cards as defined in ISO/IEC 7810. Each test method is cross-referenced to one or more base standards, which may be ISO/IEC 7810 or one or more of the supplementary standards that define the information storage technologies employed in identification cards applications.

INCITS/ISO/IEC 10373-6:2016 [2016],
Identification cards -- Test methods -- Part 6: Proximity cards
Defines test methods for characteristics of identification cards according to the definition given in ISO/IEC 7810. Each test method is cross-referenced to one or more base standards, which may be ISO/IEC 7810 or one or more of the supplementary standards that define the information storage technologies employed in identification card applications. This part of ISO/IEC 10373 deals with test methods, which are specific to contactless integrated circuit card (proximity card) technology. ISO/IEC 10373-1 deals with test methods which are common to one or more ICC technologies and other parts deal with other technology-specific tests.

INCITS/ISO/IEC 10373-7:2008 [R2016],
Identification cards -- Test methods -- Part 7: Vicinity cards
Defines test methods for characteristics of identification cards according to the definition given in ISO/IEC 7810. Each test method is cross-referenced to one or more base standards, which may be ISO/IEC 7810 or one or more of the supplementary standards that define the information storage technologies employed in identification card applications. This part of ISO/IEC 10373 deals with test methods, which are specific to contactless integrated circuit card (vicinity card) technology. ISO/IEC 10373-1 deals with test methods which are common to one or more ICC technologies and other parts deal with other technology-specific tests.

INCITS/ISO/IEC 10356-1:2000 [R2013],
Identification cards - Contactless integrated circuit(s) cards - Close-coupled cards - Part 1: Physical characteristics
This part of ISO/IEC 10356 specifies the physical characteristics of close-coupled cards (CICCs). It applies to identification cards of the card type ID-1 operating either in a slot or on the surface of a coupling device.

Identification Cards - Contactless Integrated Circuit(s) Cards - Part 2: Dimensions and Location of Coupling Areas
Specifies the dimensions, location, nature and assignment of each of the coupling areas to be provided for interfacing slot or surface card coupling devices (CCDs) with contactless integrated circuit(s) cards (CICCs) of the ID-1 card type.

INCITS/ISO/IEC 10536-3:1996 [R2013],
Identification cards - Contactless integrated circuit(s) cards - Part 3: Electronic signals and reset procedures
This part of ISO/IEC 10536 specifies the nature and characteristics of the fields to be provided for power and bi-directional communications between card coupling devices (CCDs) and contactless integrated circuit(s) cards (CICCs) of the ID-1 card type in slot or surface operation.

INCITS/ISO/IEC 10538-1991 [R2013],
Information technology - control functions for text communication
Defines the control functions and their coded representations. Applies only to text made up of characters. Does not define any control functions required for controlling the process of communication. Annexes A, B and C are for information only.

INCITS/ISO/IEC 10561-1999 [S2016],
Information technology - Office Equipment - Printing Devices Method for measuring printer throughput - Class 1 and Class 2 printers
Specifies a method for measuring the throughput of class 1 and class 2 printers, as defined in ISO/IEC 11160-1. Specifies three different test patterns: (1) a standard business letter; (2) a spreadsheet; or (3) a graphic pattern.

INCITS/ISO/IEC 10589-2002 [R2012],
Information technology - Telecommunications and information exchange between systems - Intermediate System to Intermediate System intra-domain routeing information exchange protocol for use in conjunction with the protocol for providing the connectionless-mode network service (ISO 8473)
This International Standard specifies a protocol which is used by Network Layer entities operating the protocol specified in ISO 8473 in Intermediate Systems to maintain routeing information for the purpose of routeing within a single routeing domain. The protocol specified in this International Standard relies upon the provision of a connectionless-mode underlying service.

Specifies a general framework for testing conformance to a computer graphics standard. The general framework described in this standard addresses the following six components: (a) conformance in the standard itself; (b) test requirements document, defining what shall be tested for a computer graphics standard; (c) test specifications document, addressing the test technique and the content of each test; (d) test method, defining the implementation of the test specification document, including the test software; (e) test procedures, defining the application of the test software, which consists of the procedures to be used in conformance testing; and (f) the establishment of test services.

INCITS/ISO/IEC 10646:2012 [2012], Information technology - Universal Coded Character Set (UCS)

There are extensive electronic attachments to this standard which are only available on DVD. Please contact ANSI's Customer Service Department at 1-212-624-4980 or ansonline@ansi.org for more information. ISO/IEC 10646:2012 specifies the Universal Character Set (UCS). It is applicable to the representation, transmission, interchange, processing, storage, input and presentation of the written form of the languages of the world as well as additional symbols. It covers 110 181 characters from the world's scripts.


This International Standard specifies an Amendment 1 to ISO/IEC 10646:2012/Amd 1:2013, Information technology -- Universal Coded Character Set (UCS) -- Amendment 1: Linear A, Palmyrene, Manichaean, Khojki, Khudawadi, Bassa Vah, Duployan, and other characters


Describes the forms of printed images and the sizes of alphanumeric characters as well as the signs and graphical symbols (OCR-A) intended for optical character reading according to ISO 646-1973.


Indicates the forms of printed images and the sizes of alphanumeric characters as well as the signs and graphical symbols (OCR-B-character set) intended for optical character reading according to ISO 646-1973.

INCITS/ISO/IEC 10744:1997 [R2015], Information technology - Hypermedia/Time-based Structuring Language (HyTime)

This Standard defines a language and underlying model for the representation of "hyperdocuments" that link and synchronize static and dynamic (time-based) information contained in multiple conventional and multimedia documents and information objects. The language is known as the "Hypermedia/Time-based Structuring Language", or "HyTime". HyTime can represent time in both the abstract, or "musical" sense, and in user-defined real-time units. It also provides a way of relating the two so that elements of time-dependent documents can be synchronized. NOTE 7 This facility extends to the representation of multimedia information the power, once limited to conventional documents, to distinguish intrinsic information content from style considerations. HyTime’s techniques for representing its time model are equally applicable to spatial and other domains; all are treated as systems for measuring along different axes of a coordinate space. Arbitrary cross-refrences and access paths based on external interactions ("hypermedia links") are also supported. HyTime’s time representation contains sufficient information to derive the durations of both control ("gestural") data (e.g., control information for audio or video hardware) and visual data (e.g., a music score, presentation storyboard, or television script). The media formats and data notations of objects in a HyTime hyperdocument can include formatted and unformatted documents, audio and video segments, still images, and object-oriented graphics, among others. Users can specify the positions and sizes of occurrences of objects in space and time, using a variety of measurement units and granularities. Temporal requirements of applications...


This Recommendation / International Standard: - gives an introduction and motivation for ODP; - provides an overview of the Reference Model of Open Distributed Processing (RM-ODP) and an explanation of its key concepts; - gives guidance on the application of the RM-ODP.


ISO/IEC 10746 provides a coordinating framework for the standardization of open distributed processing (ODP). This supports distribution, interworking, portability, and platform and technology independence. It establishes an enterprise architecture framework for the specification of ODP systems. ISO/IEC 10746 defines the essential concepts necessary to specify open distributed processing systems from five prescribed viewpoints. It provides a well-developed framework for the structuring of specifications for large-scale, distributed systems.


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The purpose of this standard is provide an architectural semantics for ODP.


INCITS/ISO/IEC 10747:1994 [R2015], Information technology - Telecommunications and information exchange between systems - Protocol for exchange of inter-domain routing information among intermediate systems to support forwarding of ISO 8473 PDUs

Technical Corrigendum 1


Amendment 1


Technical Corrigendum 1
INCITS/ISO/IEC 10779:2008 [R2014], Information technology - Office equipment - Office equipment accessibility for elderly persons and persons with disabilities

ISO/IEC 10779:2008 specifies accessibility guidelines to be considered when planning, developing and designing electrophotographic copying machines, page printers and multi-function devices. These guidelines are intended to improve accessibility required when primarily older persons, persons with disabilities and persons with temporary disabilities use office equipment.

INCITS/ISO/IEC 10885:1993 [R2015], Information technology - 356 mm optical disk cartridge for information interchange - Write once

This standard specifies definitions of essential concepts, the environment in which the characteristics shall be tested, the environments in which the cartridge shall be operated and stored, the mechanical, physical and dimensional characteristics of the case and of the optical disk, the optical characteristics and the recording characteristics for recording the information once and for reading it many times, so as to provide physical interchangeability between data processing systems, the format for the physical disposition of the tracks and sectors, the error correction codes, the modulation methods used for recording and the quality of the recorded signals.


Specifies processes for converting source image data to compressed image data, processes for converting compressed image data to reconstructed image data, coded representations for compressed image data, and gives guidance on how to implement these processes in practice. Is applicable to continuous-tone - grayscale or colour - digital still image data and to a wide range of applications which require use of compressed images. Is not applicable to bi-level image data.


Specifies normative compliance tests for the ITU-T Rec. T.81 (ISO/IEC 10981-1) encoding and decoding processes. These compliance tests are applicable to "stand-alone" generic implementations of one or more of the encoding and decoding processes specified in ITU-T Rec. T.81 (ISO/IEC 10981-1). The purposes of these tests include that generic encoder (and decoder) implementations compute the discrete cosine transform (DCT) and quantization functions with sufficient accuracy.


This Recommendation 1 International Standard is applicable to continuous-tone - grayscale or colour - digital still image data. It is applicable to a wide range of applications which require use of compressed images.


INCITS/ISO/IEC 10918-4:1999 [R2014], Information technology -- Digital compression and coding of continuous-tone still images: Registration of JPEG profiles, SPIFF profiles, SPIFF tags, SPIFF colour spaces, APPn markers, SPIFF compression types and Registration Authorities (REGAUT)

This Recommendation | International Standard provides for the unique registration of JPEG and SPIFF Profiles, SPIFF Tags, SPIFF Colour Spaces, application specific Markers, SPIFF Compression types and images Registration authorities as defined in the CCITT Rec. T.81 | ISO/IEC 10918-1 and ITU-T Rec. T.84 | ISO/IEC 10918-3. Unless otherwise specified, (P) rofiles, (T)ags, colour (S)paces, (M)arkers, (C) ompression types and image (R)egistration authorities will be referred to as PTSMCR items.

INCITS/ISO/IEC 10994:1992 [S2012], Information Technology - Data Interchange on 90mm Flexible Disk Cartridges Using Modified Frequency Modulation Recording at 31 831 ftpcad on 80 Tracks on Each Side - ISO Type 303

This standard specifies the characteristics of 90-mm flexible disk cartridges recorded at 31 831 ftpc on 80 tracks on each side. Such flexible disk cartridges are identified as ISO Type 303.

INCITS/ISO/IEC 10995:2011 [2013], Information technology - Digitally recorded media for information interchange and storage - Test method for the estimation of the archival lifetime of optical media

ISO/IEC 10995:2011 specifies an accelerated aging test method for estimating the life expectancy for the retrievability of information stored on recordable or rewritable optical disks.


ISO/IEC 11002:2008(E) is an Application Programming Interface (API) which provides management interfaces as defined in ISO/IEC 14776 -453 (Information technology - Small computer system interface (SCSI) - Part 453: Primary commands -3 (SCC-3)) and common vendor-specific extensions to the standard capabilities. ISO/IEC 11002 relates to SCSI multipathing features and excludes multipathing between interconnect devices (such as Fibre Channel switches) and transport specific multipathing (such as isCSI multiple connections per session).


Defines a set of concepts and their inter-relationships which should be applicable to the complete range of future computer graphics standard. May be applied to verify and refine requirements for computer graphics; to identify needs for computer graphics standards and external interfaces; to develop models based on requirements for computer graphics; to define the architecture of new computer graphics standards; compare computer graphics standards.

INCITS/ISO/IEC 11160-1:1996 [S2014], Information technology - Office Equipment - Minimum information to be included in specification sheets - Printers - Part 1: Class 1 and Class 2 printers

Specifies the minimum information that shall be included in the specification sheets of printers enabling users to compare the characteristics of different machines and select a suitable printer. Applies to Class 3 and Class 4 printers according annex B for an office environment.

INCITS/ISO/IEC 11160-2:2013[2014], Information technology -- Office equipment -- Minimum information to be included in specification sheets -- Printers -- Part 2: Class 3 and Class 4 printers

ISO/IEC 11160 is intended to facilitate users in selecting a printer which meets their requirements. ISO/IEC 11160 specifies the minimum information to be included in the specification sheets of printers in order for users to compare the characteristics of different machines. The term "Specification Sheets" applies to documents which describe the performance characteristics of the printers to be included in instruction manuals, product brochures on websites. ISO/IEC 11160 applies to printers that could be operated in an office environment. Printers requiring specially equipped rooms or specially instructed operators are not considered in ISO/IEC 11160.

INCITS/ISO/IEC 11172-1-1993 [R2013], Information Technology - Coding of Moving Pictures and Associated Audio for Digital Storage Media at up to about 1,5 Mbit/s - Part 1: Systems

This part of ISO/IEC 11172 specifies the system layer of the coding. It was developed principally to support the combination of the video and audio coding methods defined in ISO/IEC 11172-2 and ISO/IEC 11172-3.
INCITS/ISO 11172-2:1993 [R2013], Information Technology - Coding of Moving Pictures and Associated Audio for Digital Storage Media at up to about 1.5 Mbit/s - Part 2: Video

ISO/IEC 11172-2:2005 [R2014], Information technology - Metadata Registries (MDR) - Part 2: Classification for administered items

ISO/IEC 11179-2:2005 restates and elaborates on the procedures and techniques of ISO/IEC 11179-3:2003 for registering classification schemes and classifying administered items in a metadata registry (MDR). All types of administered items can be classified, including object classes, properties, representations, value domains, and data element concepts, as well as data elements themselves.

INCITS/ISO 11179-3:2014, Information technology - Metadata registries (MDR) - Part 3: Registry metamodel and basic attributes

ISO/IEC 11179-3:2013 specifies the structure of a metadata registry in the form of a conceptual data model.

INCITS/ISO 11179-4:2004 [R2014], Information technology - Management and Interchange - Metadata Registries (MDR) - Part 4: Formulation of data definitions

ISO/IEC 11179-4:2004 specifies requirements and recommendations for constructing definitions for data and metadata. Only semantic aspects of definitions are addressed; specifications for formatting the definitions are deemed unnecessary for the purposes of this standard. While especially applicable to the content of metadata registries as specified in ISO/IEC 11179-3, ISO/IEC 11179-4:2004 is useful broadly for developing definitions for data and metadata.

INCITS/ISO 11179-5:2015 [2016], Information technology - Metadata registries (MDR) - Part 5: Naming principles

Provides instruction for naming of the following items, as defined in ISO/IEC 11179-3: concept, data element concept, conceptual domain, data element, and value domain. Describes naming in a metadata registry (MDR); includes principles and rules by which naming conventions can be developed; and provides examples of naming conventions.

INCITS/ISO 11179-6:2005 [R2015], Information technology - Metadata registries (MDR) - Part 6: Registration

This standard specifies the procedure by which Administered items required in various application areas could be registered and assigned an internationally unique identifier. For each Administered item to be registered, this standard defines the type of information that is specified, the conditions that are met, and the procedure that is followed. The requirements and procedure contained herein apply to all Administered items specified in ISO/IEC 11179-3. In addition, administration records that document the common administration and identification, naming and definition details as required by, and associated with, any administered item-specific details are also governed by this standard. This standard only addresses the metadata that is used to specify all types of Administered Items. Others may want to use This standard to register and manage locally defined Administered item types that are not defined in ISO/IEC 11179-3. This standard does not address the metadata that is used to specify particular types of Administered Items such as data elements and value domains. This standard does not specify the registry’s system design, file organization techniques, storage media, programming languages, etc. to be used in its implementation.

INCITS/ISO 11319-1993 [S2016], Information Technology - 8mm Wide Magnetic Tape Cartridges for Information Interchange - Helical Scan Recording

Specifies the physical and magnetic characteristics of an 8 mm wide magnetic tape cartridge to enable interchangeability of such cartridges. It also provides a format and recording method, thus allowing, together with ISO 1001 for Magnetic Tape Labelling, full data interchange by means of such magnetic tape cartridges.

INCITS/ISO 11404-2007 [R2014], Information technology - General-Purpose Datatypes (GPD)

ISO/IEC 11404-2007 specifies the nomenclature and shared semantics for a collection of datatypes commonly occurring in programming languages and software interfaces, referred to as the General-Purpose Datatypes (GPD).

INCITS/ISO 11544-1993 [R2013], Information technology - Coded representation of picture and audio information - Progressive bi-level image compression

Defines a bit-preserving (lossless) compression method for coding image bit-planes and is particularly suitable for bi-level (two-tone, including black-white) images. Specifies requirements and test methods and gives datastream examples.
INCITS/ISO/IEC 11557:1992 [S2008],
Information Technology - 3.81 mm Wide Magnetic Tape Cartridge for Information Interchange - Helical Scan Recording - DDS-DC Format Using 60 m and 90 m Length Tapes

Specifications the physical and magnetic characteristics of a 3.81 mm-wide magnetic tape cartridge to enable interchangeability of such cartridges. It also specifies the quality of the recorded signal, the recording method and the recorded format, thereby allowing data interchange between drives by means of such magnetic tape cartridges.

INCITS/ISO/IEC 11560:1992 [R2015],
Information technology - Information interchange on 130 mm optical disk cartridges using the magneto-optical effect, for write once, read multiple functionality

This standard specifies definitions of the essential concepts, the environment in which the characteristics are to be tested, the environments in which the cartridge is to be operated and stored, the mechanical, physical and dimensional characteristics of the case and of the optical disk, the magneto-optical characteristics and the recording characteristics, so as to provide physical interchangeability between data processing systems, the format for the physical disposition of the tracks and sectors, the error correction codes, the modulation method used for recording and the quality of the recorded signals.

INCITS/ISO/IEC 11571:1998 [S2016],
Information technology - Telecommunications and Information Exchange Between Systems - Private Integrated Services Networks - Addressing

Defines the requirements for the handling of network addresses for the identification of entities which use or provide telecommunication services offered by Private Integrated Services Networks (PISNs). Covers numbering, including the requirements for the support of a Private Numbering Plan, the addressing of network service access points for open systems interconnection (OSI NSAP addressing), and the support of sub-addressing.

INCITS/ISO/IEC 11572:2000 [S2012],
Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Circuit mode bearer services - Inter-exchange signalling procedures and protocol

This International Standard defines the signalling procedures and protocol for the purpose of circuit-switched Call Control at the Q-reference point between Private Integrated Network Exchanges (PINXs) connected together within a Private Integrated Services Network (PISN). The Q reference point is defined in ISO/IEC 11579-1. This International Standard is based upon that described in ITU-T Recommendation Q.931, including the provisions for symmetrical operation described in annex D of that recommendation.

INCITS/ISO/IEC 11574:2000 [R2014],
Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Circuit-mode 64 kbit/s bearer services - Service description, functional capabilities and information flows

This International Standard specifies the service description and control aspects, including functional capabilities and information flows, of standardised circuit-mode bearer services which may be supported by a Private Integrated Services Network (PISN). This International Standard includes the following basic services: Circuit-mode 64 kbit/s unrestricted 8 kHz structured bearer service category; Circuit-mode 64 kbit/s 8 kHz structured bearer service category usable for speech information transfer; Circuit-mode 64 kbit/s 8 kHz structured bearer service category usable for 3.1 kHz audio information transfer.

INCITS/ISO/IEC 11576:1994 [S2008],
Information Technology - Procedure for the Registration of Algorithms for the Lossless Compression of Data

 Specifies the procedures to be followed by a Registration Authority in preparing, maintaining and publishing an International Register of numeric identifiers allocated to algorithms for the lossless compression of data, excluding cryptographic algorithms.

INCITS/ISO/IEC 11579-1:1994 [S2015],
Information technology - Telecommunications and information exchange between systems - Private integrated services network - Part 1: Reference configuration for PISN Exchanges (PINX)

This standard specifies a reference configuration (RC) for private integrated services network exchanges (PINX) for their interconnection to form private integrated services networks (PISN). The configuration is not intended to require any specific implementation of a PINX, but only to provide guidance for the specification of PINX capabilities. This RC is sufficient to support ISDN-like applications. It can be extended to also support non-ISDN-like applications. This RC describes a conceptual PINX. By combining multiple PINXs to a private integrated services network the RC becomes applicable to a PISN.


Technical Corrigendum 1 to ISO/IEC 11579-1:1994

INCITS/ISO/IEC 11581-6:1999 [S2016],
Information technology - User system interfaces and symbols - Icon symbols and functions - Part 6: Action Icons

Applies to icons that are shown on a screen, that users can manipulate and interact with, and that represent data or computer system functions. Addresses only action icons. Action icons represent actions by association with objects that prompt the user to recall the intended actions. Describes user interaction with and appearance of action icons on the screen. Other types of icons are covered in other parts of the standard, listed in the Foreword.

INCITS/ISO/IEC 11693-1:2012[2014],
Identification cards - Optical memory cards - Part 1: General characteristics

The intent of ISO/IEC 11693-1:2012 is to provide necessary information for card manufacturers, card issuers, and card users interested in interchanging information encoded on optical memory cards. ISO/IEC 11693-1:2012 serves as a guide to companies who plan to develop equipment and systems using optical memory cards. The data content and use of the cards depend upon the applications developed by each industry group.

INCITS/ISO/IEC 11694-1:2012 [2014],
Identification cards - Optical memory cards - Linear recording method - Part 1: Physical characteristics

ISO/IEC 11694-1:2012 defines the physical characteristics of optical memory cards using the linear recording method.

INCITS/ISO/IEC 11694-2:2012 [2014],
Identification cards - Optical memory cards - Linear recording method - Part 2: Dimensions and location of the accessible optical area

ISO/IEC 11694-2:2012 defines the dimensions and location of the accessible optical area of optical memory cards with ID-1 dimensions using the linear recording method.

INCITS/ISO/IEC 11694-3:2015 [2016],
Identification cards - Optical memory cards - Linear recording method - Part 3: Optical properties and characteristics

Specifies the optical properties and characteristics of optical memory cards using the linear recording method.

INCITS/ISO/IEC 11694-4:2008 [R2016],
Identification cards -- Optical memory cards -- Linear recording method -- Part 4: Logical data structures

Defines the logical data structures for optical memory cards necessary to allow compatibility and interchange between systems using the linear recording method.
INCITS/ISO/IEC 11694-5:2014 [2016],
Identification cards - Optical memory cards - Linear recording method - Part 5: Data format for information interchange for applications using ISO/IEC 11694-4

Defines the data format for optical memory cards necessary to allow compatibility and interchange between systems using the linear recording method.

INCITS/ISO/IEC 11694-6:2014 [2016],
Identification cards - Optical memory cards - Linear recording method - Part 6: Use of biometrics on an optical memory card

Describes the use of biometric data on optical memory cards using the logical data structure described in ISO/IEC 11694-5.

INCITS/ISO/IEC 11695-1:2015 [2016],
Identification cards -- Optical memory cards -- Holographic recording method -- Part 1: Physical characteristics

Defines the physical characteristics of optical memory cards using the holographic recording method.

INCITS/ISO/IEC 11695-2:2015 [2016],
Identification cards - Optical memory cards - Holographic recording method - Part 2: Dimensions and location of accessible optical area

Defines the dimensions and location of the accessible optical area of optical memory cards using the holographic recording method.

INCITS/ISO/IEC 11695-3:2008 [R2016],
Identification cards -- Optical memory cards -- Holographic recording method -- Part 3: Optical properties and characteristics

Specifies the optical properties and characteristics of optical memory cards using the holographic recording method.

INCITS/ISO/IEC 11770-1:1996 [2010],
Information technology -- Security techniques - Key management - Part 1: Framework

Defines a general model of key management that is independent of the use of any particular cryptographic algorithm. Identifies the objective of key management, basic concepts and key management services.

INCITS/ISO/IEC 11770-1:2010 [2013],
Information technology - Security techniques - Key management - Part 1:Framework

ISO/IEC 11770-1:2010 defines a general model of key management that is independent of the use of any particular cryptographic algorithm. However, certain key distribution mechanisms can depend on particular algorithm properties, for example, properties of asymmetric algorithms. ISO/IEC 11770 -1:2010 contains the material required for a basic understanding of subsequent parts. Examples of the use of key management mechanisms are included in ISO 11568. If non-repudiation is required for key management, ISO/IEC 13888 is applicable.

INCITS/ISO/IEC 11770-2:2008 [R2014],
Information technology - Security techniques - Key Management - Part 2: Mechanisms using symmetric techniques

ISO/IEC 11770 is concerned with the management of cryptographic keys. ISO/IEC 11770-2.2008 specifies a series of 13 mechanisms for establishing shared secret keys using symmetric cryptography. These mechanisms address three different environments for the establishment of shared secret keys: point-to-point key establishment schemes, mechanisms using a Key Distribution Centre (KDC), and techniques that use a Key Translation Centre (KTC). ISO/IEC 11770 -2.2008 describes the content of messages which carry keying material or are necessary to set up the conditions under which the keying material can be established.

INCITS/ISO/IEC 11770-3:2008 [R2014],
Information technology - Security techniques - Key management - Part 3: Mechanisms using asymmetric techniques


INCITS/ISO/IEC 11770-4:2008 [R2013],
Information technology - Security techniques - Key management - Part 4: Key establishment mechanisms based on weak secrets

This part of ISO/IEC 11770 defines key establishment mechanisms based on weak secrets, i.e., secrets that can be readily memorized by a human, and hence secrets that will be chosen from a relatively small set of possibilities. It specifies cryptographic techniques specifically designed to establish one or more secret keys based on a weak secret derived from a memorized password, while preventing off-line brute-force attacks associated with the weak secret.

INCITS/ISO/IEC 11770-5:2011 [2012],
Information technology -- Security techniques -- Key management -- Part 5: Group key management

ISO/IEC 11770-5:2011 specifies key establishment mechanisms for multiple entities to provide procedures for handling cryptographic keying material used in symmetric or asymmetric cryptographic algorithms according to the security policy in force.

INCITS/ISO/IEC 11889-1:2009 [R2014],
Information technology - Trusteed Platform Module - Part 1: Overview

ISO/IEC 11889 defines the Trusted Platform Module (TPM), a device that enables trust in computing platforms in general. ISO/IEC 11889-2:2009 defines the principles of TPM operation. These include base operating modes, cryptographic algorithms and key sizes for the algorithms, basic interoperability requirements, basic protocols and the use of the protocols, and use of TPM resources.

INCITS/ISO/IEC 11889-3:2009 [R2014],
Information technology - Trusteed Platform Module - Part 3: Structures

ISO/IEC 11889 defines the Trusted Platform Module (TPM), a device that enables trust in computing platforms in general. ISO/IEC 11889-3:2009 defines the structures and constants that enable the interoperability between TPM implementations.

INCITS/ISO/IEC 11889-4:2009 [R2014],
Information technology - Trusteed Platform Module - Part 4: Commands

ISO/IEC 11889 defines the Trusted Platform Module (TPM), a device that enables trust in computing platforms in general. ISO/IEC 11889-4:2009 defines the commands, actions of the commands, and the parameters to the commands that provide the TPM functionality.

INCITS/ISO/IEC 11976-2008 [R2014],
Information technology - Data interchange on 130 mm rewritable and write-once-read-many ultra density optical (UDO) disk cartridges - Capacity: 60 Gbytes per cartridge - Second generation

This International Standard specifies the mechanical, physical, and optical characteristics of a 130 mm optical disk cartridge (ODC) that employs thermo-optical Phase Change effects to enable data interchange between such disks.

INCITS/ISO/IEC 11989-2010 [2013], Information technology - iSCSI Management API

ISO/IEC 11989-2010(E) specifies an ApplicationProgramming Interface (API) that provides interfaces to discover and manage iSCSI resources on a system. This International Standard is applicable to vendors who deliver drivers that provide iSCSI resources to a system.

INCITS/ISO/IEC 12087-1:1995 [S2010],

ISO/IEC 12087 is concerned with the manipulation, processing and interchange of all types of digital images. The main purpose of this part is to define a generic, unifying imaging architecture to which other parts of ISO/IEC 12087 conform. This part of ISO/IEC 12087 also defines those “specializations” or “delineations” of the generic imaging architecture that are required to support IPI-PIKS and IPI-HIF.
INCITS/ISO/IEC 12087-2:1994 [R2014],
Information technology - Computer graphics and image processing - Image Processing and Interchange (IPI) - Functional specification - Part 2: Programmer’s imaging kernel system application programme interface

Establishes the specification of the application program interface (API), called the Programmer’s Imaging Kernel System (PIKS). PIKS is intended to provide a rich set of both low-level and high-level services on image and image-derived data objects. These services can be used as building blocks for a broad range of common imaging applications. Lists are included containing a summary of technological capabilities provided by PIKS and not provided by PIKS. It should be noted that PIKS functionality may be used as a pre-processor or co-processor for many of the technologies in the “Not provided by PIKS” list.


Technical Corrigendum 1


Facilitates the interchange of digital images. For this purpose, conceptual, architectural, and functional definitions of the Image Interchange Facility (IIF) are established. ISO/IEC 12087-3 consists of two major parts: (a) the IIF data format (IIF-DF) definition (by means of a formal syntax, described according to the Abstract Syntax Notation One (ASN.1)) - refer to clause 5), and (b) the IIF Gateway definition (by means of a manual page description of the functionality of an Application Program Interface (API) – refer to clause 7).


This is Amendment 1 to ISO/IEC 12087-3:1995 that facilitates the interchange of digital images. For this purpose, conceptual, architectural, and functional definitions of the Image Interchange Facility (IIF) are established. ISO/IEC 12087-3 consists of two major parts: (a) the IIF data format (IIF-DF) definition (by means of a formal syntax, described according to the Abstract Syntax Notation One (ASN.1)) - refer to clause 5), and (b) the IIF Gateway definition (by means of a manual page description of the functionality of an Application Program Interface (API) – refer to clause 7).


This part of ISO/IEC 12087 establishes the specification of the Basic Image Interchange Format (BIIF) part of the standard. BIIF is a standard developed to provide a foundation for interoperability in the interchange of imagery and imagery-related data among applications.


Technical Corrigendum 1


Technical Corrigendum 2

INCITS/ISO/IEC 12088-4:1995 [S2011], Information technology - Computer graphics and image processing - Image processing and interchange - Application program interface language bindings

Consists of the three parts that define the functional aspects of this part of ISO/IEC 12088. The Common Architecture of Imaging (IPI-CAI) defines the overall architecture. The Programmer’s Imaging Kernel System (PIKS) and the Image Interchange Facility (IPI-IF) each specify a language-independent image-processing Application Program Interface (API) within the Image Processing and Interchange Standard.

INCITS/ISO/IEC 12089:1997 [R2014], Information technology - Computer graphics and image processing - Encoding for the Image Interchange Facility (IIF)

This International Standard defines the encoding rules which shall apply to the representation of IPI-IF image data. The IPI-IF data format is defined in ISO/IEC 12087-3, called ‘Image Interchange Facility (IIF)’. It is Part 3 of the Image Processing and Interchange International Standard, defined in ISO/IEC 12087. The IPI-IF facilitates the interchange of digital images. It consists of two major parts: the IPI-IF data format (IIF-DF) definition, whose syntax is described using ASN.1; the IPI-IF gateway definition, whose functionality is described by an application programmers interface.

INCITS/ISO/IEC 12246:1993 [S2013], 8 mm wide magnetic tape cartridge dual azimuth format for information interchange - Helical Scan Recording

Specifies the physical and magnetic characteristics. Also specifies the quality of the recorded signals, the recorded format and the recording method, thereby allowing full data interchange by means of such magnetic tape cartridges. Is based on ISO/IEC 11319 with extensions and modifications which specify the additional features of the dual azimuth format, but is not intended to replace ISO/IEC 11319.

INCITS/ISO/IEC 12248:1993 [S2013], 3.81 mm wide magnetic tape cartridge for information interchange - Helical scan recording - DATA/DAT-DC format using 60m and 90 m length tapes

Specifies the physical and magnetic characteristics. Also specifies the quality of the recorded signals, the recorded format and the recording method, thereby allowing data interchange between drives by means of such magnetic tape cartridges. Specifies two types of cartridges referred to as type A (magnetic tape of nominal thickness of 13 micrometer and a nominal length of up to 60.5 m) and type B (magnetic tape of a nominal thickness of 9 micrometer and a nominal length of up to 92.0 m).

INCITS/ISO/IEC 12862-2011 [2014], Information technology - 120 mm (8,54 Gbytes per side) and 80 mm (2,66 Gbytes per side) DVD recordable disk for dual layer (DVD-R for DL)

ISO/IEC 12862:2011 specifies the mechanical, physical and optical characteristics of a 120 mm and an 80 mm dual layer DVD recordable disk to enable the interchange of such disks. It specifies the quality of the pre-recorded, unrecorded and recorded signals, the format of the data, the format of the information zone, the format of the unrecorded zone, and the recording method, thereby allowing for information interchange by means of such disks. This disk is identified as a DVD recordable disk for dual layer (DVD-R for DL).

INCITS/ISO/IEC 13187-2011 [2013], Information technology - Server management command line protocol (SM CLP) specification

This International Standard lays out the general framework for the Server Management Command Line Protocol (SM CLP). This standard is intended to guide developers of implementations of the SM CLP and may also be used as a reference by system administrators and other users of SM CLP implementations.

INCITS/ISO/IEC 13211-1-1995 [R2012], Information Technology - Prolog Language Part 1: General Core

ISO/IEC 13211 is designed to promote the applicability and portability of Prolog text and data among a variety of data processing systems.
Designed to promote the applicability and portability of Prolog modules that contain Prolog text complying with the requirements of the Programming Language Prolog as specified in this part of ISO/IEC 13211.

The scope of this standard is: an enterprise spec. for the trading function; an information spec. for the trading function; a computational spec. for traders; conformance requirements in terms of conformance points.

This part of the standard describes how the ODP trading Function can be realised using information entries and support mechanisms of the OSI Directory.

This International Standard, known as the Interchange Standard for Multimedia Interactive Documents or ISMID, facilitates the interchange of Multimedia Interactive Documents (MIDs) among heterogeneous interactive document development and delivery systems by providing the architecture from which common interchange languages can be created. ISMID is a client architecture of International Standard ISO/IEC 10744:1997, Information technology – Hypermedia/Time-based Structuring Language (HyTime) and is an SGML application conforming to International Standard ISO 8879 -- Standard Generalized Markup Language.

This International Standard, known as the Interchange Standard for Multimedia Interactive Documents or ISMID, facilitates the interchange of Multimedia Interactive Documents (MIDs) among heterogeneous interactive document development and delivery systems by providing the architecture from which common interchange languages can be created. ISMID is a client architecture of International Standard ISO/IEC 10744:1997, Information technology – Hypermedia/Time-based Structuring Language (HyTime) and is an SGML application conforming to International Standard ISO 8879 -- Standard Generalized Markup Language.

ISO/IEC 13249 defines a number of packages of generic data types common to various kinds of data used in multimedia and application areas, to enable that data to be stored and manipulated in an SQL database. The package in each subject area is defined as a part of ISO/IEC 13249. ISO/IEC 13249-1:2007 defines those concepts, notations and conventions that are common to two or more other parts of ISO/IEC 13249. In particular, it describes the way ISO/IEC 9075 is used in other parts of ISO/IEC 13249 to define the user-defined types and their behaviour appropriate to each subject area.

Introduces the Full-Text part of ISO/IEC 13249 (all parts); gives the references necessary for this part of ISO/IEC 13249; defines notations and conventions specific to this part of ISO/IEC 13249; defines concepts specific to this part of ISO/IEC 13249; and defines the full-text user-defined types and their associated routines.

ISO/IEC 13249-3:2011 defines spatial user-defined types, routines and schemas for generic spatial data handling. It addresses the need to store, manage and retrieve information based on aspects of spatial data such as geometry, location and topology.

INCITS/ISO/IEC 13249-5:2003 [S2016], Information technology -- Database languages -- SQL multimedia and application packages -- Part 5: Still image
Introduces the still image part of ISO/IEC 13249 (all parts); gives the references necessary for this part of ISO/IEC 13249; defines notations and conventions specific to this part of ISO/IEC 13249; defines concepts specific to this part of ISO/IEC 13249; and defines the still image user-defined types and their associated routines.

INCITS/ISO/IEC 13249-6:2006 [R2012], Information technology - Database languages - SQL - Multimedia and Application Packages - Part 6: Data Mining (2nd ed.)
ISO/IEC 13249 defines a number of packages of generic data types common to various kinds of data used in multimedia and application areas, to enable that data to be stored and manipulated in an SQL database. ISO/IEC 13249-6:2006 introduces the data-mining package, gives the necessary references, defines notations and conventions specific to ISO/IEC 13249-6:2006, defines concepts specific to ISO/IEC 13249-6:2006, and defines data mining user-defined types and their associated routines.

INCITS/ISO/IEC 13250-2:2006 [R2014], Information Technology - Topic Maps - Data Model
ISO/IEC 13250-2:2006 specifies the Topic Maps data model. It defines the abstract structure and interpretation of topic maps, the rules for merging topic maps and a set of fundamental subject identifiers. The purpose of the data model is to define the interpretation of the Topic Maps interchange syntax, and to serve as a foundation for the definition of supporting standards for canonicalization, querying, constraints, etc.

ISO/IEC 13250:2003 (2nd edition) specifies two syntaxes for the interchange of Topic Maps. One of these syntaxes is based on the ISO/IEC 10744:1997 (HyTime) meta-DTD (Meta Document Type Definition), and it is itself specified as a meta-DTD. The other, called XTM (XML Topic Maps), is specified as an Extensible Markup Language (XML) DTD.

ISO/IEC 13250:3-2013 defines an XML-based interchange syntax for Topic Maps, which can be used to interchange instances of the data model defined in ISO/IEC 13250-2. It also defines a mapping from the interchange syntax to the data model. The syntax is defined with a RELAX-NG schema, and more precision is provided through the mapping to the data model, which effectively also defines the interpretation of the syntax.

ISO/IEC 13250-4:2009 defines a format known as Canonical XTM, or CXTM for short. The format is an XML format, and has the property that it guarantees that two equivalent Topic Maps Data Model instances (ISO/IEC 13250-2) will always produce byte-by-byte identical serializations, and that non-equivalent instances will always produce different serializations. CXTM thus enables direct comparison of two topic maps to determine equality by comparison of their canonical serializations.

ISO/IEC 13250-6:2010 defines a text-based notation for representing instances of the data model defined in ISO/IEC 13250-2. It also defines a mapping from this notation to the data model. The syntax is defined through an Extended Backus-Naur Form (EBNF) grammar.
INCITS/ISO/IEC 13403:1995 [S2009],
Information Technology - Information Interchange on 300 mm Optical Disk Cartridges of the Write Once, Read Multiple (WORM) Type Using the CCS Method

Specifies the characteristics of 300 mm optical disk cartridges (ODC) of the WORM type providing for embossed information and for data to be written once and read multiple times.

INCITS/ISO/IEC 13422:1994 [S2008],
Information Technology - Data Interchange on 90 mm Flexible Disk Cartridges on 10 Mbyte Capacity Using Sector Servo Tracking - ISO Type 304

Specifies the characteristics of 90 mm Flexible Disk Cartridges of 10 Mbyte formatted capacity, recorded at 33 157 fprad using modified frequency modulation recording and sector servo tracking on 255 data tracks on each side.

INCITS/ISO/IEC 13481:1993 [S2009],
Information Technology - Data Interchange on 130 mm Optical Disk Cartridges - Capacity: 1 Gigabyte Per Cartridge

Specifies two implementations: Type R/W (data to be written, read and erased many times) and type WO (having write once, read multiple functionality). Specifies the conditions for conformance testing and the reference drive; the environments in which the cartridges are to be operated and stored; the mechanical, physical and dimensional characteristics of the case and of the cartridge; the format of the information on the disk; the characteristics of the embossed information on the disk; the magneto-optical characteristics of the disk; the minimum quality of user-written data on the disk.

INCITS/ISO/IEC 13549:1993 [S2009],
Information Technology - Data Interchange on 130 mm Optical Disk Cartridges - Capacity: 1,3 Gigabytes Per Cartridge

This International Standard specifies the conditions for conformance testing; the environments in which the cartridges are to be operated and stored; the mechanical, physical and dimensional characteristics of the case and of the cartridges, so as to provide mechanical interchangeability between the data processing systems; the format of the information on the disk, both embossed and user-written, including the physical disposition of the tracks and sectors, the error correction codes, and the modulation method used.

INCITS/ISO/IEC 13568-2002 [R2012],
Information technology - Z formal specification notation - Syntax, type system and semantics

The following are within the scope of this International Standard: the syntax of the Z notation; the type system of the Z notation; the semantics of the Z notation; a toolkit of widely used mathematical operators; L A T E X [10] and e-mail mark-up of the Z notation.

INCITS/ISO/IEC 13614:1995 [S2009],
Information technology - Interchange on 300 mm optical disk cartridges of the write once, read multiple (WORM) type using the SSF method

This International Standard specifies the characteristics of 300 mm optical disk cartridges (ODC) of the WORM type providing for embossed information and for data to be written once and read multiple times. Together with the standard for Volume and File Structure, this International Standard provides for full data interchange between data processing systems. Interchange involves the ability to write and read data without introducing any error.

INCITS/ISO/IEC 13660-2001 [R2012],
Information technology - Office equipment - Measurement of image quality attributes for hardcopy output - Binary monochrome text and graphic images

This International Standard specifies device-independent image quality attributes, measurement methods, and analytical procedures to describe the quality of output images from hardcopy devices. This International Standard is applicable to human-readable documents composed of binary monochrome images produced from impact printers, non-impact printers, and copiers.

INCITS/ISO/IEC 13673:2000 [R2015],
Information technology - Document processing and related communication - Conformance testing for Standard Generalized Markup Language (SGML) systems

This standard addresses the construction and use of test suites for verifying conformance of SGML systems. Its provisions assist those who build test suites, those who build SGML systems to be evaluated by such suites, and those who examine an SGML system's performance on a test suite as part of the process of selecting an SGML tool. This standard includes criteria for the organization of test suites, including naming conventions, documentation conventions, and specification of applicable concrete syntaxes and features. This standard applies to the testing only of aspects of SGML implementation and usage for which objective conformance criteria are defined in ISO 8879.

INCITS/ISO/IEC 13714:1995 [S2011],
Information Technology - User Interface to Telephone-based Services: Voice Messaging Applications

Provides users of voice messaging systems with a consistent mode of interaction in a way that is independent of the underlying system implementations. The interface is based on a set of design guidelines that are annexed to this standard.

INCITS/ISO/IEC 13817-1:1996 [S2012],
Information technology - Programming languages, their environments and system software interfaces - Vienna Development Method - Specification Language - Part 1: Base language

This part of ISO/IEC 13817 specifies the model based specification language VDM-SL (Vienna Development Method - Specification Language).


INCITS/ISO/IEC 13818-1:2013 [2014], Information technology - Generic coding of moving pictures and associated audio information: Systems ISO/IEC 13818-1:2013 specifies the system layer of the coding. It was developed principally to support the combination of the video and audio coding methods defined in ISO/IEC 13818-2 and ISO/IEC 13818-3. The system layer supports six basic functions: the synchronization of multiple compressed streams on decoding; the interleaving of multiple compressed streams into a single stream; the initialization of buffering for decoding start up; continuous buffer management; time identification; multiplexing and signalling of various components in a system stream.


This part of ISO/IEC 138 18 defines compliance to Data Storage Media Command and Control (DSMCC) standard in 2 steps: the static review and the dynamic review as defined in ISO/IEC 9646 Conformance Testing standard f 1, 2, 31. The static review requirements are specified in clause 4 of this part of ISO/IEC 13818 in the form of Protocol Implementation Conformance Statement (PICS) proforma. The ATs used for dynamic review is described in clause 5.


This Recommendation | International Standard specifies the coded representation of picture information for digital storage media and digital video communication and specifies the decoding process. The representation supports constant bit rate transmission, variable bit rate transmission, random access, channel hopping, scalable decoding, bitstream editing, as well as special functions such as fast forward playback, fast reverse playback, slow motion, pause and still pictures. This Recommendation | International Standard is forward compatible with ISO/IEC 11172-2 and upward or downward compatible with EDTV, HDTV, SDTV formats.


This part of ISO/IEC 13818 specifies the extension of ISO/IEC 11172-3 to lower sampling frequencies, the encoded representation of multichannel and multilingual high quality audio for broadcasting, transmission and storage media, and the method for decoding of multichannel and multilingual high quality audio signals. The input of the encoder and the output of the decoder are compatible with existing PCM standards.

INCITS/ISO/IEC 13818-4:2004 [R2014], Information technology - Generic coding of moving pictures and associated audio information - Part 4: Conformance testing

This part of ISO/IEC 13818 specifies how tests can be designed to verify whether bitstreams and decoders meet requirements specified in parts 1, 2, 3 and 7 of ISO/IEC 13818. In this part of ISO/IEC 13818, encoders are not addressed specifically. An encoder may be said to be an ISO/IEC 13818 encoder if it generates bitstreams compliant with the syntactic and semantic bitstream requirements specified in parts 1, 2, 3 and 7 of ISO/IEC 13818.


INCITS/ISO/IEC 13818-4:2004/AM3:2009 [R2016], Information technology -- Generic coding of moving pictures and associated audio information -- Part 4: Conformance testing - Amendment 3: Level for 1080@50p/60p conformance testing


INCITS/ISO/IEC 13818-6-1998 [R2012], Information technology - Generic coding of moving pictures and associated audio information - Part 6: Extensions for DSM-CC

The concepts and protocols of this part of ISO/IEC 13818 (DSM-CC) provide the general capability to browse, select, download, and control a variety of bit stream types. DSM-CC also provides a mechanism to manage network and application resources through the concept of a Session, an associated collection of resources required to deliver a Service. The Session complements a 'Service Domain', a collection of interfaces to browse and select services, and control the delivery of bit streams.


INCITS/ISO/IEC 13818-6-1998/AM2:2000 [R2014], Information technology - Generic coding coding of moving pictures and associated audio information - Part 6: Extensions for DSM-CC AM2: Additions to support synchronized download services, opportunistic data services and resource announcement in broadcast and interactive services


INCITS/ISO/IEC 13818-7-2006 [R2014], Information technology - Generic coding of moving pictures and associated audio information - Part 7: Advanced Audio Coding (AAC)

This International Standard describes the MPEG-2 audio non-backwards compatible standard called MPEG-2 Advanced Audio Coding, AAC [1], a higher quality multichannel standard than achievable while requiring MPEG-1 backwards compatibility. This MPEG-2 AAC audio standard allows for ITU-R 'indistinguishable' quality according to [2] at data rates of 320 kbit/s for five full-bandwidth channel audio signals. The AAC decoding process makes use of a number of required tools and a number of optional tools. Table 1 lists the tools and their status as required or optional. Required tools are mandatory in any possible profile. Optional tools may not be required in some profiles.


Amendment 1 to ISO/IEC 13818-7:2006.


This part of ISO/IEC 13818 does not change or supersede any of the requirements in ISO/IEC 13818. All Transport Streams, whether or not they are delivered in accordance with the RTI shall comply with ISO/IEC 13818-1. In particular, the accuracy requirement in ISO/IEC 13818 for PCRs in Transport Streams is not changed by the requirements of this part of ISO/IEC 13818. Compliance with this part of ISO/IEC 13818 is not required for compliance with ISO/IEC 13818-1.

INCITS/ISO/IEC 13842:1995 [S2011], Information Technology - 130 mm optical disk cartridges for information interchange - Capacity: 2 Gbytes per cartridge

Specifies (a) the conditions for conformance testing and the Reference Drive; (b) the environments in which the cartridges are to be operated and stored; (c) the mechanical, physical and dimensional characteristics of the cartridge


This part of ISO/IEC 13888 serves as a general model for subsequent parts specifying non-repudiation mechanisms using cryptographic techniques. ISO/IEC 13888 provides non-repudiation mechanisms for the following phases of non-repudiation: &##9135; evidence generation; &##9135; evidence transfer, storage and retrieval; and &##9135; evidence verification. Dispute arbitration is outside the scope of ISO/IEC 13888.
The goal of the non-repudiation service is to generate, collect, maintain, make available and validate evidence concerning a claimed event or action in order to resolve disputes about the occurrence or non-occurrence of the event or action. ISO/IEC 13888-2:2010 provides descriptions of generic structures that can be used for non-repudiation services, and of some specific communication-related mechanisms which can be used to provide non-repudiation of origin (NRO) and non-repudiation of delivery (NRD).

INCITS/ISO/IEC 13888-3:2009 [R2015],
Information technology - Security techniques - Non-repudiation - Part 3: Mechanisms using asymmetric techniques
This standard specifies mechanisms for the provision of specific, communication related, non-repudiation services using asymmetric cryptographic techniques.

INCITS/ISO/IEC 13923:1996 [S2020],
Information Technology - 3.81 mm Wide Magnetic Tape Cartridge for Information Interchange - Helical Scan Recording - DDS-2 Format Using 120 m Length Tape (formerly ISO/IEC 13923:1997)
This International Standard specifies the physical and magnetic characteristics of a 3.81 mm wide magnetic tape cartridge to enable physical interchangeability of such cartridges between drives.

INCITS/ISO/IEC 13963:1995 [S2009],
Information technology - Data Interchange on 90 mm Optical Disk Cartridges - Capacity: 230 Megabytes Per Cartridge
Specifies the characteristics of 90 mm Optical Disk Cartridges (ODC) with a capacity of 230 Mbytes per cartridge. Specifies three related, but different implementations of such cartridges: Type R/W, type P-ROM and type O-ROM. Provides for interchange between optical disk drives. Together with a standard for volume and file structure, it provides for full data interchange between data processing systems.

INCITS/ISO/IEC 14165-133:2010 [R2016],
Information technology -- Fibre Channel -- Part 133: Switch Fabric-3 (FC-SW-3)
This standard describes the operation and interaction of Fibre Channel Switches and includes: a) EPort Operation and Fabric Configuration; b) Path selection (FSPF and FSPF-Backbone); c) Bridge Port (BPort) Operation; d) distributed server interaction and communication; e) exchange of information between Switches to support zoning; f) distribution of Event Notifications between Switches.

Information technology -- Fibre Channel -- Part 321: Audio-Video (FC-AV)
Specifies the transport of digital Audio and Video formats over Fibre Channel. Specifications are included for a coherent framework (i.e., an FC-AV Container and Objects) for mapping current and future digital Audio and Video formats to Fibre Channel; mapping the formats defined by the ITU-R BT-601 and SMPTE family of standards to Fibre Channel; mapping the formats defined by the ISO/IEC 3818 family of standards (which include MPEG and related compression systems) to Fibre Channel; a profile (i.e., Simple Parametric Digital Video) that parametrically defines the characteristics of Audio and Video information for specific applications; and, data packing guidelines recommended for AV data within the Fibre Channel transmission words.

INCITS/ISO/IEC 14165-331:2007 [R2016],
Information technology -- Fibre Channel -- Part 331: Virtual Interface (FC-VI)
This standard defines the Fibre Channel mapping protocol for the Virtual Interface (VI) Architecture (FC-VI). FC-VI defines the Fibre Channel Information Units in accordance with the VI Architecture model. FC-VI additionally defines how Fibre Channel services are used to perform the services required by the VI Architecture model of its network transport.

INCITS/ISO/IEC 14165-414-2007 [R2012],
Information technology - Fibre Channel Generic Services-4 (FC-GS-4)
FC-GS-4 describes in detail the basic Fibre Channel services introduced in FC-FS. The Fibre Channel services described in this document are &amp;#8226; Directory Service, &amp;#8226; Management Service and &amp;#8226; Alias Service. In addition to the aforementioned Fibre Channel services, the Common Transport (CT) protocol is described. The Common Transport service provides a common FC-4 for use by the Fibre Channel services.

INCITS/ISO/IEC 14169-1995 [S2012],
Information Technology - 90 mm Flexible Disk Cartridges for Information Interchange - 21 Mbytes Formatted Capacity - ISO Type 305
Specifies the characteristics of 90 mm flexible disk cartridges (FDC) of 21 Mbytes formatted capacity recorded on 31 831 fjppardm in the Inner Zone and 47 747 fjppardm in the Outer Zone with sector servo tracking on 326 data tracks on each side, using 2-7 RLL recording.

INCITS/ISO/IEC 14417:1999 [R2014],
Information technology - Data recording format DD-1 for magnetic tape cassette conforming to IEC 1016
This International Standard specifies the media characteristics, the recorded tape format and file structure requirements to enable information interchange between information processing systems using 19.0 mm wide magnetic tape and cassette conforming to IEC 61016 Section 2.

INCITS/ISO/IEC 14443-1:2008 [R2015],
Identification cards - Contactless integrated circuit cards - Proximity cards - Part 1: Physical characteristics
Defines the physical characteristics of proximity cards (PICCs). It is to be used in conjunction with other parts of ISO/IEC 14443.

INCITS/ISO/IEC 14443-2:2016 [R2016],
Identification cards -- Contactless integrated circuit cards -- Proximity cards -- Part 2: Radio frequency power and signal interface
Specifies the characteristics of the fields to be provided for power and bi-directional communication between proximity coupling devices (PCDs) and proximity cards or objects (PICCs). It does not specify the means of generating coupling fields, nor the means of compliance with electromagnetic radiation and human exposure regulations, which can vary according to country.

INCITS/ISO/IEC 14443-3:2016 [R2016],
Identification cards -- Contactless integrated circuit cards -- Proximity cards -- Part 3: Initialization and anticollision
Describes the polling for proximity cards or objects (PICCs) entering the field of a proximity coupling device (PCD); the byte format, the frames and timing used during the initial phase of communication between PCDs and PICCs; the initial Request and Answer to Request command content; methods to detect and communicate with one PICC among several PICCs (anticollision); other parameters required to initialize communications between a PICC and PCD; optional means to ease and speed up the selection of one PICC among several PICCs based on application criteria; optional capability to allow a device to alternate between the functions of a PICC and a PCD to communicate with a PCD or a PICC, respectively. A device which implements this capability is called a PXD.

INCITS/ISO/IEC 14443-4:2016 [R2016],
Identification cards - Contactless integrated circuit cards - Proximity cards - Part 4: Transmission protocol
Specifies a half-duplex block transmission protocol featuring the special needs of a contactless environment and defines the activation and deactivation sequence of the protocol. It is intended to be used in conjunction with other parts of ISO/IEC 14443 and is applicable to proximity cards or objects of Type A and Type B.

INCITS/ISO/IEC 14473-1999 [R2013],
Information technology - Office Equipment - Minimum Information to be specified for image scanners
This International Standard is intended to facilitate user selection of an image scanner. This International Standard specifies the minimum information that shall be included by manufacturers in their specification sheets for scanners.
INCITS/ISO/IEC 14478-1:1998 [S2009],
Information Technology - Computer Graphics and Image Processing - Presentation Environment for Multimedia Objects (PREMO) - Part 1: Fundamentals of PREMO

Defines a flexible environment to encompass modular functionality and is extensible through the creation of future components, both within and outside of standards committees. It supports a wide range of multimedia applications in a consistent way, from simple drawings up to full motion video, sound and virtual reality environments.

Information Technology - Computer Graphics and Image Processing - Presentation Environment for Multimedia Objects (PREMO) - Part 2 - Foundation Component

Lists an initial set of object types and non-object types useful for the construction of, presentation of, and interaction with multimedia information. Dependent on the PREMO object model defined in clause 8 of ISO/IEC 14478-1. The foundation component does not depend on any other components.

INCITS/ISO/IEC 14478-3:1998 [S2009],
Information Technology - Computer Graphics and Image Processing - Presentation Environment for Multimedia Objects (PREMO) - Part 3 - Multimedia Systems Services

This Part of ISO/IEC 14478 defines a standard set of multimedia system services that can be used by multimedia application developers in a variety of computing environments. The focus is on enabling multimedia applications in a heterogeneous, distributed computing environment. Throughout this document this Part of ISO/IEC 14478 will also be referred to as "Multimedia System Services", and abbreviated as MSS.

INCITS/ISO/IEC 14478-4:1998 [S2009],
Information Technology - Computer Graphics and Image Processing - Presentation Environment for Multimedia Objects (PREMO) - Part 4 - Modelling, Rendering and Interaction Component

Describes a set of object types and non-object types to provide the construction of, presentation of, and the interaction with multimedia information. The multimedia information can be graphics, video, audio, or other types of presentable media. This information can be enhanced by time aspects.

INCITS/ISO/IEC 14492:2001 [R2012],
Information technology - Lossy/lossless coding of bi-level images

This Recommendation | International Standard defines methods for coding bi-level images and sets of images (documents consisting of multiple pages). It is particularly suitable for bi-level images consisting of text and dithered (halftone) data.

Information technology - Lossy/lossless coding of bi-level images - Amendment 1: Encoder


Information technology - Lossy/lossless coding of bi-level images - Amendment 2: Extension of adaptive templates for halftone coding


INCITS/ISO/IEC 14495-1:2000 [R2016],
Information technology - Lossless and near-lossless compression of continuous-tone still images: Baseline

Defines a set of lossless (bit-preserving) and nearly lossless (where the error for each reconstructed sample is bounded by a predefined value) compression methods for coding continuous-tone, gray-scale, or color digital still images. This standard specifies a process for converting source image data to compressed image data; specifies processes for converting compressed image data to reconstructed image data; specifies coded representations for compressed image data; and provides guidance on how to implement these processes in practice.

INCITS/ISO/IEC 14495-2-2003 [R2013],
Information technology - Lossless and near-lossless compression of continuous-tone still images: Extensions

ISO/IEC 14495-2:2003 defines a set of lossless (bit-preserving) and nearly lossless (where the error for each reconstructed sample is bounded by a predefined value) compression methods for coding continuous-tone (including bi-level), gray-scale, or colour digital still images.

INCITS/ISO/IEC 14496-1:2010 [2012],
Information technology - Coding of - Coding of audio-visual objects - Part 1: Systems

This part of ISO/IEC 14496 specifies system level functionalities for the communication of interactive audiovisual scenes, i.e. the coded representation of information related to the management of data streams (synchronization, identification, description and association of stream content).

INCITS/ISO/IEC 14496-10:2014 [2015],
Information technology - Coding of audio-visual objects - Part 10: Advanced Video Coding

This Part of ISO/IEC 14496 specifies advanced video coding for coding of audio-visual objects.

INCITS/ISO/IEC 14496-11:2005 [R2014],
Information technology - Coding of audio-visual objects - Part 11: Scene description and application engine

This part of ISO/IEC 14496 specifies: 1. the coded representation of the spatio-temporal positioning of audio-visual objects as well as their behavior in response to interaction (scene description); 2. the Extensible MPEG-4 Textual (XMT) format, a textual representation of the multimedia content described in ISO/IEC 14496 using the Extensible Markup Language (XML); and 3. a system level description of an application engine (format, delivery, lifecycle, and behavior of downloadable Java byte code applications).


This part of ISO/IEC 14496 specifies the ISO base media file format, which is a general format forming the basis for a number of other more specific file formats. This format contains the timing, structure, and media information for timed sequences of media data, such as audio-visual presentations. This part of ISO/IEC 14496 is applicable to MPEG-4, but its technical content is identical to that of ISO/IEC 15444-12, which is applicable to JPEG 2000.

Information technology - Coding of audio-visual objects - Part 13: Intellectual Property Management and Protection (IPMP) extensions

The definition, as well as Extension tags, syntax and semantics for an IPMP_Data_BaseClass to support the following functionalities: Mutual Authentication for IPMP tool to IPMP tool as well as IPMP tool to Terminal communication. The requesting by IPMP tools of the connection/disconnection to requested IPMP tools. The notification to IPMP tools of the connection/disconnection of IPMP tools. Common IPMP processing. IPMP tool to/from User interaction.

INCITS/ISO/IEC 14496-14-2003 [R2013],
Information technology - Coding of audio-visual objects - Part 14: MP4 file format

ISO/IEC 14496-14:2003 specifies the MP4 file format as derived from ISO/IEC 14496-12 and ISO/IEC 15444-12, the ISO base media file format. It revises and completely replaces Clause 13 of ISO/IEC 14496-1, in which the file format was previously specified.


ISO/IEC 14496-15:2014 specifies the storage format for streams of video that is structured as Network Abstraction Layer (NAL) Units, such as Advanced Video Coding, AVC (ISO/IEC 14496-10) and High Efficiency Video Coding, HEVC (ISO/IEC 23008-2) video streams.


INCITS/ISO/IEC 14496-16:2011 [2014], Information technology -- Coding of audio-visual objects -- Part 16: Animation Framework eXtension (AFX)

ISO/IEC 14496-16:2011 specifies MPEG-4 Animation Framework eXtension (AFX) model for representing and encoding 3D graphics assets to be used standalone or integrated in interactive multimedia presentations (the latter when combined with other parts of MPEG-4). Within this model, MPEG-4 is extended with higher-level synthetic objects for geometry, texture, and animation as well as dedicated compressed representations.

INCITS/ISO/IEC 14496-17:2006 [2014], Information technology -- Coding of audio-visual objects -- Part 17: Streaming text format

ISO/IEC 14496-17:2006 was developed in response to the need for a generic method for coding of text at very low bit rate as one of the multimedia components within an audiovisual presentation. ISO/IEC 14496-17:2006 allows for example subtitles and Karaoke song texts to be coded and transported as separate text streams at bitrates that are sufficiently low for use in mobile services over IP. Target applications are in particular found in areas with severe transmission bandwidth constraints, such as mobile services over IP.


This part of ISO/IEC 14496 specifies functionalities for the communication of font data as part of the MPEG-4 encoded audio-visual presentation. More specifically, it defines: 1. Font format representation that is utilized for font data encoding (OpenType); 2. Font compression technology for TrueType and OpenType fonts with TrueType outlines; and 3. The coded representation of information in font data streams.


This part of ISO/IEC 14496 specifies functionalities for the transmission of Synthesized Texture data as part of the MPEG-4 encoded audio-visual presentation. More specifically, it defines: 1. The synthesized texture format representation that is utilized for Synthesized Texture data encoding 2. The coded representation of Synthesized Texture data streams.


This part of ISO/IEC 14496 specifies the coded representation of picture information in the form of natural or synthetic visual objects like video sequences of rectangular or arbitrarily shaped pictures, moving 2D meshes, animated 3D face and body models and texture for synthetic objects. The coded representation allows for content based access for digital storage media, digital video communication and other applications. ISO/IEC 14496 specifies also the decoding process of the aforementioned coded representation.


INCITS/ISO/IEC 14496-20:2008M1:2009 [R2016], Information technology -- Coding of audio-visual objects -- Part 20: Lightweight Application Scene Representation (LÆSER) and Simple Aggregation Format (SAF) AMENDMENT 1: Extensions to support SVG1.2

FC-Pi-4 does not replace FC-Pi-2 but is intended to carry forward the technical requirements specified in FC-Pi-2 for the variants addressed in FC-Pi-4.


This International Standard specifies MPEG-J Graphics Framework eXtension (GFX). This extension enables Java-based applications to control the rendering and composition of synthetic and natural media in a programmatic manner.


This part of ISO/IEC 14496 specifies the Open Font Format (OFF) specification, the TrueType® and Compact Font Format (CFF) outline formats, and the TrueType® hinting language. Many references to both TrueType® and PostScript® exist throughout this document, as Open Font Format fonts combine the two technologies.


This International Standard defines the Symbolic Music Representation technology. By capitalising the Symbolic Music Representation technology the acronym ‘SMR’ has been derived. A symbolic representation of music is a logical structure based on symbolic elements representing audiovisual events, the relationship between those events, and aspects related to how those events can be rendered and synchronized with other media types.


This part of ISO/IEC 14496 (MPEG-4 Audio) is a new kind of audio standard that integrates many different types of audio coding: natural sound with synthetic sound, low bitrate delivery with high-quality delivery, speech with music, complex soundtracks with simple ones, and traditional content with interactive and virtual-reality content. By standardizing individually sophisticated coding tools as well as a novel, flexible framework for audio synchronization, mixing, and downloaded post-production, the developers of the MPEG-4 Audio standard have created new technology for a new, interactive world of digital audio.
INCITS/ISO/IEC 14496-4:2004 [R2016],
Information technology -- Coding of audio-visual objects -- Part 4: Conformance testing
Specifies how tests can be designed to verify whether bitstreams and decoders meet requirements specified in parts 1, 2, and 3 of ISO/IEC 14496 and, for part 6 of ISO/IEC 14496, it specifies how tests can be designed for bitstream delivery over various delivery technologies in an interoperable transparent manner to parts 1, 2, and 3. In this part of ISO/IEC 14496, encoders are not addressed specifically. An encoder may be said to be an ISO/IEC 14496 encoder if it generates bitstreams compliant with the syntactic and semantic bitstream requirements specified in parts 1, 2, 3, 6 of ISO/IEC 14496.


INCITS/ISO/IEC 14496-4:2004/AM 26:2008 [R2014], Information technology -- Coding of audio-visual objects -- Part 4: Conformance testing -- Amendment 26: Conformance levels and bitstreams for Open Font Format


Specifies the Delivery Layer of ISO/IEC 14496, which allows applications to transparently access and view multimedia streams whether the source of the streams is located on an interactive remote end system, the streams are available on broadcast media or they are on storage media.

INCITS/ISO/IEC 14517:1996 [S2012], Information technology - 130 mm optical disk cartridges for information interchange - Capacity: 2.6 Gbytes per cartridge

Defines a series of related 130 mm optical disk cartridges (ODCs). Gives the conditions for conformance testing and the Reference Drive, mechanical, physical and dimensional characteristics, the format of the information, the magneto-optical characteristics and the minimum quality of user-written data.


- A reference comparison method. This method is applicable to two character strings to determine their collating order in a sorted list. The method can be applied to strings containing characters from the full repertoire of ISO/IEC 10646. This method is also applicable to subsets of that repertoire, such as those of the different ISO/IEC 8-bit standard character sets, or any other character set, standardized or not, to produce ordering results valid (after tailoring) for a given set of languages for each script. This method uses collation tables derived either from the Common Template Table defined in ISO/IEC 14651:2011 or from one of its tailoring.


This is the first amendment to ISO/IEC 14651:2012 that defines the following. A reference comparison method. This method is applicable to two character strings to determine their collating order in a sorted list.

ISO/IEC 14662:2010 specifies the framework for coordinating the integration of existing International Standards and the development of future International Standards for the inter-working of Open-edi Parties via Open-edi and provides a reference for those International Standards. As such it serves to guide the work necessary to accomplish Open-edi by providing the context to be used by developers of International Standards to ensure the coherence and integration of related standardized modelling and descriptive techniques, services, service interfaces, and protocols.

INCITS/ISO/IEC 14750:1999 [R2016], Information Technology - Open Distributed Processing - Interface Definition Language
Provides the ODP Reference Model (see ITU-T Rec. X.902 | ISO/IEC 10746-2 and ITU-T Rec. X.903 | ISO/IEC 10746-3) with a language and environment neutral notation to describe computational operation interface signatures. Use of this notation does not imply use of specific supporting mechanisms and protocols.

INCITS/ISO/IEC 14750:1999 [R2016], Information Technology - Open Distributed Processing - Protocol Support for Computational Interactions
Defines how interactions between computational objects in a computational specification of a system relate to protocol support for those interactions in an engineering specification of that system.
INCITS/ISO/IEC 14753:1999 [R2016],
Information Technology - Open Distributed Processing - Interface References and Binding
Interface references are crucial to interworking between ODP systems and federation of groups of ODP systems. An interface reference embodies the information needed to establish bindings, including binding to objects at nodes that support several different communication protocols and binding to objects in different management domains.

INCITS/ISO/IEC 14760:1997 [R2015],
Information Technology - Data interchange on 90 mm overwritable and read only optical disk cartridges using phase change - Capacity: 1,3 Gbytes per cartridge
This Standard specifies the characteristics of 90 mm Optical Disk Cartridges (ODCs) using the phase change technology, with a capacity of 1,3 Gbytes per cartridge. It specifies three related Types of such cartridges.

INCITS/ISO/IEC 14769:2001 [R2016],
Information Technology - Open Distributed Processing - Type Repository Function
Defines a framework for describing types of interest in ODP systems by determining what entities need to be typed and what needs to be said about the identified types.

INCITS/ISO/IEC 14771:1999 [R2016],
Information Technology - Open Distributed Processing - Naming Framework
Defines a general framework for context-relative naming, refining and elaborating on the naming concepts defined in Part 2 of the ODP-RM; identifies and characterizes functions necessary to handle names in the context of a federation of different naming systems; and clarifies the relationship between the concepts of name management (i.e. federation and naming) in distributed computing systems.

INCITS/ISO/IEC 14772-1:1997 [R2015],
Information technology - Computer graphics and image processing - The Virtual Reality Modeling Language - Part 1: Functional specification and UTF-8 encoding
This standard, the Virtual Reality Modeling Language (VRML), defines a file format that integrates 3D graphics and multimedia. Conceptually, each VRML file is a 3D time-based space that contains graphic and aural objects that can be dynamically modified through a variety of mechanisms. This part of ISO/IEC 14772 defines the interface that applications external to the VRML browser may use to access and manipulate the objects defined in ISO/IEC 14772-1.

INCITS/ISO/IEC 14776-115:2004 [S2016],
Information technology -- Small Computer System Interface (SCSI) -- Part 115: Parallel Interface-5 (SPI-5)
The SCSI parallel interface (SPI) is designed to provide an efficient peer-to-peer I/O bus with the maximum number of hosts and peripherals determined by the bus width (i.e., 8 or 16). Data may be transferred asynchronously or synchronously at rates that depend on implementation.

INCITS/ISO/IEC 14776-151:2010 [S2016],
Information technology -- Small Computer System Interface (SCSI) -- Part 151: Serial Attached SCSI - 1.1 (SAS-1.1)
Defines the rules for exchanging information between SCSI devices using a serial interconnect. It defines the rules for exchanging information between ATA hosts and ATA devices using the same serial interconnect. It is a functional description. Conforming implementations may employ any design technique that does not violate interoperability.

INCITS/ISO/IEC 14776-342:2000 [S2016],
Information technology -- Small Computer System Interface -- Part 342: Controller Commands - 2 (SCC-2)
Defines the command set extensions for SCSI storage array devices; commonly known as RAID devices. This standard is principally intended to be used in conjunction with, not as an alternate to, any of the SCSI command standards nor to the SCSI-3 Architecture Model (ISO/IEC 14776-411) standard. This international standard is intended as an alternate to the SCSI-3 Controller Command (ISO/IEC 14776-341) standard.
INCITS/ISO/IEC 14882:2014 [2016], Information technology - Programming languages - C++

This standard specifies requirements for implementations of the C++ programming language. The first such requirement is that they implement the language, and so this International Standard also defines C++. Other requirements and relaxations of the first requirement appear at various places within this International Standard.


This standard specifies several digital signature mechanisms with appendix for messages of arbitrary length. This part of contains general principles and requirements for digital signatures with appendix. It also contains definitions and symbols which are used in all parts of ISO/IEC 14888. Various means are available to obtain a reliable copy of the public verification key, e.g., a public key certificate. Techniques for managing keys and certificates are outside the scope of ISO/IEC 14888.


This part of ISO/IEC 14888 specifies digital signatures with appendix whose security is based on the difficulty of factoring the modulus in use. For each signature scheme, it specifies: a) the relationships and constraints between all the data elements required for signing and verifying; b) a signature mechanism, i.e., how to produce a signature of a message with the data elements required for signing; c) a verification mechanism, i.e., how to verify a signature of a message with the data elements required for verifying.


ISO/IEC 14888-3:2006 specifies digital signature mechanisms with appendix whose security is based on the discrete logarithm problem. It provides a general description of a digital signature with appendix mechanism, and a variety of mechanisms that provide digital signatures with appendix.


ISO/IEC 14888-3:2006 specifies digital signature mechanisms with appendix whose security is based on the discrete logarithm problem. It provides a general description of a digital signature with appendix mechanism, and a variety of mechanisms that provide digital signatures with appendix. For each mechanism, ISO/IEC 14888-3:2006 specifies the process of generating keys, the process of producing signatures, and the process of verifying signatures.


Amendment 2 to ISO/IEC 14888-3:2006


This is the 2nd Corrigendum to INCITS/ISO/IEC 14888-3:2006


This is the first corrigendum to INCITS/ISO/IEC 14888-3:2006

INCITS/ISO/IEC 14957:2010 [2014], Information technology - Representation of data element values - Notation of the format

ISO/IEC 14957:2010 specifies the notation to be used for stating the format, i.e. the character classes, used in the representation of data elements and the length of these representations. It also specifies additional notations relative to the representation of numerical figures. For example, this formatting technique might be used as part of the metadata for data elements. The scope of ISO/IEC 14957:2010 is limited to graphic characters, such as digits, letters and special characters. The scope is limited to the basic datatypes of characters, character strings, integers, reals, and pointers.

INCITS/ISO/IEC 14977:2006 [R2015], Information technology - Syntactic metalanguage - Extended BNF

Defines a notation, Extended BNF, for specifying the syntax of a linear sequence of symbols. It defines both the logical structure of the notation and its graphical representation.

INCITS/ISO/IEC 15041:1997 [S2012], Information Technology - Data Interchange on 90 mm Optical Disk Cartridges - Capacity: 640 Mbytes per Cartridge

Please just use the first sentence and delete second sentence "The Standard specifies five related, but different, implementations of such cartridges, viz."

INCITS/ISO/IEC 15145:1997 [R2015], Information technology - Programming languages - FORTH

This standard specifies an interface between a Forth System and a Forth Program by defining the words provided by a Standard System. This Standard specifies the forms that a program written in the Forth language may take; the rules for interpreting the meaning of a program and its data. This Standard does not specify the mechanism by which programs are transformed for use on computing systems; the operations required for setup and control of the use of programs on computing systems; the method of transcription of programs or their input or output data to or from a storage medium; the program and Forth system behavior when the rules of this Standard fail to establish an interpretation; the size or complexity of a program and its data that will exceed the capacity of any specific computing system or the capability of a particular Forth system; the physical properties of input/output records, files, and units; the physical properties and implementation of storage.

INCITS/ISO/IEC 15286:1999 [S2011], Information technology - 130 mm Rewritable and Read-only Optical Disk Cartridge, Capacity: 5.2 Gigabytes per Cartridge for Information Interchange

This International Standard specifies the characteristics of a series of related 130 mm optical disk cartridges (ODCs) by using a number of Type designations.


ISO/IEC 1539-1:2010 specifies the form and establishes the interpretation of programs expressed in the base Fortran language. Its purpose is to promote portability, reliability, maintainability, and efficient execution of Fortran programs for use on a variety of computing systems. ISO/IEC 1539-1:2010 specifies the forms that a program written in the Fortran language may take, the rules for interpreting the meaning of a program and its data, the form of the input data to be processed by such a program, and the form of the output data resulting from the use of such a program.


This International Standard is intended to facilitate the users in selecting facsimile equipment which meets their requirements. This International Standard specifies the minimum information that shall be included in the specification sheets of facsimile equipment so that users may compare the characteristics of different machines.
This Recommendation | International Standard specifies the framework, concepts, and methodology for securing JPEG 2000 codestreams. The scope of this Recommendation | International Standard is to define: 1) a normative codestream syntax containing information for interpreting secure image data; 2) a normative process for registering JPSEC tools with a registration authority delivering a unique identifier; 3) informative examples of JPSEC tools in typical use cases; 4) informative guidelines on how to implement security services and related metadata.


INCITS/ISO/IEC 15445:2000 [R2015], Information technology - Data interchange on 120 mm optical disk cartridges using phase change PD format - Capacity: 650 Mbytes per cartridge


INCITS/ISO/IEC 15485-1997 [R2015], Information technology - Data interchange on 120 mm optical disk cartridges using phase change PD format - Capacity: 650 Mbytes per cartridge

INCITS/ISO/IEC 15485:1997 [R2015], Information technology - Data interchange on 120 mm optical disk cartridges using phase change PD format - Capacity: 650 Mbytes per cartridge


This Recommendation | International Standard specifies the framework, concepts, and methodology for securing JPEG 2000 codestreams. The scope of this Recommendation | International Standard is to define: 1) a normative codestream syntax containing information for interpreting secure image data; 2) a normative process for registering JPSEC tools with a registration authority delivering a unique identifier; 3) informative examples of JPSEC tools in typical use cases; 4) informative guidelines on how to implement security services and related metadata.


This standard is a conforming application of ISO 8879, SGML. This Standard describes the way in which the HTML language specified by the certain clauses (see standard) in the W3C Recommendation for HTML 4.01 shall be used, and does so by identifying all the differences between the HTML language specified by the W3C Recommendation for HTML 4.01 and the HTML language defined by this Standard.
INCITS/ISO/IEC 15498:1997 [R2015],
Information technology - Data interchange on 90 mm optical disk cartridges - HS-1 format - Capacity: 650 Mbytes per cartridge
This Standard specifies the characteristics of 120 mm Optical Disk Cartridges (ODCs) with a capacity of 650 Mbytes using Phase Change PD format. This present International Standard specifies two related, but different implementations of such cartridges, viz.
Type R/W Provides for data to be written, read and overwritten many times over the whole recording surface of the disk using the phase change recording and read-out method. Type WORM Provides for data to be written once and read many times over the whole recording surface of the disk using the phase change recording and read-out method. This Standard specifies: • the conditions for conformance testing and the Reference Drive; • the environments in which the cartridges are to be operated and stored; • the mechanical and physical characteristics of the cartridge, so as to provide mechanical interchangeability between data processing systems; • the format of the information on the disk known as the PD format; including the physical disposition of the tracks and sectors, the error correction codes, and the modulation method used; • the characteristics of the embossed information on the disk; • the phase change recording characteristics of the disk, enabling data processing systems to write data onto the disk; • the minimum quality of user-written data on the disk, enabling data processing systems to read data from the disk. This Standard provides for interchange between optical disk drives. Together with a Standard for volume and file structure it provides for full data interchange between data processing systems.

INCITS/ISO/IEC 15521:1998 [S2015],
Information technology - 3,81 mm wide magnetic tape cartridge for information interchange - Helical scan recording - DDS-3 format using 125 m length tapes
This Standard specifies the physical and magnetic characteristics of a 3,81 mm wide magnetic tape cartridge to enable physical interchangeability of such cartridges between drives. It also specifies the quality of the recorded signals, the recording method and the recorded format - called Digital Data Storage (DDS) - whereby allowing data interchange between drives by means of such magnetic tape cartridges. Information interchange between systems also requires, at a minimum, agreement between the interchange parties upon the interchange code(s) and the specifications of the structure and labelling of the information on the interchange cartridge. Under information interchange circumstances in which a processing algorithm, e.g. for lossless data compression as specified in ISO/IEC 11558, is applied to the host data prior to recording on the tape and a complementary reprocessing algorithm is applied after the data is read from the tape, agreement upon these by the interchange parties is also required.

INCITS/ISO/IEC 15693-1:2010 [R2016],
Identification cards -- Contactless integrated circuit cards -- Vicinity cards -- Part 1: Physical characteristics
This part of ISO/IEC 15693 defines the physical characteristics of vicinity cards (VICCs). It is used in conjunction with other parts of ISO/IEC 15693.

INCITS/ISO/IEC 15693-2:2006 [R2016],
Identification cards -- Contactless integrated circuit cards -- Vicinity cards -- Part 2: Air interface and initialization
ISO/IEC 15693 forms part of a series of International Standards that specify a contactless smart card. The card can be carried by members of the public in a purse or wallet and when presented nearby a terminal device give access to places, goods or services. In addition, the card can be attached to objects like bags and valuable items which can then be tracked whilst in the vicinity of a reading device. ISO/IEC 15693-2:2006 defines the power and communications interface between the vicinity card and the reading device. Other parts of ISO/IEC 15693 define the physical dimensions of the card and the commands interpreted by the card and reader.

INCITS/ISO/IEC 15693-3:2009 [R2016],
Identification cards -- Contactless integrated circuit cards -- Vicinity cards -- Part 3: Anticollision and transmission protocol
Specifies protocol and commands, other parameters required to initialize communications between a vicinity integrated circuit card and a vicinity coupling device, methods to detect and communicate with one card among several cards ("anticollision"), optional means to ease and speed up the selection of one among several cards based on application criteria. Defines the physical characteristics of vicinity cards (VICCs). It is used in conjunction with other parts of ISO/IEC 15693.

INCITS/ISO/IEC 15718:1998 [R2015],
Information technology - Data interchange on 8 mm wide magnetic tape cartridge - Helical scan recording - HH-1 format
This Standard specifies the physical and magnetic characteristics of an 8 mm wide magnetic tape cartridge so as to provide physical interchange of such cartridges between drives. It also specifies the quality of the recorded signals, the recording method and the recorded format, thereby allowing data interchange between drives by means of such magnetic tape cartridges. Information interchange between systems also requires, at a minimum, agreement between the interchange parties upon the interchange code(s) and the specifications of the structure and labelling of the information on the interchange cartridge.

INCITS/ISO/IEC 15775:1999 [R2013],
Information Technology - Office Machines - Test Chart for colour copying machines - Realisation and application
This International Standard applies to implementation and application of test charts for colour copying machines. This International Standard serves for testing of reproduction properties of colour copying machines, in order to help to recognize the possibilities and limits of various machines and for their comparison.

INCITS/ISO/IEC 15775/AM1-2005 [R2013],
Information technology - Office Machines - Method of specifying image reproduction of colour copying machines by analog test charts Realization and application - Amendment 1
This is the first amendment to ISO/IEC 15775:1999 that applies to the implementation and application of test charts for colour copying machines. This International Standard serves for testing of reproduction properties of colour copying machines, in order to help to recognize the possibilities and limits of various machines and for their comparison.
INCITS/ISO/IEC 15780:1998 [S2015],
Information Technology - 8 mm Wide Magnetic Tape Cartridge - Helical Scan Recording - AIT-1 Format

Specifies the physical and magnetic characteristics of an 8 mm wide magnetic tape cartridge to enable physical interchange of such cartridges between drives. Also specifies the quality of the recorded signals, the recording method and the recorded format - called Advanced Intelligent Tape No. 1 (AIT-1) - thereby allowing data interchange between drives by means of such magnetic tape cartridges. Information interchange between systems also requires, at a minimum, agreement between the interchange parties upon the interchange code(s) and the specifications of the structure and labelling of the information on the interchanged cartridge.

INCITS/ISO/IEC 15816:2002 [S2012],
Information Technology - Security Techniques - Security Information Objects for Access Control

Provides definition of guidelines for specifying the abstract syntax of generic and specific Security Information Objects (SIOs) for Access Control; the specification of specific SIOs for Access Control; the specification of generic SIOs for Access Control. The scope of this Recommendation | International Standard covers only the "statics" of SIOs through syntactic definitions in terms of ASN.1 descriptions and additional semantic explanations. It does not cover the "dynamics" of SIOs, for example rules relating to their creation and deletion. The dynamics of SIOs are a local implementation issue.

INCITS/ISO/IEC 15895:1999 [R2015],
Information technology - Data interchange on 12,7 mm 128-track magnetic tape cartridges - DLT 3-XT format

This Standard specifies the physical and magnetic characteristics of a 12.7 mm wide, 128-track magnetic tape cartridge, to enable physical interchangeability of such cartridges between drives. It also specifies the quality of the recorded signals, a format - called Digital Linear Tape 3 Extended (DLT 3-XT) - and a recording method, thereby allowing data interchange between drives. Together with a labelling standard, for instance International Standard ISO 1001 for Magnetic Tape Labelling, it allows full data interchange by means of such magnetic tape cartridges.

INCITS/ISO/IEC 15896:1999 [R2015],
Information technology - Data interchange on 12.7 mm 208-track magnetic tape cartridges - DLT 5 format

This Standard specifies the physical and magnetic characteristics of a 12.7 mm wide, 208-track magnetic tape cartridge, to enable physical interchangeability of such cartridges between drives. It also specifies the quality of the recorded signals, a format - called Digital Linear Tape 5 (DLT 5) - and a recording method, thereby allowing data interchange between drives. Together with a labelling standard, for instance International Standard ISO 1001 for Magnetic Tape Labelling, it allows full data interchange by means of such magnetic tape cartridges.

INCITS/ISO/IEC 15898:1998 [S2012],
Information Technology - 356 Optical Disk Cartridges, Extended Capacity, Using Phase Change Technology for Information Interchange

Specifies the characteristics of 356 mm Optical Disk Cartridges (ODCs) of the type providing for information to be written once and read many times.

INCITS/ISO/IEC 15938-1:2002 [R2012],
Information technology - Multimedia content description interface - Part 1: Systems

This International Standard defines a Multimedia Content Description Interface, specifying a series of interfaces from system to application level to allow disparate systems to interchange information about multimedia content. It describes the architecture for systems, a language for extensions and specific applications, description tools in the audio and visual domains, as well as tools that are not specific to audio-visual domains.


Amendment 1 to ISO/IEC 15938-1:2002.


This International Standard specifies a metadata system for describing multimedia content. This part of ISO/IEC 15938 specifies the schema definition across all parts of ISO/IEC 15938. This part of ISO/IEC 15938 collects the description tools specified in ISO/IEC 15938, assigns a namespace designation, and specifies the resulting syntax description in a single schema using description definition language from ISO/IEC 15938-2.


This International Standard specifies a metadata system for describing multimedia content. It specifies the Description Definition Language (DDL) that comprises part 2 of the standard (ISO/IEC 15938-2).


This part of ISO/IEC 15938 specifies tools for description of visual content, including still images, video and 3D models. These tools are defined by their syntax in DDL and binary representations and semantics associated with the syntactic elements. They enable description of the visual features of the visual material, such as color, texture, shape and motion, as well as localization of the described objects in the image or video sequence. An overview of the visual description tools is shown in Figure 1.


This International Standard defines a Multimedia Content Description Interface, specifying a series of interfaces from system to application level to allow disparate systems to interchange information about multimedia content. It describes the architecture for systems, a language for extensions and specific applications, description tools in the audio and visual domains, as well as tools that are not specific to audio-visual domains. As a whole, this International Standard encompassing all of the aforementioned components is known as "MPEG-7."


Amendment 2 to IEC 15938-4:2002.
INCITS/ISO 15938-5-2003 [R2013], Information technology - Multimedia content description interface - Part 5: Multimedia description schemes

Specifies a metadata system for describing multimedia content. This document specifies the Multimedia Description Schemes (MDS) description tools (Description Schemes, Descriptors, and datatypes) that comprise ISO/IEC 15938-5.


AMENDMENT 1: Multimedia description schemes extensions


Amendment 2 to Multimedia description schemes user preference extensions


Amendment 3: Improvements to geographic descriptor


INCITS/ISO 15938-6-2003 [R2013], Information technology - Multimedia content description interface - Part 6: Reference software

ISO/IEC 15938-6:2003 is the reference software for ISO/IEC 15938 standard. It implements the normative components of the ISO/IEC 15938 standard, which are the descriptors and description schemes and their coding schemes.


Amendment 1: Reference software extensions


Amendment 2 to Reference software - Amendment 2: Reference software of perceptual 3D shape descriptor


INCITS/ISO 15938-7-2003 [R2013], Information technology - Multimedia content description interface - Part 7: Conformance testing

ISO/IEC 15938-7:2003 specifies a metadata system for describing multimedia content. ISO/IEC 15938-7:2003 specifies how tests can be designed to verify whether descriptions and description consuming terminals meet the specifications of parts 1, 2, 3, 4 and 5 of ISO/IEC IEC 15938. In ISO/IEC 15938-7:2003, the creation or extraction of descriptions from multimedia content is not addressed specifically. A system producing descriptions may be said to be an ISO/IEC 15938 compatible description production system if it produces descriptions (binary or textual) that conform to the specifications of parts 1, 2, 3, 4 and 5 of ISO/IEC 15938.


Amendment 1 to ISO/IEC 15938-7:2003.


This part of 15938-9 collects standard profiles and levels for MPEG-7, specified across all ISO/IEC 15938 parts. While all parts are potential candidates for profiling, current profiles concentrate on the description definition language [ISO/IEC 15938-2], visual [ISO/IEC 15938-3], audio [ISO/IEC 15938-4] and multimedia description schemes [ISO/IEC 15938-5], which are based on the namespace versioning defined in schema definition [ISO/IEC 15938-10].

INCITS/ISO 15944-1-2002 [R2013], Information technology - Business Agreement Semantic Descriptive Techniques

Part 1: Business Operational Aspects of Open-edi for implementation

This standard allows constraints (which include legal requirements, commercial and/or international trade and contract terms, public policy [e.g. privacy/data protection, product or service labelling, consumer protection], laws and regulations) to be defined and clearly integrated into Open-edi through the BOV. This means that terms and definitions in this standard serve as a common bridge among these different sets of business operational requirements allowing the integration of code sets and rules defining these requirements to be integrated into business processes electronically.

INCITS/ISO 15944-10:2014, Information technology - Business Operational View - Part 10: IT-enabled coded domains as semantic components in business transactions

The primary purpose of ISO/IEC 15944-10:2013 is to provide, in a single consolidated document, an integrated approach for the key concepts and their definitions as well as rules pertaining to "coded domains" as they already exist in the multipart ISO/IEC 15944 eBusiness standard, especially Parts 1, 2, 5 and 8. It does so in a systematic and rules-based manner. As such, ISO/IEC 15944-10:2013 serves as a methodology and tool for an IT-enabled approach to existing widely used standards, specifications, authority files, pick-lists, etc.


Part 2: Registration of Scenarios and their components

Integrated business operational view (BOV) The Open-edi Reference Model (ISO/IEC 14662, Section 4) states: 'The intention is that the sending, by an Open-edi Party, of information from a scenario, conforming to Open-edi standards, shall allow the acceptance and processing of that information in the context of that scenario by one or more Open-edi Parties by reference to the scenario and without the need for agreement.'


Part 4: Business Transaction Scenarios - Accounting and Economic Ontology

ISO/IEC 15944-4:2007 focuses on providing a definition of the concepts and the relationships that exist among those concepts in an Open-edi business transaction. Such a repository of conceptual definitions is termed a domain ontology for Open-edi.
INCITS/ISO/IEC 15944-5:2008 [R2013],
Information technology -- Business Operational View -- Part 5: Identification and referencing of requirements of jurisdictional domains as sources of external constraints
ISO/IEC 15944-5:2008 is directed at being able to identify and reference laws and regulations impacting eBusiness scenarios and scenario components as external constraints. The primary source of such external constraints is jurisdictional domains.

INCITS/ISO/IEC 15944-7:2009 [R2015],
Information technology - Business Operational View - Part 7: eBusiness vocabulary
This standard provides a consolidated vocabulary of eBusiness concepts as found and defined in ISO/IEC 14662 and the existing parts of ISO/IEC 15944, namely, Parts 1, 2, 4, 5, 6 and 7 along with their associated terms. This standard provides the rules, guidelines and procedures governing the formation of definitions for concepts relevant to eBusiness and choice of terms as a single, harmonized and integrated controlled vocabulary. This includes those governing multilingual expandability which incorporates and integrates cultural capability. As such, this standard facilitates the production of human interface equivalents (HIEs) of eBusiness terms and definitions in the various official (and de facto) languages of ISO members. This standard identifies the essential elements of an entry in this controlled vocabulary as well as their rules and specifications. It also includes rules for ensuring quality and integrity control requirement for each entry and the interworking among the entries while doing so in an IT-enabled manner. It also addresses maintenance and update procedures. This standard is built on ISO/IEC 14662 and the existing Parts 1, 2, 4, 5, 6 and 7 of ISO/IEC 15944. The exclusions which apply to one or more of these International Standards apply to ISO/IEC 15944-7:2009 This standard does not currently support the following requirements (in no particular order): 1. the more detailed level of rules (and possible more detailed level of granularity) for the essential elements of “eBusiness vocabulary” entry, as currently specified in 5.3; 2. the more detailed level of rules for change management of the eBusiness vocabulary. It is most likely that these will be addressed in the second edition (and will be based on requirements defined in INCITS/ISO/IEC 15944).

INCITS/ISO/IEC 15944-8:2012 [2012],
Information technology - Business Operational View - Part 8: Identification of privacy protection requirements as external constraints on business transactions
ISO/IEC 15944-8:2012 has been developed to support modelling generic international requirements for identifying and providing privacy protection of personal information throughout any kind of information and communications technology (ICT) based business transaction where the individual has the role of a buyer. It provides users and designers with a methodology and tools addressing requirements imposed by jurisdictional domains.

INCITS/ISO/IEC 15945:2002 [S2012],
Information Technology - Security Techniques - Specification of TTP Services to Support the Application of Digital Signatures
Define those TTP services needed to support the application of digital signatures for the purpose of non-repudiation of creation of documents. This document will also define interfaces and protocols to enable interoperability between entities associated with these TTP services. Definitions of technical services and protocols are required to allow for the implementation of TTP services and related commercial applications. This standard focuses on (1) implementation and interoperability, (2) service specifications, and (3) technical requirements.

INCITS/ISO/IEC 15946-1:2002 [R2008],
Information technology - Security techniques - Cryptographic techniques based on elliptic curves - Part 1: General
International Standard ISO/IEC 15946 specifies public-key cryptographic techniques based on elliptic curves. These include the establishment of keys for secret-key systems, and digital signature mechanisms. This part of ISO/IEC 15946 describes the mathematical background and general techniques necessary for implementing any of the mechanisms described in other parts of ISO/IEC 15946.

INCITS/ISO/IEC 15946-1:2008 [R2014],
Information technology - Security techniques - Cryptographic techniques based on elliptic curves - Part 1: General
ISO/IEC 15946 specifies public-key cryptographic techniques based on elliptic curves. These include the establishment of keys for secret-key systems, and digital signature mechanisms. This part of ISO/IEC 15946 describes the mathematical background and general techniques necessary for implementing any of the mechanisms described in other parts of ISO/IEC 15946 and other ISO/IEC standards.

This is the first corrigendum to INCITS/ISO/IEC 15946-1-2008

The scope of this part of ISO/IEC 15946 is restricted to cryptographic techniques based on elliptic curves defined over finite fields of prime power order (including the special cases of prime order and characteristic two). The representation of elements of the underlying finite field (i.e. which basis is used) is outside the scope of this part of ISO/IEC 15946.
ISO/IEC 15946 does not specify the implementation of the techniques it defines. Interoperability of products complying with ISO/IEC 15946 will not be guaranteed.

INCITS/ISO/IEC 15948:2004 [R2014],
Information technology - Computer graphics and image processing - Portable Network Graphics (PNG): Functional specification
ISO/IEC 15948:2004 specifies a datastream and an associated file format, Portable Network Graphics (PNG, pronounced “ping”), for a lossless, portable, compressed individual computer graphics image transmitted across the Internet. Indexed-colour, greyscale, and truecolour images are supported, with optional transparency. Sample depths range from 1 to 16 bits. PNG is fully streamable with a progressive display option. It is robust, providing both full file integrity checking and simple detection of common transmission errors.

INCITS/ISO/IEC 16262-2011 [2012], Information technology - Programming languages, their environments and system software interfaces - ECMAScript language specification
This International Standard defines the ECMAScript scripting language.

INCITS/ISO/IEC 16382-2000 [R2015],
Information technology - Data interchange on 12,7 mm 208-track magnetic tape cartridges - DLT 6 format
This Standard specifies the physical and magnetic characteristics of a 12,7 mm wide, 208-track magnetic tape cartridge, to enable physical interchangeability of such cartridges between drives. It also specifies the quality of the recorded signals, a format - called Digital Linear Tape 6 (DLT 6) - and a recording method, thereby allowing data interchange between drives. Together with a labelling standard, for instance International Standard ISO 1001 for Magnetic Tape Labelling, it allows full data interchange by means of such magnetic tape cartridges.

INCITS/ISO/IEC 16448:2002 [S2012],
Information Technology - 120 mm DVD - Read-only Disk
Specifies the mechanical, physical and optical characteristics of a 120 mm, read-only optical disk to enable the interchange of such disks. It specifies the quality of the recorded signals, the format of the data and the recording method, thereby allowing for information interchange by means of such disks.

INCITS/ISO/IEC 16449:2002 [S2012],
Information Technology - 80 mm DVD - Read-only Disk
Specifies the mechanical, physical and optical characteristics of a 80 mm, read-only optical disk to enable the interchange of such disks. It specifies the quality of the recorded signals, the format of the data and the recording method, thereby allowing for information interchange by means of such disks.
INCITS/ISO/IEC 16485:2000 [R2016],
Information technology -- Mixed Raster Content (MRC)

Defines a means to efficiently represent raster-oriented pages that contain a mixture of multi-level and bi-level images. Any of the many ITU-T recommended encoding schemes, such as T.81 (JPEG) for the encoding of multi-level images and T.6 (MMR) for the encoding of bi-level images, may be combined within the context of this Recommendation.

INCITS/ISO/IEC 16509:1999 [R2015],
Information technology - Year 2000 terminology

This standard identifies terms and concepts pertinent to the resolution of the Year 2000 issue, including the rollover from the year 1999 to 2000, incorrect recognition of leap years, and values in date fields used for non-date purposes, and provides definitions of these terms and descriptions of these concepts. This standard does not specifically address operating system anomalies such as might occur in the year 2038.

INCITS/ISO/IEC 16680:2012 [2012], Information technology - The Open Group Service Integration Maturity Model (OSIMM)

It specifies a model against which the degree of service integration maturity of an organization can be assessed, and a process for assessing the current and desired degree of service integration maturity of an organization, using the model.

INCITS/ISO/IEC 16824:1999 [R2015],
Information technology - 120 mm DVD rewritable disk (DVD-RAM)

This standard specifies the mechanical, physical and optical characteristics of a 120 mm optical disk to enable interchange of such disks. It specifies the quality of the recorded signals, the format of the data and the recording method, thereby allowing for information interchange by means of such disks. The data can be written, read and overwritten many times using the phase change method. This disk is identified as DVD-RAM. This standard specifies: the two related but different Types of this disk (see clause 7), the conditions for conformance, the environments in which the disk is to be tested, operated and stored, the mechanical, physical and dimensional characteristics of the disk, as well as to provide mechanical interchange between data processing systems, the format of the information on the disk, the conversion of the tracks and sectors, the error correcting codes and the coding method, the characteristics of the signals recorded on the disk, thus enabling data processing systems to read the data from the disk. This standard provides for the interchange of disks between optical disk drives. Together with a standard for volume and file structure, it provides for full data interchange between data processing systems. The optical disks specified by this Standard may be enclosed in cases according to ISO/IEC 16825 as specified therein.

INCITS/ISO/IEC 16825:1999 [R2015],
Information technology - Case for 120 mm DVD-RAM disks

This Standard specifies the characteristics of a case for use with 120 mm DVD-RAM disks as specified in Standard ECMA-ppp. The present International Standard specifies three related, but different implementations of such cases, viz. Type 1 Provides a case for a one-sided (Type 1S) or a two-sided (Type 2S) DVD-RAM disk such that the disk cannot be removed from the case. This case is reversible. Type 2 Provides a case for a one-sided DVD-RAM disk (Type 1S) such that the disk may be removed from the case. This case is not reversible. Type 3 Provides a case into which a one-sided DVD-RAM disk (Type 1S) may be inserted, then used as a cartridge. This case is not reversible. This Standard specifies: the environments in which the cases are to be operated and stored; the dimensional and mechanical characteristics of the case, so as to provide mechanical interchangeability between data processing systems; This Standard provides for mechanical interchange between optical disk drives. Together with ISO/IEC for 120 mm DVD-RAM disks* and a standard for volume and file structure, it provides for full data interchange between data processing systems.

INCITS/ISO/IEC 16963:2011 [2014], Information technology - Digitally recorded media for information interchange and storage - Test method for the estimation of lifetime of optical media for long-term data storage

This Standard specifies an accelerated aging test method for estimating the lifetime of information stored on recordable or rewritable optical disks. This test includes details on the following formats: DVD-R/RW/RAM, +R/+RW and CD-R/RW.

INCITS/ISO/IEC 16969:1999 [R2015],
Information technology - Data interchange on 120 mm optical disk cartridges using +R format - Capacity: 3,0 Gbytes and 6,0 Gbytes

This Standard specifies the mechanical, physical and optical characteristics of 120 mm rewritable optical disks with capacities of 3,0 Gbytes and 6,0 Gbytes. It specifies the quality of the recorded and unrecorded signals, the format of the data and the recording method, thereby allowing for information interchange by means of such disks. The data can be written, read and overwritten many times using the phase change method. These disks are identified as +RW. This Standard specifies two related but different Types of this disk (see clause 7), the conditions for conformance, the environments in which the disk is to be tested, operated and stored, the mechanical, physical and dimensional characteristics of the disk, as well as to provide mechanical interchange between data processing systems, the format of the information on the disk, the conversion of the tracks and sectors, the error correcting codes and the coding method, the characteristics of the signals recorded on the disk, thus enabling data processing systems to read the data from the disk. This Standard provides for the interchange of disks between optical disk drives. Together with a standard for volume and file structure, it provides for full data interchange between data processing systems.

INCITS/ISO/IEC 17203-2011 [2012], Information technology - Open Virtualization Format (OVF) specification

The Open Virtualization Format (OVF) Specification describes an open, secure, portable, efficient and extensible format for the packaging and distribution of software to be run in virtual machines.

INCITS/ISO/IEC 17341:2009 [R2014], Information technology - Data interchange on 120 mm and 80 mm optical disk using +RW format - Capacity: 4,7 Gbytes and 1,46 Gbytes per side (recording speed up to 4X)

This International Standard specifies the mechanical, physical and optical characteristics of 120 mm rewritable optical disks with capacities of 4,7 Gbytes and 9,4 Gbytes. It specifies the quality of the recorded and unrecorded signals, the format of the data and the recording method, thereby allowing for information interchange by means of such disks. The data can be written, read and overwritten many times using the phase change method. These disks are identified as +RW.

INCITS/ISO/IEC 17342:2004 [R2015], Information technology - 80 mm (1,46 Gbytes per side) and 120 mm (4,70 Gbytes per side) DVD re-recordable disk (DVD-RW)

This standard specifies the mechanical, physical and optical characteristics of an 80 mm and a 120 mm DVD re-recordable disk to enable the interchange of such disks. It specifies the quality of the pre-recorded, unrecorded and the recorded signals, the format of the data, the format of the information zone, the format of the unrecorded zone, and the recording method, thereby allowing for information interchange by means of such disks.

INCITS/ISO/IEC 17344:2009 [R2014], Information technology - Data interchange on 120 mm and 80 mm Optical Disk using +R Format - Capacity: 4,7 Gbytes and 1,46 Gbytes per Side (Recording speed up to 16X)

This International Standard specifies the mechanical, physical and optical characteristics of 120 mm recordable optical disks with capacities of 4,7 Gbytes and 9,4 Gbytes. It specifies the quality of the recorded and unrecorded signals, the format of the data and the recording method, thereby allowing for information interchange by means of such disks. The data can be written once and read many times using a nonreversible method. These disks are identified as +R.

INCITS/ISO/IEC 17345:2006-2007 [R2012], Information technology - Data Interchange on 130 mm Rewritable and Write Once Read Many Ultra Density Optical (UDO) Disk Cartridges - Capacity: 30 Gbytes per Cartridge - First Generation

This International Standard specifies the mechanical, physical, and optical characteristics of a 130 mm optical disk cartridge (ODC) that employs thermo-optical Phase Change effects to enable data interchange between such disks.

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INCITS/ISO/IEC 17346:2005 [R2015], Information technology - Data interchange on 90 mm optical disk cartridges - Capacity: 1,3 Gbytes per cartridge

This standard defines the characteristics of 90 mm Optical Disk Cartridges (ODC) with a capacity of 1.3 GB per cartridge. It specifies only Type R/W for 2 048-byte sectors of such cartridges. Type R/W provides for data to be written, read and erased many times over the entire recording surface of the disk using the thermo-magnetic and magneto-optical effects. It is also referred to as "fully rewritable". ISO/IEC 17346:2004 provides for 2 048-byte sectors only. All sectors on a disk are of the same size. This standard specifies: • the conditions for conformance testing and the Reference Drive; • the environments in which the cartridges are to be operated and stored; • the mechanical and physical characteristics of the cartridge, so as to provide mechanical interchangeability between data processing systems; • the format of the information on the disk, both embossed and user-written; including the physical disposition of the tracks and sectors, the error correction codes, and the modulation method used; • the characteristics of the embossed information on the disk; • the magneto-optical characteristics of the disk, enabling processing systems to write data onto the disk; • the minimum quality of user-written data on the disk, enabling data processing systems to read data from the disk. This standard provides for interchange between optical disk drives. Together with a standard for volume and file structure, it provides for full data interchange between data processing systems.

INCITS/ISO/IEC 17462:2000 [S2011], Information technology - 3,81 mm Wide Magnetic Tape Cartridge for Information Interchange - Helical scan recording - DDS-4 Format

Specifies the physical and magnetic characteristics of a 3,81 mm wide magnetic tape cartridge to enable physical interchangeability of such cartridges between drives. It also specifies the quality of the recorded signals, the recording method and the recorded format - called Digital Data Storage 4 (DDS-4) - thereby allowing data interchange between drives by means of such magnetic tape cartridges.

INCITS/ISO/IEC 17592:2004 [R2015], Information technology - 120 mm (4,7 Gbytes per side) and 80 mm (1,46 Gbytes per side) DVD rewritable disk (DVD-RAM)

This standard specifies the mechanical, physical and optical characteristics of an optical disk, identified as DVD Rewritable Disk (DVD-RAM), to enable interchange of such disks. It specifies the quality of the recorded signals, the format of the data and the recording method, thereby allowing for information interchange by means of such disks. The data can be written, read and overwritten many times using the phase change method. Two Types are specified that differ only by their diameter of 120 mm and 80 mm, and the resulting difference of capacity.

INCITS/ISO/IEC 17594:2004 [R2015], Information technology - Cases for 120 mm and 80 mm DVD-RAM disks

This standard specifies the characteristics of a case for use with the 120 mm and 80 mm DVD-RAM disks specified in ISO/IEC 17592. ISO/IEC 17594:2004 specifies nine related, but different implementations of this case. This standard specifies: • the environments in which the cases are to be operated and stored; • the dimensional and mechanical characteristics of the case, so as to provide mechanical interchangeability between data processing systems. This standard provides for mechanical interchange between optical disk drives. Together with ISO/IEC 17592 for 120 mm (4,7 Gbytes per side) and 80 mm (1,46 Gbytes per side) DVD-RAM disks and a standard for volume and file structure, it provides for full data interchange between data processing systems.


ISO/IEC 17629:2014 specifies a method for measuring first print out time of digital printing devices. It is applicable to digital printing devices and multifunctional devices. It is intended to be used for black and white (B&W) as well as colour digital printing devices and multifunctional devices of any underlying marking technology. It includes instructions for test charts, test setup procedure, test procedure, and the reporting requirements for the digital printing measurements.

INCITS/ISO/IEC 17788:2014 [2017], Information technology - Cloud computing - Overview and vocabulary

Provides an overview of cloud computing along with a set of terms and definitions. It is a terminology foundation for cloud computing standards and is applicable to all types of organizations (e.g., commercial enterprises, government agencies, not-for-profit organizations).

INCITS/ISO/IEC 17789:2014 [2017], Information technology - Cloud computing - Reference architecture

Specifies the cloud computing reference architecture (CCRA). The reference architecture includes the cloud computing roles, cloud computing activities, and the cloud computing functional components and their relationships.


ISO/IEC 17799:2005 establishes guidelines and general principles for initiating, implementing, maintaining, and improving information security management in an organization. The objectives outlined provide general guidance on the commonly accepted goals of information security management. ISO/IEC 17799:2005 contains best practices of control objectives and controls in the following areas of information security management.


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INCITS/ISO/IEC 17823:2015 [2017], Colour terminology for office colour equipment

Provides definitions for colour terms used with office equipment, in particular for use with colour scanning and printing devices that have digital imaging capabilities, including multi-function devices. This standard is not intended to replace terms and definitions published in documents or user interfaces issued or created by manufacturers.


ISO/IEC 17826:2012 specifies the interface to access cloud storage and to manage the data stored therein. It is applicable to developers who are implementing or using cloud storage.

INCITS/ISO/IEC 17913:2000 [R2015], Information technology - 12,7mm 128-track magnetic tape cartridge for information interchange - Parallel serpentine format

This Standard specifies the physical and magnetic characteristics of a magnetic tape cartridge, using a magnetic tape 12,7 mm wide, so as to provide physical interchange of such cartridges between drives. It also specifies the quality of the recorded signals, the recording method and the recorded format known as Parallel Serpentine, thereby allowing data interchange between drives by means of such cartridges. The format supports variable length Logical Records, high speed search, and the use of the algorithm for data compression specified in ISO/IEC 15200. Information interchange between systems also requires, at a minimum, agreement between the interchange parties upon the interchange code(s) and the specification of the structure and labelling of the information on the interchange cartridge. Together with a standard for volume and file structure, e.g., International Standard ISO 1001, this International Standard provides for full data interchange between data processing systems.


ISO/IEC 17963:2013 describes a Web services protocol based on SOAP for use in management&amp;#8203;&amp;#8203;specific domains. These domains include the management of entities such as PCs, servers, devices, Web services and other applications manageable entities. Services can expose only a WS-Management interface or compose the WS-Management service interface with some of the many other Web service specifications.

Provides definitions for colour terms used with office equipment, in particular for use with colour scanning and printing devices that have digital imaging capabilities, including multi-function devices. This standard is not intended to replace terms and definitions published in documents or user interfaces issued or created by manufacturers.


ISO/IEC 17998:2012 describes a framework that provides context and definitions to enable organizations to understand and deploy service-oriented architecture (SOA) governance.


This part of ISO/IEC 18013 establishes guidelines for the design format and data content of an ISO compliant driving licence (IDL) in regard to both visual human-readable features and ISO machine-readable technologies. It creates a common basis for international use and mutual recognition of the IDL without impeding individual national/community/regional motor vehicle authorities in taking care of their specific needs.


Establishes guidelines for the content and formatting of data stored on an ISO compliant driving license (IDL) using machine-readable technologies. It creates a common basis for the international use of IDL data without restricting individual domestic or regional driver licensing authorities from applying their specific data policies. Specifies the following items. Mandatory and optional machine-readable data. Machine-readable IDL data support the following functions (subject in some cases to the inclusion of appropriate optional data elements): confirming the driving privileges of a driver; etc.


Establishes guidelines for the design format and data content of an ISO-compliant driving license (IDL) with regard to human-readable features [ISO/IEC 18013-1], machine-readable technologies [ISO/IEC 18013-2], and access control, authentication and integrity validation [ISO/IEC 18013-3]. It creates a common basis for international use and mutual recognition of the IDL without impeding individual countries/states to apply their privacy rules and national/community/regional motor vehicle authorities in taking care of their specific needs.


This standard identifies the objective of a time-stamping authority; describes a general model on which time-stamping services are based; defines time-stamping services; and defines the basic protocols between the involved entities.


This standard presents a general framework for the provision of time-stamping services. Time-stamping services may generate, renew and verify time-stamp tokens. Time-stamp tokens are associations between data and points in time, and are created in a way that aims to provide evidence that the data existed at the associated date and time. In addition, the evidence may be used by non-repudiation services. This standard specifies mechanisms that generate independent time-stamps: in order to verify an independent time-stamp token, verifiers do not need access to any other time-stamp tokens. That is, timestamp tokens are not linked, as is the case for the token types defined in ISO/IEC 18014-3.


This part of the standard describes a general model for time-stamping services producing linked tokens, describes the basic components used to construct a time-stamping service producing linked tokens, defines the data structures used to interact with a time-stamping service producing linked tokens, describes specific instances of time-stamping services producing linked tokens, and defines a protocol to be utilized by time-stamping services producing linked tokens for the purpose of extending linked tokens to published values.


ISO/IEC 18023-1:2006 addresses the concepts, syntax and semantics for the representation and interchange of environmental data. It specifies: a data representation model for expressing environmental data; specifications of the data types and classes that together constitute the data representation model; and an application program interface that supports the storage and retrieval of environmental data using the data representation model.


This is Amendment 1 to ISO/IEC 18023-1:2005 which addresses the concepts, syntax and semantics for the representation and interchange of environmental data. It specifies: - a data representation model for expressing environmental data; - specifications of the data types and classes that together constitute the data representation model; and - an application program interface that supports the storage and retrieval of environmental data using the data representation model.


ISO/IEC 18023-2:2006 specifies the abstract syntax of a SEDRIS transmittal. Actual encodings (e.g. binary encoding) are specified in other parts of ISO/IEC 18023.

INCITS/ISO/IEC 18023-3:2006 [R2014], Information technology -- SEDRIS -- Part 3: Transmittal format binary encoding


This is Amendment 1 to ISO/IEC 18023-3:2006 that defines a binary encoding for DRM objects specified in ISO/IEC 18023-1 according to the abstract syntax specified in ISO/IEC 18023-2.


ISO/IEC 18024-4:2006 specifies a language-dependent layer for the C programming language. ISO/IEC 18023-1 specifies a language-independent application program interface (API) for SEDRIS. For integration into a programming language, the SEDRIS API is embedded in a language-dependent layer obeying the particular conventions of that language.


This is Amendment 1 to ISO/IEC 18024-4:2006 that specifies a language-dependent layer for the C programming language. ISO/IEC 18023-1 specifies a language-independent application program interface (API) for SEDRIS. For integration into a programming language, the SEDRIS API is embedded in a language-dependent layer obeying the particular conventions of that language.
INCITS/ISO/IEC 18025-2014, Information technology -- Environmental Data Coding Specification (EDCS)

ISO/IEC 18025:2014 provides mechanisms to specify unambiguously objects used to model environmental concepts. To accomplish this, a collection of nine EDCS dictionaries of environmental concepts are specified: classifications, specify the type of environmental objects; attributes, specify the state of environmental objects; attribute value characteristics, specify information concerning the values of attributes; attribute enumerants, specify the allowable values for the state of an enumerated attribute; units, specify quantitative measures of the state of some environmental objects; unit scales, allow a wide range of numerical values to be stated; unit equivalence classes, specify sets of units that are mutually comparable; organizational schemas, useful for locating classifications and attributes sharing a common context; and groups, into which concepts sharing a common context are collected. A functional interface is also specified. As denoting and encoding a concept requires a standard way of identifying the concept, ISO/IEC 18025:2014 specifies labels and codes in the dictionaries.

INCITS/ISO/IEC 18026:2009 [R2015], Information technology - Spatial Reference Model (SRM)

This standard specifies the Spatial Reference Model (SRM) defining relevant aspects of spatial positioning and related information processing. The SRM allows precise and unambiguous specification of geometric properties such as position (location), direction, and distance. The SRM addresses the needs of a broad community of users, who have a range of accuracy and performance expectations depending on their mission-critical intensive applications. Aspects of this standard apply to, but are not limited to: 1. mapping, charting, geodesy, and imagery; 2. topography; 3. location-based services; 4. oceanography; 5. meteorology and climatology; 6. interplanetary and planetary sciences; 7. embedded systems; and 8. modelling and simulation. The application program interface supports more than 30 forms of position representation. To ensure that spatial operations are performed consistently, the application program interface specifies conversion operations with functionality defined to ensure high precision transformation between alternative representations of geometric properties. This standard is not intended to replace the standards and specifications developed by ISO/TC 211, ISO/TC 184, the International Astronomical Union (IAU), and the International Association of Geodesy (IAG). It is applicable to applications whose spatial information requirements overlap two or more of the application areas that are the scope of the work of ISO/TC 211, ISO/TC 184, the IAU, and the IAG.


This part of ISO/IEC 18028 provides an overview of different techniques of security gateways, of components and of different types of security gateway architectures. It also provides guidelines for selection and configuration of security gateways. Although Personal Firewalls make use of similar techniques, they are outside the scope of this part of ISO/IEC 18028 because they do not serve as security gateways. The intended audiences for this part of ISO/IEC 18028 are technical and managerial personnel, e.g. IT managers, system administrators, network administrators and IT security personnel.


This part of ISO/IEC 18028 provides guidance for securely using remote access - a method to remotely connect a computer either to another computer or to a network using public networks and its implication for IT security. In this it introduces the different types of remote access including the protocols in use, discusses the authentication issues related to remote access and provides support when setting up remote access securely. It is intended to help network administrators and technicians who plan to use this kind of connection or who already have it in use and need advice on how to set it up securely and operate it securely.


This part of ISO/IEC 18028 provides detailed direction with respect to the security aspects of using Virtual Private Network (VPN) connections to inter-connect networks, and also to connect remote users to networks. It builds upon the network management direction provided in ISO/IEC 18028-1.


This International Standard specifies a conceptual model for a random bit generator for cryptographic purposes, together with the elements of this model. This International Standard specifies the characteristics of the main elements required for a non-deterministic random bit generator, specifies the characteristics of the main elements required for a deterministic random bit generator, establishes the security requirements for both the non-deterministic and the deterministic random bit generator.

INCITS/ISO/IEC 18032:2005 [R2014], Information technology - Security techniques - Prime number generation

ISO/IEC 18032:2005 specifies methods for generating and testing prime numbers. Prime numbers are used in various cryptographic algorithms, mainly in asymmetric encryption algorithms and digital signature algorithms. Firstly, ISO/IEC 18032:2005 specifies methods for testing whether a given number is prime. The testing methods included in ISO/IEC 18032:2005 can be divided into two groups: Probabilistic primality tests, which have a small error probability. All probabilistic tests described here may declare a composite to be a prime. One test described here may declare a prime to be composite. Deterministic methods, which are guaranteed to give the right verdict. These methods use so-called primality certificates. Secondly, ISO/IEC 18032:2005 specifies methods to generate prime numbers. Again, both probabilistic and deterministic methods are presented.


This part of ISO/IEC 18033 is general in nature, and provides definitions that apply in subsequent parts of ISO/IEC 18033. The nature of encryption is introduced, and certain general aspects of its use and properties are described. The criteria used to select the algorithms specified in subsequent parts of ISO/IEC 18033 are defined in Annex A.


This is an Amendment 1 to ISO/IEC 18033-1:2005.

INCITS/ISO/IEC 18033-2-2008 [R2013], Information technology - Security techniques - Encryption algorithms - Part 2: Asymmetric ciphers

This part of ISO/IEC 18033 specifies several asymmetric ciphers. These specifications prescribe the functional interfaces and correct methods of use of such ciphers in general, as well as the precise functionality and cipher text format for several specific asymmetric ciphers (although conforming systems may choose to use alternative formats for storing and transmitting cipher-texts).


ISO/IEC 18033 specifies encryption systems (ciphers) for the purpose of data confidentiality. ISO/IEC 18033-3:2010 specifies block ciphers. A block cipher is a symmetric encryption system with the property that the encryption algorithm operates on a block of plaintext, i.e. a string of bits of a defined length, to yield a block of ciphertext.
INCITS/ISO/IEC 18033-4:2011 [2012],
Information technology -- Security techniques -- Encryption algorithms -- Part 4: Stream ciphers
This part of ISO/IEC 18033 specifies a) output functions to combine a keystream with plaintext, b) keystream generators for producing keystream, and c) object identifiers assigned to dedicated keystream generators in accordance with ISO/IEC 9834. NOTE 1 The list of assigned object identifiers is given in Annex A. NOTE 2 Any change to the specification of these algorithms resulting in a change of functional behaviour will result in a change of the object identifier assigned to the algorithms concerned.

INCITS/ISO/IEC 18035:2003 [R2013],
Information technology -- Network management -- Object identifiers
ISO/IEC 18035:2002 defines a consistent set of icons and related functions that are represented by multimedia applications on a computer screen and that users interact with to control such applications. It describes controls applying to such functions as: Play, Pause, Stop, Rewind, Scan forward, Scan backward, Replay backward, Loop, Go to beginning, Go to previous, Go to next, Go to end, Set volume and Mute.

INCITS/ISO/IEC 18041-4:2007 [R2014],
Information technology -- Computer graphics, image processing and environmental data representation -- Environmental Data Coding Specification (EDCS) language bindings -- Part 4: C
ISO/IEC 18041-4:2007 specifies the binding of the application programming interface (API) defined in ISO/IEC 18025 to the C programming language. The Environmental Data Coding Specification (EDCS) is a mapping between data and meaning. Data in a system may need to be identified as to purpose, metric and usage. This specification defines a standard set of terms for providing this information. ISO/IEC 18041-4:2007 defines a standard binding for the C computer programming language.

INCITS/ISO/IEC 18042-4:2006 [R2014],
Information technology -- Computer graphics and image processing -- Spatial Reference Model (SRM) language bindings -- Part 4: C
This document has been packaged as a zipped file to ensure that any links between the files have been structured. Be sure to save all the files in the same folder to ensure that any links between the files function.

INCITS/ISO 18024-2:2006/Amd 1:2011,
Information technology -- Computer graphics and image processing -- Spatial Reference Model (SRM) language bindings -- Part 4: C
AMENDMENT 1
This is the first Amendment to ISO/IEC 18024-2:2005 that specifies a language-independent application program interface (API). For integration into a programming language, the Spatial Reference Model (SRM) API is embedded in a language-dependent layer obeying the particular conventions of that language. ISO/IEC 18024-2:2005 specifies such a language-dependent layer for the C language.

INCITS/ISO/IEC 18043:2006 [R2013],
Information technology -- Security techniques -- Selection, deployment and operations of Intrusion Detection Systems (IDSs)
This International Standard provides guidelines to assist organizations in preparing to deploy Intrusion Detection System (IDS). In particular, it addresses the selection, deployment and operations of IDS. It also provides background information from which these guidelines are derived.

This International Standard is a companion document to the evaluation criteria for IT security defined in ISO/IEC 15408. It defines the minimum actions to be performed by an evaluator in order to conduct an ISO/IEC 15408 evaluation, using the criteria and evaluation evidence defined in ISO/IEC 15408. This International Standard does not define evaluator actions for certain high assurance ISO/IEC 15408 components, where there is as yet no generally agreed guidance.

ISO/IEC 18050:2006 specifies two methodologies for the measurement of specific print quality attributes of two-dimensional bar code symbols printed within the requirements of Digital Postage Marks. One of these methodologies is applicable to multi-row bar code symbologies and the other to two-dimensional matrix symbologies. ISO/IEC 18050:2006 defines methods for grading print quality attributes and deriving an overall assessment of symbol quality.

INCITS/ISO 18092:2013 [2015], Information technology -- Telecommunications and information exchange between systems -- Near Field Communication -- Interface and Protocol (NFCIP-1)
This standard defines communication modes for Near Field Communication Interface and Protocol (NFCIP-1) using inductive coupled devices operating at the centre frequency of 13.56 MHz for interconnection of computer peripherals. It also defines both the Active and the Passive communication modes of Near Field Communication Interface and Protocol (NFCIP-1) to realize a communication network using Near Field Communication devices for networked products and also for consumer equipment. This standard specifies, in particular, modulation schemes, codings, transfer speeds, and frame format of the RF interface, as well as initialization schemes and conditions required for data collision control during initialization. It also defines a transport protocol including protocol activation and data exchange methods.

INCITS/ISO/IEC 1831:1980 [S2013], Printing specifications for optical character recognition includes basic definitions, measurement requirements, specifications and recommendations for OCR paper and print, and deals with three main parameters for OCR media: optical properties of paper; optical properties and dimensions of ink patterns used as OCR characters; basic requirements for positions of OCR characters on paper. References: ISO 216; 1073/1; 1073/2; 2469; 2471; CIE Publication 15 (E 1.3.1) 1971.

INCITS/ISO/IEC 18809-2000 [S2016], Information technology -- 8 mm wide magnetic tape cartridge for information interchange -- Helical scan recording -- AIT-1 with MIC Format
Specifies the physical and magnetic characteristics of an 8 mm wide magnetic tape cartridge containing a memory chip to enable physical interchange of such cartridges between drives. It also specifies the quality of the recorded signals, the recording method and the recorded format -- called Advanced Intelligent Tape No. 1 with Memory In Cartridge (AIT-1 with MIC) -- thereby allowing data interchange between drives by means of such magnetic tape cartridges.

INCITS/ISO/IEC 18810-2001 [S2016], Information technology -- 8 mm wide magnetic tape cartridge for information interchange -- Helical scan recording -- AIT-2 with MIC Format
Specifies the physical and magnetic characteristics of an 8 mm wide magnetic tape cartridge containing a memory chip to enable physical interchange of such cartridges between drives. It also specifies the quality of the recorded signals, the recording method and the recorded format -- called Advanced Intelligent Tape No. 2 with Memory In Cartridge (AIT-2 with MIC) -- thereby allowing data interchange between drives by means of such magnetic tape cartridges. The System Log are recorded in the MIC.
INCITS/ISO/IEC 18836:2001 [S2011], Information technology - 8 mm wide magnetic tape cartridge for information interchange - Helical scan recording - Mammoth Type-2 Format

Specifies the physical and magnetic characteristics of an 8 mm wide magnetic tape cartridge to enable physical interchange of such cartridges between drives. It also specifies the quality of the recorded signals, the recording method and the recorded format called MammothTape-2, and thereby allowing data interchange between drives by means of such magnetic tape cartridges.

INCITS/ISO/IEC 19118:2011 [2012], Geographic information - Encoding

ISO 19118:2011 specifies the requirements for defining encoding rules for use for the interchange of data that conform to the geographic information in the set of International Standards known as the "ISO 19100 series".

INCITS/ISO/IEC 19136:2007 [R2015], Geographic information - Geography Markup Language (GML)

The Geography Markup Language (GML) is an XML encoding in compliance with ISO 19118 for the transport and storage of geographic information modelled in accordance with the conceptual modelling framework used in the ISO 19100 series of International Standards and including both the spatial and non-spatial properties of geographic features. This standard defines the XML Schema syntax, mechanisms and conventions that: • provide an open, vendor-neutral framework for the description of geospatial application schemas for the transport and storage of geographic information in XML; • allow profiles that support proper subsets of GML framework descriptive capabilities; • support the description of geospatial application schemas for specialized domains and information communities; • enable the creation and maintenance of linked geographic application schemas and datasets; • support the storage and transport of application schemas and data sets; • increase the ability of organizations to share geographic application schemas and the information they describe. Implementers may decide to store geographic application schemas and information in GML, or they may decide to convert from some other storage format on demand and use GML only for schema and data transport.

INCITS/ISO/IEC 19395:2015 [2017], Information technology - Sustainability for and by information technology - Smart data centre resource monitoring and control

Provides Messages that facilitate integrated or "smart" monitoring and control of Resources in those islands. The Messages are exchanged between the Management Function and Resources. ISO/IEC 19395:2015 acknowledges that those Resources may be composed of other Resources (e.g. a rack may contain servers, ventilators, etc.). In addition, e.g. those servers may be viewed from their computing, energy consumption or dissipation aspects which ISO/IEC 19395:2015 models as Resource Components and groups into IT, power and fluid Domains, respectively.


ISO/IEC 19502:2005 defines a metamodel (defined using Meta Object Facility, MOF), a set of interfaces (defined using Open Distributed Processing (ODP) Interface Definition Language (IDL) (ITU-T Recommendation X.920 (1997) | ISO/IEC 14750:1999)), that can be used to define and manipulate a set of interoperable metamodels and their corresponding models. ISO/IEC 19502:2005 also defines the mapping from MOF to ODP IDL. These interoperable metamodels include the Unified Modeling Language (UML) metamodel (ISO/IEC 19501:2005), the MOF meta-metamodel, as well as future standard technologies that will be specified using metamodels.

INCITS/ISO/IEC 19503:2005 [R2014], Information technology - XML Metadata Interchange (XMI)

The main purpose of ISO/IEC 19503:2005 (XMI) is to enable easy interchange of metadata between application development lifecycle tools (such as modeling tools based on the Unified Modeling Language (UML), ISO/IEC 19501, and metadata repositories/frameworks based on the Meta Object Facility (MOF), ISO/IEC 19502) in distributed heterogeneous environments. ISO/IEC 19503:2005 integrates three key industry standards: XML, eXtensible Markup Language, a W3C standard; UML, Unified Modeling Language, an OMG modeling specification which is now ISO/IEC 19501; MOF, Meta Object Facility (ISO/IEC 19502).


ISO/IEC 19508:2014 provides the basis for metamodel definition in OMG’s family of MDA languages and is based on a simplification of UML2’s class modeling capabilities. In addition to providing the means for metamodel definition it adds core capabilities for model management in general, including Identifiers, a simple generic Tag capability and Reflective operations that are defined generically and can be applied regardless of metamodel.


ISO/IEC 19509:2014 supports the Meta Object Facility (MOF) Core defined in ISO/IEC 19508. MOF is the foundation technology for describing metamodels. It covers a wide range of domains, and is based on a constrained subset of UML. XML is widely used XML interchange format. It defines the following aspects involved in describing objects in XML: the representation of objects in terms of XML elements and attributes; the standard mechanisms to link objects within the same file or across files; the validation of XML documents using XML Schemas; object identity, which allows objects to be referenced from other objects in terms of IDs and UUIDs.

INCITS/ISO/IEC 19752:2004 [2008], Information technology - Method for the determination of toner cartridge yield for monochromatic electrophotographic printers and multifunction devices that may contain printer components

ISO/IEC 19752:2004 is limited to evaluation of toner cartridge yield for toner containing cartridges (i.e. all-in-one toner cartridges and toner cartridges without a photoconductor) for monochrome electrophotographic printers. ISO/IEC 19752:2004 can also be applied to the printer component of any multifunctional device that has a digital input-printing path (i.e. multi-function devices that contain printer components).

INCITS/ISO/IEC 19752:2004 [R2013], Information technology - Method for the determination of toner cartridge yield for monochrome electrophotographic printers and multi-function devices that may contain printer components

ISO/IEC 19752:2004 is limited to evaluation of toner cartridge yield for toner containing cartridges (i.e. all-in-one toner cartridges and toner cartridges without a photoconductor) for monochrome electrophotographic printers. ISO/IEC 19752:2004 can also be applied to the printer component of any multifunctional device that has a digital input-printing path (i.e. multi-function devices that contain printer components).

INCITS/ISO/IEC 19752:2004/Cor 1:2013, Information technology -- Method for the determination of toner cartridge yield for monochromatic electrophotographic printers and multi-function devices that contain printer components -- Technical Corrigendum 1

This is the first corrigendum to ISO/IEC 19752:2004 that is limited to evaluation of toner cartridge yield for toner containing cartridges (i.e. all-in-one toner cartridges and toner cartridges without a photoconductor) for monochrome electrophotographic printers. ISO/IEC 19752:2004 can also be applied to the printer component of any multifunctional device that has a digital input-printing path (i.e. multi-function devices that contain printer components).


ISO/IEC 19756:2011 (TMCL) is a constraint language for Topic Maps, allowing definitions of Topic Maps schemas to be written in a precise and machine-readable form. This makes it possible to validate a topic map against a TMCL schema to see if it conforms to the constraints in the schema, and also enables other uses, such as schema-driven editors and object mappings. TMCL is defined as a Topic Maps vocabulary consisting of a number of topic, association, occurrence, and role types, identified by Published Subject Identifiers (PSIs), and defined using English prose.
schemata may be written in any schema languages, elements or attributes. An NVDL script also specifies validators, depending on the namespaces of the attributes in a given XML document to different Validation Dispatching Language (NVDL). An NVDL NG schemas and specifies when an XML document is validated. ISO/IEC 19757:2:2008 specifies RELAX NG, a schema language for XML. A RELAX NG schema specifies a pattern for the structure and content of an XML document. The pattern is specified by using a regular tree grammar. It establishes requirements for RELAX NG schemas and specifies when an XML document matches the pattern specified by a RELAX NG schema.

ISO/IEC 19757 defines a set of Document Schema Definition Languages (DSDDL) that can be used to specify one or more validation processes performed against Extensible Markup Language (XML) or Standard Generalized Markup Language (SGML) documents. (XML is an application profile SGML, ISO 8879:1986.) ISO/IEC 19757:3:2006 specifies Schematron, a rules-based schema language for XML. It establishes requirements for Schematron schemas and specifies when an XML document matches the patterns specified by a Schematron schema.

ISO/IEC 19757-4:2006 specifies a Namespace-based Validation Dispatching Language (NVDL). An NVDL script controls the dispatching of elements or attributes in a given XML document to different validators, depending on the namespces of the elements or attributes. An NVDL script also specifies which schemata are used by these validators. These schemata may be written in any schema languages, including those specified by ISO/IEC 19757.

INCITS/ISO/IEC 19757-4:2006/Cor 1:2008 [R2015], Information technology - Document Schema Definition Languages (DSDDL) - Part 4: Namespace-based Validation Dispatching Language (NVDL) - Technical Corrigendum 1

This technical corrigendum corrects a defect in ISO/IEC 19757:8-2008. ISO/IEC 19757:8-2008 specifies a mechanism that allows users to assign locally meaningful names to XML elements, attributes, entities and processing instructions, without having to completely rewrite the Document Type Definition (DTD) or schema against which they are to be validated. In addition, ISO/IEC 19757:8-2008 provides an XML-based format for declaring the replacement text for entity references and provides a mechanism that allows users to define default values for both element content and attribute values.

ISO/IEC 19757-5:2011 specifies an XML language that allows users to create and extend datatype libraries for their own purposes. The datatype definitions in these libraries can be used by XML validators and other tools to validate content and make comparisons between values.

INCITS/ISO/IEC 19757-7:2009 [2013], Information technology -- Document Schema Definition Languages (DSDDL) -- Part 7: Character Repertoire Description Language (CREPDL)
ISO/IEC 19757-7:2009 specifies a Character Repertoire Description Language (CREPDL); a CREPDL schema describes a character repertoire. ISO/IEC 19757-7:2009 introduces kernels and hulls of repertoires, then specifies the syntax of CREPDL schemas and the semantics of a correct CREPDL schema; the semantics specify when a character is in a repertoire described by a CREPDL schema. ISO/IEC 19757-7:2009 defines CREPDL processors and their behaviour. Finally, it describes differences of conformant CREPDL processors, and provides examples of CREPDL schemas.

ISO/IEC 19757-8:2008 specifies a mechanism that allows users to assign locally meaningful names to XML elements, attributes, entities and processing instructions, without having to completely rewrite the Document Type Definition (DTD) or schema against which they are to be validated. In addition, ISO/IEC 19757-8:2008 provides an XML-based format for declaring the replacement text for entity references and provides a mechanism that allows users to define default values for both element content and attribute values.

ISO/IEC 19757-9:2008 defines a language that is designed to extend the declarative functionality of an XML Document Type Definition (DTD) to include declaring one or more namespaces to which some or all of the element and attribute names in a DTD belong, declaring constraints on the content of elements with content model ANY to contain elements whose names belong to one or more specified namespaces, declaring datatypes for elements that contain data content only and for attribute values.

ISO/IEC 19763 specifies a metamodel framework for interoperability. ISO/IEC 19763-1:2007 specifies objectives, the basic concept of the metamodel framework, and requirements for development of each part of ISO/IEC 19763.

Specifies a metamodel framework for interoperability. This part of ISO/IEC 19763 specifies the metamodel that provides a facility to register administrative and evolution information related to ontologies. The metamodel specified is intended to promote interoperation among application systems, by providing administrative and evolution information related to ontologies, accompanied with standardized ontology repositories that register ontologies themselves in specific languages. It does not specify the metamodels of ontologies expressed in specific languages and the mappings among them. They are specified in other specifications such as the Ontology Definition Metamodel from the Object Management Group.

INCITS/ISO/IEC 19772-2009 [R2014], Information technology - Security techniques - Authenticated encryption
This International Standard specifies six methods for authenticated encryption, i.e. defined ways of processing a data string with the following security objectives: &amp;#61630; data confidentiality, i.e. protection against unauthorized disclosure of data, &amp;#61630; data integrity, i.e. protection that enables the recipient of data to verify that it has not been modified, &amp;#61630; data origin authentication, i.e. protection that enables the recipient of data to verify the identity of the data originator.
INCITS/ISO/IEC 19773:2011 [2012], Information technology -- Metadata Registries (MDR) modules
ISO/IEC 19773:2011 specifies small modules of data that can be used or reused in applications. These modules have been extracted from ISO/IEC 11179-3, ISO/IEC 19763, and OASIS EBXML, and have been refined further. These modules are intended to harmonize with current and future versions of the ISO/IEC 11179 series and the ISO/IEC 19763 series. These modules include: reference-or-literal (reflit) for on-demand choices of pointers or data; multitext, multistring, etc. for recording internationalized and localized data within the same structure; slots and slot arrays for standardized extensible data structures; etc.

ISO/IEC 19774, Extensible 3D (X3D), defines a system that integrates three-dimensional (3D) graphics and multimedia. Conceptually, each X3D file is a 3D time-based space that contains graphic and aural objects that can be dynamically modified through a variety of mechanisms. ISO/IEC 19774:2006 defines a mapping of the abstract objects in X3D to a specific X3D encoding using the Extensible Markup Language (XML).

INCITS/ISO/IEC 19776:2:2015 [2016], Information technology - Computer graphics, image processing and environmental data representation - Extensible 3D (X3D) Part 2: Scene access interface (SAI)
Specifies a standard set of services that are made available by a browser so that an author can access the scene graph while it is running. Such access is designed to support inspection and modification of the scene graph.

For integration into a programming language, the X3D abstract interfaces are embedded in a language-dependent layer obeying the particular conventions of that language. ISO/IEC 19777:1:2006 specifies such a language-dependent layer for the ECMAScript language. ISO/IEC 19777:2 specifies a language-independent application programmer interface (API) to a set of services and functions.

INCITS/ISO/IEC 19777:2:2008 [R2013], Information technology - Computer graphics and image processing - Extensible 3D (X3D) language bindings - Part 2: Java
The Extensible 3D (X3D) specification, ISO/IEC 19775, specifies a language-independent application programmer interface (API) to a set of services and functions. For integration into a programming language, the X3D abstract interfaces are embedded in a language dependent layer obeying the particular conventions of that language. ISO/IEC 19777:2:2006 specifies such a language-dependent layer for the Java programming language.

This standard is applicable to collaborative technologies used to support communication among learners, instructors and other participants. The implementation and communicative use of these technologies entails the creation of information related to participant groups, and to the collaborative environments, functions and tools that are set up for, and used by, these groups. This part of ISO/IEC 19778 -- together with its subsequent parts -- defines Data Models that enable the portability and reuse of this data in integrated form, and allow Data Model instantiations to be exchanged, stored, retrieved, reused or analysed by a variety of systems.

INCITS/ISO/IEC 19778:3:2011 [2012], Information technology -- Computer graphics, image processing and environmental data representation -- Extensible 3D (X3D) encodings -- Part 3: Compressed binary encoding
Defines a system that integrates three-dimensional graphics and multimedia. Conceptually, each X3D file is a 3D time-based space that contains graphic and aural objects that can be dynamically modified through a variety of mechanisms. ISO/IEC 19776:2:2008 defines a mapping of the abstract objects in X3D to a specific X3D encoding written out in a compact binary form.
INCITS/ISO 19778-3:2008 [R2015], Information technology - Learning, education and training - Collaborative technology - Collaborative workplace - Part 3: Collaborative group data model

This part of ISO/IEC 19778 specifies the Data Model for a collaborative group. The collaborative group Data Model comprises roles which can be played by the participants of a collaborative group, declares the intended role holders (positions for playing a particular role) for each role, and (at least during the life-span of the collaborative workplace) assigns participants to these role holders. The role names may be used as references to roles specified in detail by further specifications or standards. Where no such specifications or standards are available or identified, the provision of descriptions for human interpretation may support harmonization use of these names.

Provided participant identifiers may be used as references to detailed participant information which may be specified in a provided user management system. NOTE There is a risk of improper access and misuse of personal and private data facilitated by use of the collaborative group Data Model. It is the responsibility of the implementer to ensure proper use of any involved personal information.


ISO/IEC 19784-2:2007 provides an interface that specifies a biometric sensor interface for a Biometric Service Provider (BSP, see ISO/IEC 19784-1). The interface supports a BSP wishing to provide the BioAPI Service Provider Interface (SPI) functions, whilst removing device handling activity from the BSP. Provides an interface that can be used by all types of biometric sensor, including inter alia image streaming sensors (infrared, face, iris, fingerprint, etc.), voice streaming sensors and digital tablets providing dynamic signature data.


Specifies a biometric sensor interface for a Biometric Service Provider (BSP, see ISO/IEC 19784-1). The interface supports a BSP wishing to provide the BioAPI Service Provider Interface (SPI) functions, whilst removing device handling activity from the BSP. ISO/IEC 19784-4:2011 provides an interface that can be used by all types of biometric sensor, including inter alia image streaming sensors (infrared, face, iris, finger, etc.), voice streaming sensors and digital tablets providing dynamic signature data.


This is the first Technical Corrigendum to ISO/IEC 19784-2:2007 that defines the interface between a biometric service provider (BSP) and a biometric archive function provider (BAFP) for BioAPI. A BAFP encapsulates all functionality for the storage, search and management of biometric reference data regardless of the kind of physical storage media. Using a BAFP, a BSP does not have to provide special handling of different storage media like database servers, smartcards, database web services, etc. Whatever media is used, the BSP in all cases handles the same interface for a BAFP.


Amendment 3 to ISO/IEC 19784-1:2006.


This is the first amendment to ISO/IEC 19784-1:2006 that provides a defined interface that allows a software application to communicate with (utilize the services of) one or more biometric technologies. It includes a high-level generic biometric authentication model suited to a broad range of biometrically enabled applications and to most forms of biometric technology. An architectural model is described which enables components of a biometric system to be provided by different vendors, and to interwork through fully-defined Application Programming Interfaces (APIs), corresponding Service Provider Interfaces (SPIs), and associated data structures.


This is the second amendment to ISO/IEC 19784-1:2006 that defines the interface between a biometric service provider (BSP) and a biometric archive function provider (BAFP) for BioAPI. A BAFP encapsulates all functionality for the storage, search and management of biometric reference data regardless of the kind of physical storage media.


This is the third amendment to ISO/IEC 19784-1:2006 that defines the interface between a biometric service provider (BSP) and a biometric archive function provider (BAFP) for BioAPI. A BAFP encapsulates all functionality for the storage, search and management of biometric reference data regardless of the kind of physical storage media.


This is the first amendment to ISO/IEC 19784-1:2006 that provides a defined interface that allows a software application to communicate with (utilize the services of) one or more biometric technologies. It includes a high-level generic biometric authentication model suited to a broad range of biometrically enabled applications and to most forms of biometric technology. An architectural model is described which enables components of a biometric system to be provided by different vendors, and to interwork through fully-defined Application Programming Interfaces (APIs), corresponding Service Provider Interfaces (SPIs), and associated data structures.

INCITS/ISO 19784-1:2006/Cor 1:2013, Information technology - Biometric application programming interface - Part 4: Biometric sensor function provider interface

This is the second amendment to ISO/IEC 19784-1:2006 that defines the interface between a biometric service provider (BSP) and a biometric archive function provider (BAFP) for BioAPI. A BAFP encapsulates all functionality for the storage, search and management of biometric reference data regardless of the kind of physical storage media.


This is the second technical corrigendum to ISO/IEC 19784-2:2007 and ISO/IEC 19784-2:2007 defines the interface between a biometric service provider (BSP) and a biometric archive function provider (BAFP) for BioAPI. A BAFP encapsulates all functionality for the storage, search and management of biometric reference data regardless of the kind of physical storage media.


ISO/IEC 19785-1:2006 defines a basic structure for standardized biometric information records (BIRs) within the Common Biometric Exchange Formats Framework (CBEFF). This structure consists of three parts: the standard biometric header (SBH), the biometric data block (BD), and the security block (SB). CBEFF also defines several data elements and their standardized abstract values that can be used in SBHs and SBS (CBEFF treats the BD as opaque data).
Amendment 1 to ISO/IEC 19785-1:2006

ISO/IEC 19785-2:2006 specifies the requirements for the operation of the Biometric Registration Authority within the Common Biometric Exchange Formats Framework (CBEFF). The Registration Authority is responsible for assigning and publishing, via its website, unique biometric organization identifier values to organizations that own or are otherwise responsible for standardized or proprietary format specifications for biometric data blocks, biometric information record security blocks and/or CBEFF patron formats, and to organizations that intend to assign biometric product identifier values to their products.
Amendment 1 to ISO/IEC 19785-2:2006

ISO/IEC 19785-3:2007 specifies several patron formats that conform to the requirements of ISO/IEC 19785-1. ISO/IEC 19785-1 defines a basic structure for standardized biometric information records (BIRs) that consists of three parts, the standard biometric header (SBH), the biometric data block (BDB), and the security block (SB). CBEFF also defines several data elements and their standardized abstract values that can be used in SBHs and SBs (CBEFF treats the BDB as opaque data). CBEFF also establishes mechanisms by which organizations, called 'patrons' by CBEFF, can specify and publish BIR format specifications, which are in turn called 'patron formats'
Amendment 1 to ISO/IEC 19785-3:2007

This part of ISO/IEC 19785 specifies security block formats (see ISO/IEC 19785-1) registered in accordance with ISO/IEC 19785-2 as formats defined by the CBEFF biometric organization ISO/IEC JTC 1/SC 37, and specifies their registered security block format identifiers.

This is the first technical corrigendum to ISO/IEC 19785-4:2010 and ISO/IEC 19785-4:2010 specifies security block formats (see ISO/IEC 19785-1) registered in accordance with ISO/IEC 19785-2 as formats defined by the CBEFF biometric organization ISO/IEC JTC 1/SC 37, and specifies their registered security block format identifiers. [The security block format identifier is recorded in the standard biometric header (SBH) of a patron format (or defined by that patron format as the only available security block format).]

This International Standard specifies the security requirements for a cryptographic module utilised within a security system protecting sensitive information in computer and telecommunication systems. This International Standard defines four security levels for cryptographic modules to provide for a wide spectrum of data sensitivity (e.g. low value administrative data, million dollar funds transfers, life protecting data, personal identity information, and sensitive information used by government) and a diversity of application environments (e.g. a guarded facility, an office, removable media, and a completely unprotected location).

ISO/IEC 19792:2009 specifies the subjects to be addressed during a security evaluation of a biometric system. It covers the biometric-specific aspects and principles to be considered during the security evaluation of a biometric system. It does not address the non-biometric aspects which might form part of the overall security evaluation of a system using biometric technology (e.g. requirements on databases or communication channels).

Standardized biometric data interchange formats are crucial to the interoperability of biometric components. ISO/IEC 19794-1:2006 describes general aspects of biometric data interchange formats and specifies requirements to be taken into account in standardizing specific formats. It classifies biometric data according to their processing level and establishes a naming concept for biometric data interchange formats on this basis.

This conformance testing methodology amends ISO/IEC 19794-1:2011 which describes the general aspects and requirements for defining biometric data interchange formats. The notation and transfer formats provide platform independence and separation of transfer syntax from content definition. ISO/IEC 19794-1:2011 defines what is commonly applied for biometric data formats, i.e. the standardization of the common content, meaning, and representation of biometric data formats of biometric types considered in the specific parts of ISO/IEC 19794.

ISO/IEC 19794-1-2011 describes the general aspects and requirements for defining biometric data interchange formats. The notation and transfer formats provide platform independence and separation of transfer syntax from content definition. ISO/IEC 19794-1:2011 defines what is commonly applied for biometric data formats, i.e., the standardization of the common content, meaning, and representation of biometric data formats of biometric types considered in the specific parts of ISO/IEC 19794.

ISO/IEC 19794-10:2007 specifies a data record interchange format for storing, recording and transmitting the information from one or more hand silhouettes within a Common Biometric Exchange Formats Framework (CBEFF) data structure. It defines the content, format and units of measurement for the exchange of hand silhouette data that may be used in the verification or identification process of a subject. The information consists of a variety of mandatory and optional items, including data capture parameters, standardized hand position and vendor-specific information.
INCITS/ISO/IEC 19794-11:2013 [2013], Information technology -- Biometric data interchange formats -- Part 11: Signature/sign processed dynamic data

For the purpose of biometric comparison, ISO/IEC 19794-11:2013 specifies a data interchange format for processed signature/sign behavioural data extracted from a time series, captured using devices such as digitizing tablets, pen-based computing devices, or advanced pen systems. The data interchange format is generic, in that it may be applied and used in a wide range of application areas where handwritten signs or signature/signs are used. No application-specific requirements or features are addressed in ISO/IEC 19794-11:2013.


This is the first amendment to ISO/IEC 19794-11:2013 and ISO/IEC 19794-11:2013 specifies a data interchange format for processed signature/sign behavioural data extracted from a time series, captured using devices such as digitizing tablets, pen-based computing devices, or advanced pen systems.

INCITS/ISO/IEC 19794-14:2013 [2013], Information technology -- Biometric data interchange formats -- Part 14: DNA data

ISO/IEC 19794-14:2013 specifies a data interchange format for the exchange of DNA data for person identification or verification technologies that utilize human DNA. It will provide the ability for DNA profile data to be exchanged and used for comparison (subject to privacy regulations) with DNA profile data produced by any other system that is based on a compatible DNA profiling technique and where the data format conforms to ISO/IEC 19794-14:2013.


ISO/IEC 19794-2:2005 specifies a concept and data formats for representation of fingerprints using the fundamental notion of minutiae. It is generic, in that it may be applied and used in a wide range of application areas where automated fingerprint recognition is involved.


This is the second corrigendum to Amendment 1 of ISO/IEC 19794-2:2005 and amendment 1 addresses the Detailed description of finger minutiae location, direction, and type of ISO/IEC 19794-2:2005 which specifies a concept and data formats for representation of fingerprints using the fundamental notion of minutiae. It is generic, in that it may be applied and used in a wide range of application areas where automated fingerprint recognition is involved.


Technical Corrigendum 1 to ISO/IEC 19794-2:2005


ISO/IEC 19794-2:2011 specifies a concept and data formats for representation of fingerprints using the fundamental notion of minutiae. It is generic, in that it may be applied and used in a wide range of application areas where automated fingerprint recognition is involved. It contains definitions of relevant terms, a description of how minutiae are to be determined, data formats for containing the data for both general use and for use with cards, and conformance information. Guidelines and values for matching and decision parameters are provided.


ISO/IEC 19794-2:2005 specifies a concept and data formats for representation of fingerprints using the fundamental notion of minutiae. It is generic, in that it may be applied and used in a wide range of application areas where automated fingerprint recognition is involved. ISO/IEC 19794-2:2005 contains definitions of relevant terms, a description of how minutiae shall be determined, data formats for containing the data for both general use and for use with cards, and conformance information. Guidelines and values for matching and decision parameters are provided in an informative annex.


This is the first amendment for ISO/IEC 19794-2:2011 and ISO/IEC 19794-2:2011 specifies a concept and data formats for representation of fingerprints using the fundamental notion of minutiae. It is generic, in that it may be applied and used in a wide range of application areas where automated fingerprint recognition is involved. It contains definitions of relevant terms, a description of how minutiae are to be determined, data formats for containing the data for both general use and for use with cards, and conformance information. Guidelines and values for matching and decision parameters are provided.

INCITS/ISO/IEC 19794-3-2007 [R2012], Information technology - Biometric Data Interchange Formats - Part 3: Finger Pattern Spectral Data

ISO/IEC 19794-3:2006, the finger pattern spectral data interchange format, specifies requirements for the representation of local or global spectral data derived from a fingerprint image. The format is designed to provide flexibility in the choice of spectral representation in that spectral components may be based on quantized co-sinusoidal triplets, Discrete Fourier Transformations or Gabor filters. The format also allows for a variable number of spectral components to be retained, which enables data representations in a form that is more compact than storage of the entire fingerprint image.


ISO/IEC 19794-4:2005 specifies a data record interchange format for storing, recording, and transmitting the information from one or more fingerprint or palm image areas within an ISO/IEC 19785-1 CBFEF data structure. This can be used for the exchange and comparison of fingerprint image data. It defines the content, format, and units of measurement for the exchange of fingerprint data that may be used in the verification or identification process of a subject. The information consists of a variety of mandatory and optional items, including scanning parameters, compressed or uncompressed images and vendor-specific information.


This is the first Technical Corrigendum to ISO/IEC 19794-4:2005 that specifies a data record interchange format for storing, recording, and transmitting the information from one or more fingerprint or palm image areas within an ISO/IEC 19785-1 CBFEF data structure. This can be used for the exchange and comparison of fingerprint image data. It defines the content, format, and units of measurement for the exchange of fingerprint image data that may be used in the verification or identification process of a subject.
INCITS/ISO/IEC 19794-4:2011 [2013],
Information technology - Biometric data interchange formats - Part 4: Finger image data

ISO/IEC 19794-4:2011 specifies a data record interchange format for storing, recording, and transmitting the information from one or more finger or palm image areas within an ISO/IEC 19785-1 data structure. This can be used for the exchange and comparison of finger image data. It defines the content, format, and units of measurement for the exchange of finger image data that may be used in the verification or identification process of a subject. The information consists of a variety of mandatory and optional items, including scanning parameters, compressed or uncompressed images and vendor-specific information.

INCITS/ISO/IEC 19794-4:2011/Amd 1:2014,
Information technology - Biometric data interchange formats - Part 4: Finger image data - Amendment 1: Conformance testing methodology and clarification of defects

This is the first amendment to ISO/IEC 19794-4:2011 on Conformance testing methodology and clarification of defects and ISO/IEC 19794-4:2011 specifies a data record interchange format for storing, recording, and transmitting the information from one or more finger or palm image areas within an ISO/IEC 19785-1 data structure. This can be used for the exchange and comparison of finger image data.

INCITS/ISO/IEC 19794-4:2011/Cor 1:2014,
Information technology - Biometric data interchange formats - Part 4: Finger image data - Technical Corrigendum 1

This is the first corrigendum to ISO/IEC 19794-4:2011 and ISO/IEC 19794-4:2011 specifies a data record interchange format for storing, recording, and transmitting the information from one or more finger or palm image areas within an ISO/IEC 19785-1 data structure. This can be used for the exchange and comparison of finger image data.

INCITS/ISO/IEC 19794-5:2005 [R2012],
Information technology - Biometric Data Interchange Formats - Part 5: Face Image Data

ISO/IEC 19794-5:2005 specifies scene, photographic, digitization and format requirements for images of faces to be used in the context of both human verification and computer automated recognition. The approach to specifying scene and photographic requirements in this format is to carefully describe constraints on how a photograph should appear rather than to dictate how the photograph should be taken.

INCITS/ISO/IEC 19794-5:2005/Cor 1:2008 [R2014],
Information technology - Biometric data interchange formats - Part 5: Face image data - Technical Corrigendum 2

This is the second corrigendum to ISO/IEC 19794-5:2005 and ISO/IEC 19794-5:2005 specifies scene, photographic, digitization and format requirements for images of faces to be used in the context of both human verification and computer automated recognition. The approach to specifying scene and photographic requirements in this format is to carefully describe constraints on how a photograph should appear rather than to dictate how the photograph should be taken.

INCITS/ISO/IEC 19794-5:2005/Cor 2:2008 [R2014],
Information technology - Biometric data interchange formats - Part 5: Face image data - Technical Corrigendum 3

This is the third corrigendum to ISO/IEC 19794-5:2005 and ISO/IEC 19794-5:2005 specifies scene, photographic, digitization and format requirements for images of faces to be used in the context of both human verification and computer automated recognition.

INCITS/ISO/IEC 19794-5:2011 [2013],
Information technology - Biometric data interchange formats - Part 5: Face image data

ISO/IEC 19794-5:2011 specifies a record format for storing, recording, and transmitting information from one or more facial images or a short video stream of facial images, specifies scene constraints of the facial images, specifies photographic properties of the facial images, specifies digital image attributes of the facial images, and provides best practices for the photography of faces.

Information technology - Biometric Data Interchange Formats - Part 5: Face Image Data AMENDMENT 1: Conformance testing methodology and clarification of defects

This is the first amendment to the 2011 edition of ISO/IEC 19794-5 that: specifies a record format for storing, recording, and transmitting information from one or more facial images or a short video stream of facial images, - specifies scene constraints of the facial images, - specifies photographic properties of the facial images, - specifies digital image attributes of the facial images, and provides best practices for the photography of faces.

INCITS/ISO/IEC 19794-6:2007 [R2012],
Information technology - Biometric Data Interchange Formats - Part 6: Iris Image Data

ISO/IEC 19794-6:2005 specifies two alternative image interchange formats for biometric authentication systems that utilize iris recognition. The first is based on a rectilinear image storage format that may be a raw, uncompressed array of intensity values or a compressed format such as that specified by ISO/IEC 15444. The second format is based on a polar image specification that requires certain pre-processing and image segmentation steps, but produces a much more compact data structure that contains only iris information.

INCITS/ISO/IEC 19794-6:2011 [2013],
Information technology - Biometric data interchange formats - Part 6: Iris image data

ISO/IEC 19794-6:2011 specifies iris image interchange formats for biometric enrollment, verification and identification systems. The image information might be stored as an array of intensity values optionally compressed with ISO/IEC 15948 or ISO/IEC 15444, or an array of intensity values optionally compressed with ISO/IEC 15948 or ISO/IEC 15444 that might be cropped around the iris, with the iris at the centre, and which might incorporate region-of-interest masking of non-iris regions.

INCITS/ISO/IEC 19794-6:2011/Cor 1:2014,
Information technology - Biometric data interchange formats - Part 6: Iris image data - Technical Corrigendum 1

This is the first corrigendum to ISO/IEC 19794-5:2011 and ISO/IEC 19794-6:2011 specifies iris image interchange formats for biometric enrollment, verification and identification systems. The image information might be cropped around the iris, with the iris at the centre, and which might incorporate region-of-interest masking of non-iris regions.
INCITS/ISO 19794-7:2007 [R2012], Information technology - Biometric Data Interchange Formats - Part 7: Sign/Signature Series Data

ISO/IEC 19794-7:2007 specifies two data interchange formats for signature/sign behavioural data captured in the form of time series using devices such as digitizing tablets or advanced pen systems. One data interchange format is for general use and the other one is a compact format for use with smart cards or other tokens. Both data interchange formats can be used for both acquired signature/sign samples (serving as a starting point for feature extraction) and for time-series features (to be compared directly by time-series based comparison algorithms).


Technical Corrigendum 1 to ISO/IEC 19794-7:2007

INCITS/ISO 19794-7:2014, Information technology -- Biometric data interchange formats -- Part 7: Signature/sign time series data

ISO/IEC 19794-7:2014 specifies data interchange formats for signature/sign behavioural data captured in the form of a multi-dimensional time series using devices such as digitizing tablets or advanced pen systems. The data interchange formats are generic, in that they may be applied and used in a wide range of application areas where handwritten signs or signatures are involved. No application-specific requirements or features are addressed in ISO/IEC 19794-7:2014.

INCITS/ISO 19794-8:2006 [R2014], Information technology - Biometric Data Interchange Formats - Part 8: Finger Pattern Skeletal Data

ISO/IEC 19794-8:2006 specifies the interchange format for the exchange of pattern-based skeletal fingerprint recognition data. The data format is generic, in that it may be applied and used in a wide range of application areas where automated fingerprint recognition is involved. The exchange format defined in ISO/IEC 19794-8:2006 describes all characteristics of a fingerprint in a small data record. Thus it allows for the extraction of both spectral information (orientation, frequency, phase, etc.) and features (minutiae, core, ridge count, etc.). Transformations like translation and rotation can also be accommodated by the format defined herein.

INCITS/ISO 19794-8:2006/Cor 1:2013, Information technology - Biometric data interchange formats - Part 8: Finger pattern skeletal data - Technical Corrigendum 1

This is the first Technical Corrigendum to ISO/IEC 19794-8:2006 that specifies the interchange format for the exchange of pattern-based skeletal fingerprint recognition data. The data format is generic, in that it may be applied and used in a wide range of application areas where automated fingerprint recognition is involved.

provides guidance on the operational testing of biometric systems; specifies performance metrics for operational systems; details data that may be retained by operational systems to enable performance monitoring; and specifies requirements on test methods, recording of data, and reporting of results of operational evaluations.

INCITS/ISO/IEC 19795-7:2011 [R2016], Information technology -- Biometric performance testing and reporting -- Part 7: Testing of on-card biometric comparison algorithms

Establishes a mechanism for measuring the core algorithmic capabilities of biometric comparison algorithms running on ISO/IEC 7816 integrated circuit cards. Specifically, the standard instantiates a mechanism for on-card biometric comparison testing; standardizes procedures for the measurement of the accuracy of on-card biometric comparison implementations running on object-based, test-specific sample cards; standardizes procedures for the measurement of durations of the various operations; and gives examples for matching ISO/IEC 19794-2:2005 compact card minutiae templates.


ISO/IEC 19796-1:2005 is a framework to describe, compare, analyze, and implement quality management and quality assurance approaches. It will serve to compare different existing approaches and to harmonize these towards a common quality model. The main aspect is the Reference Framework for the Description of Quality Approaches (RFDAQ).


This part of ISO/IEC 19796 extends the "reference framework for the description of quality approaches" (RFDAQ) defined in ISO/IEC 19796-1 by providing a harmonized description of the methods and metrics required to implement quality management and quality assurance systems for stakeholders designing, developing, or utilizing information technology systems used for learning, education, and training. Activities such as quality planning, quality control, and quality improvement are important for quality management implementations. While these three activities are focused on products, processes and their development, quality assurance is focused more on confirmation and indication for internal and external stakeholders. It should be noted that the reference methods and metrics for this part of ISO/IEC 19796 include issues related to the implementation of quality management and assurance systems for information technologies that are used for learning, education, and training. This part of ISO/IEC 19796 is to be used to help identify methods and metrics to implement a quality assurance and management system of an IT system used for learning, education, and training. For example, it may be used for quality management systems that help to verify items such as IT system effectiveness, compliance with quality objectives including purposes, customer satisfaction, training in the use of the IT system, complaints handling, and auditing.

INCITS/ISO/IEC 19798:2007 [R2013], Information Technology - Method of the determination of toner cartridge yield for Colour printers and multi-function devices that contain printer components

ISO/IEC 19798:2007 defines a method for testing and calculation of average yield measured in the number of standard pages for a colour toner cartridge and specific printer printing in a semi-continuous mode under a defined set of conditions. It uses the test page suite defined in ISO/IEC 24712. ISO/IEC 19798:2007 can also be applied to the printer component of any multifunctional device that has a digital input-printing path (i.e. multi-function devices that contain printer components).

INCITS/ISO/IEC 19798:2007/Cor 1:2013, Method for the determination of toner cartridge yield for colour printers and multi-function devices that contain printer components -- Technical Corrigendum 1

This is the first corrigendum to ISO/IEC 19798:2007 that defines a method for testing and calculation of average yield measured in the number of standard pages for a colour toner cartridge and specific printer printing in a semi-continuous mode under a defined set of conditions. It uses the test page suite defined in ISO/IEC 24712. ISO/IEC 19798:2007 can also be applied to the printer component of any multifunctional device that has a digital input-printing path (i.e. multi-function devices that contain printer components).


ISO/IEC 19799:2007 defines methods and processes for measuring objective print quality attributes for the assessment of gloss non-uniformity on printed pages in reflection mode, and provides transforms, when applicable, that relate the objective results to subjective responses if appropriate. The gloss uniformity attributes included in ISO/IEC 19799:2007 are differential gloss, gloss uniformity within a page, and gloss consistency within a run.


This International Standard specifies the syntax and semantics of COBOL. Its purpose is to promote a high degree of machine independence to permit the use of COBOL on a variety of data processing systems.


This International Standard specifies the syntax and semantics of COBOL. Its purpose is to promote a high degree of machine independence to permit the use of COBOL on a variety of data processing systems.

INCITS/ISO/IEC 20005-2014, Information technology - Sensor networks - Services and interfaces supporting collaborative information processing in intelligent sensor networks

ISO/IEC 20005:2013 specifies services and interfaces supporting collaborative information processing (CIP) in intelligent sensor networks which includes: - CIP functionalities and CIP functional model, - common services supporting CIP, - common service interfaces to CIP.


ISO/IEC 20008-1:2013 specifies principles, including a general model, a set of entities, a number of processes, and general requirements for the following two categories of anonymous digital signature mechanisms: 1.signature mechanisms using a group public key, and 2.signature mechanisms using multiple public keys.
authentication mechanisms that allow the legitimacy requirements and constraints for anonymous entity authentication methods using a group public key; provides a group public key to verify a digital signature. It signature mechanisms, in which a verifier makes use of a general description of an anonymous digital signature mechanism using a group public key; a variety of mechanisms that provide such anonymous digital signatures.

ISO/IEC 20009-1:2013 specifies a model, requirements and constraints for anonymous entity authentication mechanisms that allow the legitimacy of an entity to be corroborated.

INCITS/ISO/IEC 20060:2010 [2013], Information technology - Open Terminal Architecture (OTA) - Virtual machine
ISO/IEC 20060:2010 provides the specifications for the standard Open Terminal Architecture (OTA) kernel in seven layers: definition of the virtual machine (VM); description of the services provided by the VM to terminal programmers; specification of a set of tokens representing the native machine language of the VM; specification of the format in which token modules are delivered to an OTA kernel for processing.

INCITS/ISO/IEC 20061:2001 [2020], Information technology - 12,65 mm wide magnetic tape cassette for information interchange - Helical scan recording DTF-2
This International Standard specifies the physical and magnetic characteristics of magnetic tape cassettes, using magnetic tape 12,65 mm wide so as to provide physical interchange of such cassettes between drives. It also specifies the quality of the recorded signals, the recording method and the recorded format, called Digital Tape Format-2 (DTF-2), thereby allowing data interchange between drives by means of such cassettes.

INCITS/ISO/IEC 20062:2001 [2012], Information technology - 8 mm wide magnetic tape cartridge for information interchange - Helical scan recording VXA-1 format
This International Standard specifies the physical and magnetic characteristics of an 8 mm wide magnetic tape cartridge to enable physical interchange of such cartridges between drives. It also specifies the quality of the recorded signals, the recording method and the recorded format called VXA-1, and thereby allowing data interchange between drives by means of such magnetic tape cartridges. This International Standard specifies three types depending on the length of magnetic tape contained in the case, referred to as Type A, Type B and Type C.
INCITS/ISO/IEC 20944-4:2013 [2013],
Information technology -- Metadata
Registries Interoperability and Bindings
(MDR-IB) -- Part 4: Protocol bindings
The ISO/IEC 20944 series of International Standards provides the bindings and their interoperability for metadata registries, such as those specified in the ISO/IEC 11179 series of International Standards. ISO/IEC 20944-4:2013 contains provisions that are common to protocol bindings and the protocol bindings themselves. The protocol bindings have commonality in their conceptualization of the services provided. Common features include: - common data transfer semantics; - harmonized session services for connection-oriented and connection-less protocols. Bindings for HTTP and WebDAV protocols are provided.

INCITS/ISO/IEC 20944-5:2013 [2013],
Information technology -- Metadata
Registries Interoperability and Bindings
(MDR-IB) -- Part 5: Profiles
The ISO/IEC 20944 series of International Standards provides the bindings and their interoperability for metadata registries, such as those specified in the ISO/IEC 11179 series of International Standards. ISO/IEC 20944-5:2013 contains provisions that are common to the profiles, and the profiles themselves. A profile of ISO/IEC 11179-3:2003 is included, which maps ISO/IEC 11179 metadata to standardized identifiers for navigation and access of ISO/IEC 11179 metadata.

INCITS/ISO/IEC 20970:2002 [S2012],
Information technology - Programming
languages, their environments and system
software interfaces - JEFF file format
This International Standard's most immediate interest is for deploying portable applications on small footprint devices. This International Standard provides dramatic savings of dynamic memory and execution time without sacrificing any of the flexibility usually attached to the use of non-pre-linked portable code.

INCITS/ISO/IEC 21000-10:2006 [R2014],
Information technology - Multimedia
framework (MPEG-21) - Part 10: Digital Item
Processing
This Part of ISO/IEC 21000, entitled Digital Item Processing (DIP), specifies the syntax and semantics of tools that may be used to process Digital Items. The tools provide a normative set of tools that specify the processing of a Digital Item in a predefined manner.

[R2014], Information technology - Multimedia
framework (MPEG-21) - Part 10: Digital Item Processing - Amendment 1: Addition C++ bindings
Amendment 1 to ISO/IEC 21000-10:2006.

INCITS/ISO/IEC 21000-14:2007 [R2014],
Information technology - Multimedia
Framework (MPEG-21) - Part 14: Conformance Testing
This International Standard specifies conformance points and conformance tests for different parts of ISO/IEC 21000. Based on the various conformance points, it is identified which requirements defined in ISO/IEC 21000 apply to those conformance points. The tests are developed to ascertain whether a particular artifact (such as a piece of software or hardware or a document) meets all the requirements for a specific conformance point or not.

INCITS/ISO/IEC 21000-15:2006 [R2014],
Information technology - Multimedia
Framework (MPEG-21) - Part 15: Event
Reporting
This part of ISO/IEC 21000 specifies - how to express Event Report Requests (ER-R) that contain information about which Events to report, what information is to be reported and to whom; - how to express Event Reports (ER) which are created by an MPEG-21 Peer in response to an Event Report Request when the conditions specified by an ER-R are met.

[R2014], Information technology - Multimedia
Framework (MPEG-21) - Part 15: Event
Reporting - Amendment 1: Security in Event Reporting

INCITS/ISO/IEC 21000-16:2005 [R2014],
Information technology - Multimedia
Framework (MPEG-21) - Part 16: Binary
Format
This part of ISO/IEC 21000 specifies the ISO/IEC 21000 binary format which is an alternative serialization format of descriptions as specified within other ISO/IEC 21000 parts, e.g. ISO/IEC 21000-2. This enables the efficient interchange or storage of ISO/IEC 21000 descriptions.

INCITS/ISO/IEC 21000-17:2006 [R2014],
Information technology -- Multimedia
framework (MPEG-21) -- Part 17: Fragment Identification of MPEG Resources
ISO/IEC 21000-17:2006 specifies a normative syntax for Fragment Identifiers to be used in URIs (Uniform Resource Identifiers) for addressing parts of any resource whose Internet Media Type is one of: audio/mpeg; video/mpeg; video/mp4; audio/mp4; application/mp4. ISO/IEC 21000 (MPEG-21) defines an open framework for multimedia delivery and consumption, with both the content creator and content consumer as focal points. The vision for MPEG-21 is to define a multimedia framework to enable transparent and augmented use of multimedia resources across a wide range of networks and devices used by different communities.

INCITS/ISO/IEC 21000-18:2007 [R2014],
Information technology-Multimedia
Framework (MPEG-21) - Part 18: Digital Item
Streaming
This part of ISO/IEC 21000 specifies tools for Digital Item Streaming. The first tool is the Bitstream Binding Language, which describes how Digital Items (comprising the Digital Item Declaration, metadata and resources) can be mapped to delivery channels such as MPEG-2 Transport Streams or the Real-time Transport Protocol.

INCITS/ISO/IEC 21000-2-2003 [R2013],
Information technology - Multimedia
framework (MPEG-21) - Part 2: Digital Item
Declaration
This document describes the MPEG-21 Digital Item Declaration technology, which is part 2 of the MPEG-21 standard.

INCITS/ISO/IEC 21000-2:2005 [2008],
Information technology - Multimedia
framework (MPEG-21) - Part 2: Digital Item
Declaration

INCITS/ISO/IEC 21000-3-2003 [R2013],
Information technology - Multimedia
framework (MPEG-21) - Part 3: Digital Item
Identification
This third part of MPEG-21 (ISO/IEC 21000-3), entitled Digital Item Identification (DIID), specifies how to uniquely identify Digital Items (and parts thereof), IP related to the Digital Items; Description Schemes, etc.

[R2014], Information technology - Multimedia
Framework (MPEG-21) - Part 3: Digital Item
Identification and Description - Amendment 1: relates identifier types

INCITS/ISO/IEC 21000-4:2006 [R2014],
Information technology - Multimedia
framework (MPEG-21) - Part 4: Intellectual
Property Management and Protection
Components
This part of ISO/IEC 21000 specifies how to include IPMP information and protected parts of Digital Items in a DIDL document. It purposely does not specify protection measures, keys, key management, trust management, encryption algorithms, certification infrastructures or other components that would also be needed as part of a complete IPMP solution. The IPMP DIDL encapsulates and protects a part of the hierarchy of a Digital Item, and associates appropriate identification and protection information with it. The description of IPMP governance and tools is required to satisfy IPMP for a Digital Item or its parts to be accessed.

This standard specifies the syntax and semantics of tools that may be used to assist the adaptation of Digital Items, i.e., the Digital Item Declaration and resources referenced by the declaration. The tools could be used to satisfy transmission, storage and consumption constraints, as well as Quality of Service management by the various Users. It is important to emphasize that the adaptation engines themselves are non-normative tools of this part of ISO/IEC 21000.

INCITS/ISO/IEC 21000-8-2008 [R2014], Information technology - Multimedia framework (MPEG-21) - Part 8: Reference software

This International Standard describes reference software implementing the normative clauses of the other parts of ISO/IEC 21000. The information provided is applicable for determining the reference software modules available for parts of ISO/IEC 21000, understanding the functionality of the available reference software modules, and utilizing the available reference software modules.


Amendment 1 to ISO/IEC 21000-8:2008.


This International Standard specifies the MPEG-21 file format, in which an MPEG-21 XML document (e.g. Digital Item Declaration (DID)) and some or all of its referenced content can be placed in a single &amp;#8216;content package' file. This enables the interchange, editing, and &amp;#8216;playback' of MPEG-21 documents.


INCITS/ISO/IEC 21117:2012 [2013], Information technology - Office equipment - Copiers and multi-function devices - Information to be included in specification sheets and related test methods

This International Standard specifies the information to be listed in specification sheets for electrophotographic digital copying machines and multi-function devices. The intention of this International Standard is to allow purchasers and users to compare the characteristics of different models of copying machines and multi-function devices so that they can more easily select copying machines and multi-function devices that meet their requirements.

INCITS/ISO/IEC 22092:2002 [2012], Information technology - Data Interchange on 130 mm Magneto-Optical Disk Cartridges - Capacity: 9.1 Gbytes Per Cartridge

Specifies the mechanical, physical, and optical characteristics of a 130 mm optical disk cartridge (ODC) that employs thermo-magnetic and magneto-optical effects to enable data interchange between such disks. This International Standard specifies two Types, viz. Type R/W provides for data to be written, read and erased many time over the recording surface(s) of the disk.

INCITS/ISO/IEC 22051:2002 [2016], Information technology - Data Interchange on 12,7 mm, 384-track magnetic tape cartridges - SDLT1 format

Specifies the physical and magnetic characteristics of a 12.7 mm wide, 448-track magnetic tape cartridge, to enable physical interchangeability of such cartridges between drives. It also specifies the quality of the recorded signals, the recording method and the recorded format, thereby allowing data interchange between drives by means of such cartridges. The format supports variable length Logical Records, high speed search, and the use of a registered algorithm for data compression.

INCITS/ISO/IEC 22091:2002 [2013], Information technology - Streaming Lossless Data Compression algorithm (SLDC)

Specifies a lossless compression algorithm to reduce the number of 8-bit bytes required to represent data records and File Marks. The algorithm is known as Streaming Lossless Data Compression algorithm (SLDC). One buffer size (1.024 bytes) is specified. The numerical identifier according to ISO/IEC 11576 allocated to this algorithm is 6.

INCITS/ISO/IEC 22050-2002 [2013], Information technology - Data Interchange on 12,7 mm, 384-track magnetic tape cartridges - Ultrium-1 format

This International Standard specifies the physical and magnetic characteristics of magnetic tape cartridges, using magnetic tape 12.65 mm wide so as to provide physical interchange of such cartridges between drives. It also specifies the quality of the recorded signals, the recording method and the recorded format, thereby allowing data interchange between drives by means of such cartridges. The format supports variable length Logical Records, high speed search, and the use of a registered algorithm for data compression.

INCITS/ISO/IEC 22005-2002 [2013], Information technology - Data Interchange on 12,7 mm, 384-track magnetic tape cartridges - SDLT1 format

Specifies the physical and magnetic characteristics of a 12.7 mm wide, 448-track magnetic tape cartridge, to enable physical interchangeability of such cartridges between drives. It also specifies the quality of the recorded signals, a format - called Super Digital Linear Tape 1 (SDLT 1) - and a recording method, thereby allowing data interchange between drives. Together with a labelling standard, for instance ISO 1001 for Magnetic Tape Labelling, it allows full data interchange by means of such magnetic tape cartridges.

INCITS/ISO/IEC 22009:2002 [2013], Information technology - Streaming Lossless Data Compression algorithm (SLDC)

Specifies a lossless compression algorithm to reduce the number of 8-bit bytes required to represent data records and File Marks. The algorithm is known as Streaming Lossless Data Compression algorithm (SLDC). One buffer size (1.024 bytes) is specified. The numerical identifier according to ISO/IEC 11576 allocated to this algorithm is 6.

INCITS/ISO/IEC 21118-2012 [2013], Information technology -- Office equipment -- Information to be included in specification sheets -- Data projectors ISO/IEC 21118:2012 specifies the information to be included in the specification sheets for front projection type data projectors and the form of specification sheets. It is also applicable to data projectors that have a video signal input port as well as a computer signal input port. It is not applicable to units for a rear screen projection or with a video input terminal alone.

INCITS/ISO/IEC 22050-2002 [2013], Information technology - Data Interchange on 12,7 mm, 384-track magnetic tape cartridges - SDLT1 format

This International Standard specifies the physical and magnetic characteristics of magnetic tape cartridges, using magnetic tape 12.65 mm wide so as to provide physical interchange of such cartridges between drives. It also specifies the quality of the recorded signals, the recording method and the recorded format, thereby allowing data interchange between drives by means of such cartridges. The format supports variable length Logical Records, high speed search, and the use of a registered algorithm for data compression.

INCITS/ISO/IEC 22051:2002 [2016], Information technology - Data Interchange on 12,7 mm, 384-track magnetic tape cartridges - SDLT1 format

Specifies the physical and magnetic characteristics of a 12.7 mm wide, 448-track magnetic tape cartridge, to enable physical interchangeability of such cartridges between drives. It also specifies the quality of the recorded signals, a format - called Super Digital Linear Tape 1 (SDLT 1) - and a recording method, thereby allowing data interchange between drives. Together with a labelling standard, for instance ISO 1001 for Magnetic Tape Labelling, it allows full data interchange by means of such magnetic tape cartridges.

INCITS/ISO/IEC 22091:2002 [2013], Information technology - Streaming Lossless Data Compression algorithm (SLDC)

Specifies a lossless compression algorithm to reduce the number of 8-bit bytes required to represent data records and File Marks. The algorithm is known as Streaming Lossless Data Compression algorithm (SLDC). One buffer size (1.024 bytes) is specified. The numerical identifier according to ISO/IEC 11576 allocated to this algorithm is 6.

INCITS/ISO/IEC 22092:2002 [2012], Information technology - Data Interchange on 130 mm Magneto-Optical Disk Cartridges - Capacity: 9.1 Gbytes Per Cartridge

Specifies the mechanical, physical, and optical characteristics of a 130 mm optical disk cartridge (ODC) that employs thermo-magnetic and magneto-optical effects to enable data interchange between such disks. This International Standard specifies two Types, viz. Type R/W provides for data to be written, read and erased many time over the recording surface(s) of the disk.
INCITS/ISO/IEC 22533:2005 [R2015],
Information technology - Data interchange on 90 mm Optical Disk Cartridges - Capacity: 2.3 Gbytes per Cartridge
This Standard defines the characteristics of 90 mm Optical Disk Cartridges (ODC) with a capacity of 2.3 GB per Cartridge. The Standard specifies only Type R/W for 2 048-byte sectors of such cartridge. Type R/W provides for data to be written, read and erased many times over the entire recording surface of the disk using the thermo-magnetic and magneto-optical effects. It is also referred to as "fully rewritable". This International Standard provides for 2 048-byte sectors only. All sectors on a disk are of the same size.

INCITS/ISO/IEC 22536:2013 [2015], Information technology -- Telecommunications and information exchange between systems -- Near Field Communication Interface and Protocol (NFCIP-1) -- RF interface test methods
This standard is part of a suite of standards that specify tests for ISO/IEC 18092. It defines test methods for the RF-interface. This standard specifies RF-test methods for NFCIP-1 devices with antennas fitting within the rectangular area of 50 mm by 40 mm. This test standard, the first of two parts, specifies compliance tests for the RF interface of ISO/IEC 18092 devices. The companion test standard ISO/IEC 23917 specifies protocol tests for ISO/IEC 18092.

INCITS/ISO/IEC 22537:2006 [R2015], Information technology - ECMAScript for XML (E4X) specification
This standard defines the syntax and semantics of ECMAScript for XML (E4X), a set of programming language extensions adding native XML support to ECMAScript.

INCITS/ISO/IEC 23000-10:2009 [R2016], Information technology -- Multimedia application format (MPEG-A) -- Part 10: Video surveillance application format
Specifies a file format designed to provide for a first level of interoperability for video-based surveillance systems. The file format provides the overall structure for storing video content and associated metadata in a single file.

This part of ISO/IEC 23000 presents a basic architecture for constructing an annotated music library. It defines a simple file format for songs and a file format for albums and playlists. A compliant player application has to support all these specified file formats.

This part of ISO/IEC 23000, also known as 'photo player MAF', specifies a file format for digital photo library applications. It establishes a standardized solution for the carriage of images and associated metadata, to facilitate simple and fully interoperable exchange across different devices and platforms. The set of metadata includes MPEG-7 visual content descriptions, as well as acquisition-based metadata (such as date, time and camera settings). This allows compliant devices to support new, content-enhanced functionality, such as intelligent browsing, content-based search or automatic categorization.


INCITS/ISO/IEC 23000-4:2009 [R2016], Information technology -- Multimedia application format (MPEG-A) -- Part 4: Musical slide show application format

INCITS/ISO/IEC 23000-4:2009/AM 1:2009 [R2016], Information technology -- Multimedia application format (MPEG-A) -- Part 4: Musical slide show application format - Amendment 1: Conformance and reference software for musical slide show application format

INCITS/ISO/IEC 23000-5:2011 [2014], Information technology - Multimedia application format (MPEG-A) - Part 5: Media streaming application format
ISO/IEC 23000-5:2011 specifies a digital item structure, a file format, and references a set of protocols used in a media streaming environment for applications where governed audio and video information is streamed to an end-user device by means of existing protocols such as MPEG-2 Transport Stream or Real Time Protocol over User Datagram Protocols over Internet Protocol (RTP/UDP/IP), and provides informative implementation examples corresponding to specific applications.

INCITS/ISO/IEC 23000-6:2009 [R2016], Information technology -- Multimedia application format (MPEG-A) -- Part 6: Professional archival application format
The purpose of the PA-AF is to provide a standardized packaging format for digital files. This packaging format can also serve as an implementation of the information package specified by the reference model of the open archival information system (OAIS). The OAIS reference model is a framework for understanding and applying concepts necessary for long-term digital information preservation (where long-term is long enough to be concerned about changing technologies). In addition, PA-AF can also be used as an intermediate or exchange packaging format for any kind of multimedia content.

INCITS/ISO/IEC 23000-7:2008 [R2014], Information technology -- Multimedia application format (MPEG-A) -- Part 7: Open access application format
This international Standard specifies a container format, which can contain any type of content and can also transport additional metadata. This packaging mechanism offers the possibility to enrich the content with human and machine-readable metadata and is not limited to a specific content type. Unlike other application formats, the open access application format is not a multimedia-based format.

INCITS/ISO/IEC 23000-7:2008/AM 1:2009 [R2016], Information technology -- Multimedia application format (MPEG-A) -- Part 7: Open access application format - Amendment 1: Conformance and reference software for open access application format
Amendment 1 to ISO/IEC 23000-7:2008.

This part of ISO/IEC 23000 specifies a file format that pertains to both terrestrial digital multimedia broadcasting (T-DMB) and satellite digital multimedia broadcasting (S-DMB) contents and services. It integrates the existing DMB contents with appropriate additional information to facilitate storage, interchange, management, editing, and presentation of the contents in protected, governed, and interoperable ways.

This part of ISO/IEC 23001 provides a standardized set of technologies for encoding XML documents. It addresses a broad spectrum of applications and requirements by providing a generic method for transmitting and compressing XML documents.

Amendment 1 to ISO/IEC 23001-1:2006.


Amendment 2 to ISO/IEC 23001-1:2006.

INCITS/ISO 23001-2:2008 [R2014], Information technology -- MPEG systems technologies -- Part 2: Fragment request units

This part of ISO/IEC 23001 specifies the fragment request unit technology. It comprises a syntax and semantics for expressing a request for fragments of XML. It also specifies how such requests can be used in XML based systems such as ISO/IEC 15938-1 and ISO/IEC 23001-1. The technology can be used in resource constrained environments so that only the fragments of XML of interest at a given time need be transmitted to a requesting peer from a responding peer. It can also be used for node-by-node navigation of a remote XML document.


This part of ISO/IEC 23001 specifies XML IPMP messages (hereinafter IPMP Messages) which are a simple and natural extension of the IPMP Information Descriptors defined in ISO/IEC 21000-4. They allow dispatching of the IPMP information related to a protected content element retrieved from the associated digital item to the modules in charge of performing the IPMP operations required to access the protected content element.

INCITS/ISO 23001-5:2008 [R2014], Information technology -- MPEG systems technologies -- Part 5: Bitstream Syntax Description Language (BSDL)

This part of ISO/IEC 23001 specifies BSDL (Bitstream Syntax Description Language), a language based on W3C XML Schema to describe the structure of a bitstream with an XML document named BS Description.

INCITS/ISO 23002-1:2006 [R2014], Information technology -- MPEG video technologies -- Part 1: Accuracy requirements for implementation of integer-output 8x8 inverse discrete cosine transform

A number of image and video coding related standards (see Bibliography) include a requirement for decoders to implement an integer-output 8x8 inverse discrete cosine transform (IDCT) for the generation of inversetransformed sample differences with a nominal range from -28 to 28 - 1 for some integer number of bits B, where B is greater than or equal to 8. This part of ISO/IEC 23002 specifies conformance requirements for establishing sufficient accuracy in such an integer-output IDCT implementation. It is intended to be suitable for reference to establish partial or complete requirements for IDCT accuracy for conformance to other standards that require IDCT accuracy.

INCITS/ISO 23002-1:2006/AM1:2008 [R2014], Information technology -- MPEG video technologies -- Part 1: Accuracy requirements for implementation of integer-output 8x8 transform AMENDMENT 1: Software for integer IDCT accuracy testing

Amendment 1 to ISO/IEC 23002-1:2006.


This part of ISO/IEC 23002 specifies a particular implementation of an integer-output 8&215;8 IDCT that fully conforms to the accuracy requirements specified in ISO/IEC 23002-1 (see Ref. [7] in the Bibliography) and additionally meets or exceeds all accuracy requirements specified for IDCT precision in a number of international video coding standards (see Ref. [2] to [6] in the Bibliography). It additionally provides a (nonnormative) specification of an integer-output 8&215;8 forward DCT based on the same factorization structure.

INCITS/ISO 23002-3:2007 [R2014], Information technology -- MPEG video technologies -- Part 3: Representation of auxiliary video and supplemental information

This part of ISO/IEC 23002 defines auxiliary video streams as data coded as video sequences and supplementing a primary video sequence. Depth maps and parallax maps are the first specified types of auxiliary video streams, relating to stereoscopic-view video content.


This International Standard describes the MPEG Surround standard (Spatial Audio Coding, SAC), that is capable of re-creating N channels based on M+N transmitted channels, and additional control data. In the preferred modes of operating the spatial audio coding system, the M channels can either be a single mono channel or a stereo channel pair. The control data represents a significant lower data rate than required for transmitting all N channels, making the coding very efficient while at the same time ensuring compatibility with both M channel devices and N channel devices.


Amendment 1 to ISO/IEC 23003-1:2007.


This part of ISO/IEC 23004 defines the architecture of the MPEG Multimedia Middleware (M3W) technology.


This part of ISO/IEC 23004 defines the Multimedia application programming interface (API) of MPEG Multimedia Middleware. The context of this Multimedia API is described in ISO/IEC 23004-1.


This part of ISO/IEC 23004 defines the Multimedia Middleware (M3W) Component Model and Core Framework. The context of the M3W Component Model and Core Framework is described in ISO/IEC 23004-1.


This part of ISO/IEC 23004 defines the Resource and Quality Management framework of the MPEG Multimedia Middleware (M3W) technology.
INCITS/ISO/IEC 23004-5:2008 [R2014],
Information technology -- Multimedia Middleware -- Part 5: Component download
This part of ISO/IEC 23004 defines the MPEG Multimedia Middleware (M3W) technology Download Architecture. This definition contains the specification of the part of the M3W application programming interface (API) related to download as well as the realization. The M3W API specification provides a uniform view of the download functionality provided by M3W. The specification of the realization is relevant for those who are making an implementation of a download framework for M3W.

INCITS/ISO/IEC 23004-6:2008 [R2014],
Information technology -- Multimedia Middleware -- Part 6: Fault management
This part of ISO/IEC 23004 defines the MPEG Multimedia Middleware (M3W) technology Fault Management Architecture. It contains the specification of the part of the M3W application programming interface (API) related to Fault Management as well as the realization. The M3W API specification provides a uniform view of the Fault Management functionality provided by M3W. The specification of the realization is relevant for those who are making an implementation of a Fault Management framework for M3W.

INCITS/ISO/IEC 23004-7:2008 [R2014],
Information technology -- Multimedia Middleware -- Part 7: System integrity management
This part of ISO/IEC 23004 defines the MPEG Multimedia Middleware (M3W) technology Integrity Management Architecture. It contains the specification of the part of the M3W application programming interface (API) related to Integrity Management as well as the realization. The M3W API specification provides a uniform view of the Integrity Management functionality provided by M3W. The specification of the realization is relevant for those who are making an implementation of an Integrity Management framework for M3W.

INCITS/ISO/IEC 23004-8:2009 [R2016],
Information technology -- Multimedia Middleware -- Part 8: Reference software
This standard explains the organization of the reference software for ISO/IEC 23004, Parts 1 to 7 (Multimedia Middleware). The electronic attachment to ISO/IEC 23004-8:2009 provides the source code of the actual software.

INCITS/ISO/IEC 23270-2008 [R2013],
Information technology - C# Language Specification
This International Standard specifies the form and establishes the interpretation of programs written in the C# programming language. It specifies; The representation of C# programs; The syntax and constraints of the C# language; The semantic rules for interpreting C# programs; The restrictions and limits imposed by a conforming implementation of C#.

INCITS/ISO/IEC 23271:2012 [2013], Information technology - Common Language Infrastructure (CLI)
ISO/IEC 23271:2012 defines the Common Language Infrastructure (CLI) in which applications written in multiple high-level languages can be executed in different system environments without the need to rewrite those applications to take into consideration the unique characteristics of those environments. It consists of six partitions.

This standard defines a system interface for compiled applications and a minimal environment for support of installation scripts. Its purpose is to enable a uniform industry standard environment for high-volume applications conforming to the LSB.


INCITS/ISO/IEC 23360-3:2006 [R2015], Linux Standard Base (LSB) core specification 3.1 - Part 3: Specification for IA64 architecture This standard is the Itanium(TM) architecture-specific Core part of the Linux Standard Base (LSB). It supplements the generic LSB Core module with those interfaces that differ between architectures. Interfaces described in ISO/IEC 23360-3 are mandatory except where explicitly listed otherwise. Core interfaces may be supplemented by other modules; all modules are built upon the core.

INCITS/ISO/IEC 23360-4:2006 [R2015], Linux Standard Base (LSB) core specification 3.1 - Part 4: Specification for AMD64 architecture This standard is the AMD64 architecture-specific Core part of the Linux Standard Base (LSB). It supplements the generic LSB Core module with those interfaces that differ between architectures. Interfaces described in ISO/IEC 23360-4 are mandatory except where explicitly listed otherwise. Core interfaces may be supplemented by other modules; all modules are built upon the core.

INCITS/ISO/IEC 23360-5:2006 [R2015], Linux Standard Base (LSB) core specification 3.1 - Part 5: Specification for PPC32 architecture This standard is the PPC32 architecture-specific Core part of the Linux Standard Base (LSB). It supplements the generic LSB Core module with those interfaces that differ between architectures. Interfaces described in ISO/IEC 23360-5 are mandatory except where explicitly listed otherwise. Core interfaces may be supplemented by other modules; all modules are built upon the core.

INCITS/ISO/IEC 23360-6:2006 [R2015], Linux Standard Base (LSB) core specification 3.1 - Part 6: Specification for PPC64 architecture This standard is the PPC64 architecture-specific Core part of the Linux Standard Base (LSB). It supplements the generic LSB Core module with those interfaces that differ between architectures. Interfaces described in ISO/IEC 23360-6 are mandatory except where explicitly listed otherwise. Core interfaces may be supplemented by other modules; all modules are built upon the core.

INCITS/ISO/IEC 23360-7:2006 [R2015], Linux Standard Base (LSB) core specification 3.1 - Part 7: Specification for S390 architecture This standard is the S390 architecture-specific Core part of the Linux Standard Base (LSB). It supplements the generic LSB Core module with those interfaces that differ between architectures. Interfaces described in ISO/IEC 23360-7 are mandatory except where explicitly listed otherwise. Core interfaces may be supplemented by other modules; all modules are built upon the core.

INCITS/ISO/IEC 23651:2003 [R2013], Information technology - 8 mm wide magnetic tape cartridge for information interchange - Helical scan recording - AIT-3 format
ISO/IEC 23651:2003 specifies the physical and magnetic characteristics of an 8 mm wide magnetic tape cartridge containing a memory chip to enable physical interchange of such cartridges between drives. It also specifies the quality of the recorded signals, the recording method and the recorded format - called Advanced Intelligent Tape No. 3 (AIT-3 format) - thereby allowing data interchange between drives by means of such magnetic tape cartridges.

INCITS/ISO/IEC 2375-2003 [R2013], Information technology - Procedure for registration of escape sequences and coded character sets ISO/IEC 2375:2003 specifies the procedures to be followed for preparing, maintaining, and publishing a register of escape sequences and of the coded character sets they identify.
INCITS/ISO/IEC 2382-1:1993 [R2013],
Information technology -- Vocabulary - Part 1: Fundamental Terms

Presents, in English and French, 144 terms in the following fields: general terms, information representation, hardware, software, programming, applications and end user, computer security, data management. In order to facilitate their translation into other languages, the definitions are drafted so as to avoid, as far as possible, any peculiarity attached to the language.

INCITS/ISO/IEC 2382-10-1979 [R2013],
Information technology - Vocabulary - Part 10: Operating techniques & facilities

Supports the international communication in information processing. Provides selected English and French terms and their definitions in the main fields of data processing including the used basic processes and device types, of the organization and representation of data, computer programming and operation, input and output devices and peripheral units as well as special applications.

INCITS/ISO/IEC 2382-12:1988 [R2013],
Information technology -- Vocabulary - Part 12: Peripheral equipment

Facilitates the international communication in information processing. Provides selected English and French terms and their definitions in the field of data media, storage devices as well as magnetic tapes and printers.

INCITS/ISO/IEC 2382-13-1996 [R2011],
Information technology - Vocabulary - Part 13: Computer Graphics

This part of ISO/IEC 2382 is intended to facilitate international communication in computer graphics. It presents, in two languages, terms and definitions of selected concepts relevant to the field of information technology and identifies relationships among the entries. In order to facilitate their translation into other languages, the definitions are drafted so as to avoid, as far as possible, any peculiarity attached to a language. This part of ISO/IEC 2382 defines concepts related to computer graphics.

INCITS/ISO/IEC 2382-17:1999 [2013],
Information technology -- Vocabulary -- Part 17: Databases

This part of ISO/IEC 2382 is intended to facilitate international communication in the area of databases. It presents, in two languages, terms and definitions of selected concepts relevant to databases and identifies relationships among the entries. To facilitate their translation into other languages, the definitions are drafted so as to avoid, as far as possible, any peculiarity attached to a language. This part of ISO/IEC 2382 defines concepts related to databases.

INCITS/ISO/IEC 2382-19-1989[S2011],
Information technology -- Vocabulary - Part 19: Analog computing

Serves for the international communication in information processing. Provides selected English and French terms and their definitions in the field of concepts relating to analog and hybrid arithmetic units, function generators, converters and modes of operation of such components.

INCITS/ISO/IEC 2382-2:1976 [R2013],
Information technology -- Vocabulary - Part 2: Arithmetic and logic operations

Facilitates the international communication in information processing. Provides selected English and French terms and their definitions in the field of mathematics and logic. The terms relating to numeric values are dealt with under the aspect of computing techniques as for arithmetic and logical operations.

INCITS/ISO/IEC 2382-20-1990 [R2011],
Information technology - Vocabulary - Part 20: Systems development

Communication in information processing. It presents, in two languages, terms and definitions of selected concepts relevant to the field of information processing and identifies relationships between the entries. In order to facilitate their translation into other languages, the definitions are drafted so as to avoid, as far as possible, any peculiarity attached to a language. This part of ISO/IEC 2382 defines concepts relating to a system life cycle, from the requirements analysis to the implementation, including system design and quality assurance.

INCITS/ISO/IEC 2382-23-1994 [R2011],
Information technology - Vocabulary - Part 23: Text Processing

This part of ISO/IEC 2382 is intended to facilitate international communication in information processing. It presents, in two languages, terms and definitions of selected concepts relevant to the field of information processing and identifies relationships between the entries. In order to facilitate their translation into other languages, the definitions are drafted so as to avoid, as far as possible, any peculiarity attached to a language. This part of ISO/IEC 2382 defines concepts related to text processing, text editors, text output and text editing.

INCITS/ISO/IEC 2382-24-1995 [R2011],
Information technology - Vocabulary - Part 24: Computer-integrated manufacturing (CIM)

This part of ISO/IEC 2382 is intended to facilitate international communication in computer-integrated manufacturing. It presents, in two languages, terms and definitions of selected concepts relevant to the field of information technology and identifies relationships among the entries. In order to facilitate their translation into other languages, the definitions are drafted so as to avoid, as far as possible, any peculiarity attached to a language. This part of ISO/IEC 2382 defines concepts related to computer-integrated manufacturing.

INCITS/ISO/IEC 2382-25-1992 [R2011],
Information technology - Vocabulary - Part 25: Local Area Networks (LAN)

This part of ISO/IEC 2382 is intended to facilitate international communication in information processing. It presents, in two languages, terms and definitions of selected concepts relevant to the field of information processing and identifies relationships between the entries. In order to facilitate their translation into other languages, the definitions are drafted so as to avoid, as far as possible, any peculiarity attached to a language. This part of ISO/IEC 2382 defines different types of local arenetworks, concepts relating to devices, to transmissions and the problems that can appear, and also protocols that govern exchanges.

INCITS/ISO/IEC 2382-26-1993 [R2011],
Information technology - Vocabulary - Part 26: Open Systems Interconnection Architecture

International communication in open systems interconnection. It presents, in two languages, terms and definitions of selected concepts relevant to the field of information technology and identifies relationships among the entries. In order to facilitate their translation into other languages, the definitions are drafted so as to avoid, as far as possible, any peculiarity attached to a language. This part of ISO/IEC 2382 defines concepts related to open system interconnection.

Information technology - Vocabulary - Part 27: Office Automation

This part of ISO/IEC 2382 is intended to facilitate international communication in office automation. It presents, in two languages, terms and definitions of selected concepts relevant to the field of office automation and identifies relationships between the entries. In order to facilitate their translation into other languages, the definitions are drafted so as to avoid, as far as possible, any peculiarity attached to a language. This part of ISO/IEC 2382 defines concepts related to office automation, electronic mail, and text, voice and image transmission.

INCITS/ISO/IEC 2382-28-1995 [R2011],
Information technology - Vocabulary - Part 28: Artificial Intelligence - Basic concepts and expert systems

This part of ISO/IEC 2382 is intended to facilitate international communication in information technology. It presents, in two languages, terms and definitions of selected concepts relevant to this field of information technology and identifies relationships among the entries. In order to facilitate their translation into other languages, the definitions are drafted so as to avoid, as far as possible, any peculiarity attached to a language. This part of ISO/IEC 2382 defines basic concepts related to artificial intelligence and expert systems.
INCITS/ISO/IEC 2382-3:1987 [R2013],
Information technology -- Vocabulary - Part 3: Equipment technology

Supports the international communication in information processing. Provides selected English and French terms and their definitions in the field of circuits and signals, modes of operation and processing and also functional design and logic devices.

INCITS/ISO/IEC 2382-36:2013[2015],
Information technology - Vocabulary - Part 36: Learning, education and training

This standard is intended to facilitate international communication in information technology for learning, education, and training. It presents, in two languages, terms and definitions of selected concepts relevant to the field of information technology for learning, education, and training and identifies relationships among the entries.

INCITS/ISO/IEC 2382-37:2012 [2013],
Information technology - Vocabulary - Part 37: Biometrics

ISO/IEC 2382-37:2012 establishes a systematic description of the concepts in the field of biometrics pertaining to recognition of human beings and reconciles variant terms in use in pre-existing biometric standards against the preferred terms, thereby clarifying the use of terms in this field.

INCITS/ISO/IEC 2382-4:1999 [R2014],
Information technology - Vocabulary - Part 4: Organization of data

This part of ISO/IEC 2382 is intended to facilitate international communication in information technology. It presents, in two languages, terms and definitions of selected concepts relevant to the field of information technology and identifies relationships among the entries. In order to facilitate their translation into other languages, the definitions are drafted so as to avoid, as far as possible, any peculiarity attached to a language. This part of ISO/IEC 2382 deals in particular with character sets, codes, graphic characters, control characters, strings, words, sets of data, separators and identifiers.

INCITS/ISO/IEC 2382-7:2000 [R2014],
Information technology -Vocabulary -- Part 7: Computer Programming

This part of ISO/IEC 2382 is intended to facilitate international communication in information processing. It presents, in two languages, terms and definitions of selected concepts relevant to the field of information processing and identifies relationships between the entries.

INCITS/ISO/IEC 2382-9:1995 [R2013],
Information technology -- Vocabulary - Part 9: Data Communication

Is intended to facilitate international communication in data communication. Presents, in two languages, terms and definitions of selected concepts relevant to the field of data communication and identifies relationships among the entries.

INCITS/ISO/IEC 2382:2015 [2015], Information technology - Vocabulary

Terms and definitions

INCITS/ISO/IEC 23912:2005 [R2015],
Information technology - 80 mm (1,46 Gbytes per side) and 120 mm (4,70 Gbytes per side) DVD Recordable Disk (DVD-R)

This standard specifies the mechanical, physical and optical characteristics of an 80 mm and a 120 mm DVD Recordable disk to enable the interchange of such disks. It specifies the quality of the pre-recorded, unrecorded and the recorded signals, the format of the data, the format of the information zone, the format of the unrecorded zone, and the recording method, thereby allowing for information interchange by means of such disks. This disk is identified as a DVD Recordable (DVD-R) disk. This standard specifies: - 80 mm and 120 mm nominal diameter disks that may be either single or double sided; - the conditions for conformance; - the environments in which the disk is to be operated and stored; - the mechanical and physical characteristics of the disk, so as to provide mechanical interchange between data processing systems; - the format of the pre-recorded information on an unrecorded disk, including the physical disposition of the tracks and sectors, the error correcting codes and the coding method used; - the format of the data and the recorded information on the disk, including the physical disposition of the tracks and sectors, the error correcting codes and the coding method used; - the characteristics of the signals from pre-recorded and unrecorded areas on the disk, enabling data processing systems to read the pre-recorded information and to write to the disks; and - the characteristics of the signals recorded on the disk, enabling data processing systems to read the data from the disk. This standard provides for interchange of disks between disk drives. Together with a standard for volume and file structure, it provides for full data interchange between data processing systems.

INCITS/ISO/IEC 23917:2005 [R2015],
Information technology - Telecommunications and information exchange between systems - NFCIP-1 - Protocol Test Methods

This Standard specifies protocol test methods for ISO/IEC 18092 in addition to those specified in ISO/IEC 22536.

INCITS/ISO/IEC 23988:2008 [R2013],
Information Technology - A code of practice for the use of information technology (IT) in the delivery of assessments

Growth in the power and capabilities of information technology (IT) has led to the increasing use of IT to deliver, score and record responses of tests and assessments in a wide range of educational and other contexts. Suitably used, IT delivery offers advantages of speed and efficiency, better feedback and improvements in validity and reliability, but its increased use has raised issues about the security and fairness of IT-delivered assessments, as well as resulting in a wide range of different practices.

INCITS/ISO/IEC 24700:2005 [R2013],
Information technology - Quality and Performance of Office Equipment that Contain Reused Components

ISO/IEC 24700:2004 specifies product characteristics for use in an original equipment manufacturer’s or authorized third party’s declaration of conformity to demonstrate that a marketed product that contains reused components performs equivalent to new, meeting equivalent to new component specifications and performance criteria, and continues to meet all the safety and environmental criteria required by responsibly built products.

INCITS/ISO/IEC 24703:2008 [R2013],
Information technology - Learning, education and training - Participant identifiers
defines the datatype of identifiers that can be associated with participants in learning, education and training. Participants may be users, teachers, agents, groups, organizations or institutions.

INCITS/ISO/IEC 24707-2007 [R2013],
Information technology - Common Logic (CL): a framework for a family of logic-based languages

ISO/IEC 24707:2007 defines the abstract syntax and semantics, and three concrete dialects are defined in the annexes. The three conforming dialects specified are Common Logic Interchange Format (CLIF), Conceptual Graph Interchange Format (CGIF) and XML for Common Logic (XCL).

INCITS/ISO/IEC 24708:2008 [R2014],
Information technology - BioAPI Interworking Protocol (BIP)

ISO/IEC 24708:2008 specifies the syntax, semantics, and encodings of a set of messages (BIP messages) that enable a BioAPI-conforming application (see ISO/IEC 19784-1) to request biometric operations in BioAPI-conforming biometric service providers (BSPs) across node or process boundaries, and to be notified of events originating in those remote BSPs. It also specifies extensions to the architecture and behaviour of the BioAPI framework (specified in ISO/IEC 19784 -1) that supports the creation, processing, sending and reception of BIP messages. It is applicable to all distributed applications of BioAPI.

INCITS/ISO/IEC 24709-1:2007 [R2014],
Information technology - BioAPI Conformance Testing for the biometric application programming interface (BioAPI) - Part 1: Methods and Procedures

ISO/IEC 24709-1:2007 specifies the concepts, framework, test methods and criteria required to test conformance of biometric products claiming conformance to BioAPI (ISO/IEC 19784-1). Guidelines for specifying BioAPI conformance test suites, writing test assertions and defining procedures to be followed during the conformance testing are provided. The conformance testing methodology is concerned with conformance testing of biometric products claiming conformance to BioAPI. Definitions of schemas of the assertion language are provided in normative annexes.
ISO/IEC 24709-2:2007 defines a number of test assertions written in the assertion language specified in ISO/IEC 24709-1. These assertions enable a user of ISO/IEC 24709-2:2007 (such as a testing laboratory) to test the conformance to ISO/IEC 19784-1 (BioAPI 2.0) of any biometric service provider (BSP) that claims to be a conforming implementation of that International Standard. Each test assertion specified in ISO/IEC 24709-2:2007 exercises one or more features of an implementation under test. Assertions are placed into packages (one or more assertions per package) as required by the assertion language.

INCITS/ISO/IEC 24709-3:2011 [R2016], Information technology -- Conformance testing for the biometric application programming interface (BioAPI) -- Part 3: Test assertions for BioAPI frameworks
Defines a number of test assertions written in the assertion language specified in ISO/IEC 24709-1:2007. Specifies all the test assertions that are to be executed for conformance testing of BioAPI frameworks claiming conformance to ISO/IEC 19784-1 (BioAPI 2.0). Test assertions specified in this part of ISO/IEC 24709 are not claimed to be exhaustive (see also ISO/IEC 24709-1:2007, Clause 6).

INCITS/ISO/IEC 24711:2007 [R2013], Information technology - Method for the determination of ink cartridge yield for color inkjet printers and multi-function devices that contain printer components
ISO/IEC 24711:2007 defines a method for testing and calculation of average yield measured in the number of standard pages for a colour inkjet cartridge and a specific printer printing in a semi-continuous mode under a defined set of conditions. It uses the test page suite defined in ISO/IEC 24712. ISO/IEC 24711:2007 can also be applied to the printer component of any multifunctional device that has a digital input-printing path (i.e. multi-function devices that contain printer components).

INCITS/ISO/IEC 24711:2007/Cor 1:2013, Method for the determination of ink cartridge yield for colour inkjet printers and multi-function devices that contain printer components -- Technical Corrigendum 1
This is the first corrigendum to ISO/IEC 24711:2007 that defines a method for testing and calculation of average yield measured in the number of standard pages for a colour inkjet cartridge and a specific printer printing in a semi-continuous mode under a defined set of conditions. It uses the test page suite defined in ISO/IEC 24712. ISO/IEC 24711:2007 can also be applied to the printer component of any multifunctional device that has a digital input-printing path (i.e. multi-function devices that contain printer components).

ISO/IEC 24712:2007 defines colour test pages for the measurement of consumable yield. The test page suite includes four "customer" type documents and one "diagnostic" page that is used to determine end of ink or toner consumable life. These pages can be used for electro-photographic, inkjet printers and multi-function devices that have a digital printing path, i.e. an all-in-one electro-photographic machine that has digital printing capabilities.

ISO/IEC 24713-1:2008 provides common definitions used within the profile standards and references other standards applicable to the successful implementation of a generic biometric system. A harmonized (with the other part 1 standards in WG 3 and WG5) generic biometric system is described and a diagram is present. The description includes detail of the individual components present in a generic biometric system.

This part of ISO/IEC 24713 specifies a biometric profile including data interchange formats, system requirements, and the operation of biometric procedures on a Seafarers' Identity Document (SID). The domain of applicability can extend to other situations where an interoperable biometrics-based identity document is required, but the main focus is on the use of biometrics on a Seafarers' Identity Document (SID). This part of ISO/IEC 24713 notes that ILO Convention No. 185 already provides the overarching policy guidance on biometric verification and identification of seafarers and it relies on that guidance. Determining any matters of policy beyond those or in contradiction to those included in ILO Convention No. 185 is explicitly out of scope of this part of ISO/IEC 24713.

ISO/IEC 24727 is a set of programming interfaces for interactions between integrated circuit cards and external applications to include generic services for multi-sector use. The organization and the operation of the ICC conform to ISO/IEC 7816-4.


This part of ISO/IEC 24727 defines services as representations of action requests and action responses to be supported at the client-application service interface. The services are described in a programming-language independent way. This part of ISO/IEC 24727 is the application interface of the Open Systems Interconnection Reference Model defined in ISO/IEC 7498-1. It provides a high-level interface for a client-application making use of information storage and processing operations of a card-application as viewed on the generic card interface. This part of ISO/IEC 24727 does not mandate a specific implementation methodology for this interface.

ISO/IEC 24727 defines a set of programming interfaces for interactions between integrated circuit cards and external applications to include generic services for multi-sector use. This part of ISO/IEC 24727 standardizes the connectivity and security mechanisms between the client-application and the card-application. It specifies API-Administration of service-independent and implementation-independent ISO/IEC 24727 compliant modules, including security, that enables action requests to a specific card-application of an ICC such that, when coupled to data model and content discovery operations, the card-application can be used by a variety of client-applications.

INCITS/ISO/IEC 24734-2009 [R2014], Information technology - Office equipment - Method of measuring digital printing productivity
Specifies the minimum information that shall be included in the specification sheets of printers enabling users to compare the characteristics of different machines and select a suitable printer. Applies to Class 3 and Class 4 printers according to annex B for an office environment.
ISO/IEC 24734:2014 specifies a method for measuring the productivity of digital printing devices with various office applications and print job characteristics. It is applicable to digital printing devices, including single-function and multi-function devices, regardless of print technology (e.g. inkjet, laser). Devices can be equipped with a range of paper feed and finishing options either directly connected to the computer system or via a network. It is intended to be used for black and white (B&W) as well as colour digital printing devices.

This International Standard specifies a method for measuring the 'productivity' of digital copying devices and multifunctional devices with various copying modes. It is applicable to digital copying devices and multifunctional devices equipped with automatic document feeder and collating function. This International Standard is intended to be used for black and white (B&W) as well as colour digital copying devices and multifunctional devices of any underlying marking technology. It allows comparison of the throughput copying rates for a machine operated in various available operating modes (simplex, duplex, size of substrates, etc.

ICNITS/ISO/IEC 24739-1:2009 [2012], Information technology - AT Attachment with Packet Interface - 7 - Part 1: Register Delivered Command Set, Logical Register Set (ATA/ATAPI-7 V1)
ISO/IEC 24739-1:2009(E) specifies the AT Attachment Interface between host systems and storage devices. It provides a common attachment interface for systems manufacturers, system integrators, software suppliers and suppliers of intelligent storage devices. It defines the register delivered commands used by devices implementing the standard.

ISO/IEC 24739-2:2009(E) specifies the AT Attachment Interface between host systems and storage devices. It provides a common attachment interface for systems manufacturers, system integrators, software suppliers and suppliers of intelligent storage devices.

ISO/IEC 24739-3:2010(E) specifies the connectors and cables for physical interconnection between host and storage device, the electrical and logical characteristics of the interconnecting signals, and the protocols for transporting of commands, data, and status over the interface for the serial interface.

ICNITS/ISO/IEC 24745:2011 [2012], Information technology -- Security techniques -- Biometric information protection
ISO/IEC 24745:2011 provides guidance for the protection of biometric information under various requirements for confidentiality, integrity and renewability/revocability during storage and transfer. Additionally, ISO/IEC 24745:2011 provides requirements and guidelines for the secure and privacy-compliant management and processing of biometric information.

ICNITS/ISO/IEC 24747:2009 [R2015], Information technology - Programming languages, their environments and system software interfaces - Extensions to the C Library to support mathematical special functions
This standard defines extensions to the C Standard Library that is defined in the International Standard for the C programming language (ISO/IEC 9899). Unless otherwise specified, the whole of the C Standard Library is included in ISO/IEC 24747:2009 by reference, see Clause 2.

ISO/IEC 24752 facilitates operation of information and electronic products through remote and alternative interfaces and intelligent agents. ISO/IEC 24752-1:2008 defines a framework of components that combine to enable remote user interfaces and remote control of network-accessible electronic devices and services through a universal remote console (URC). It provides an overview of the URC framework and its components.

ISO/IEC 24752 facilitates operation of information and electronic products through remote and alternative interfaces and intelligent agents. ISO/IEC 24752-2:2008 describes user interface sockets, an abstract concept that describes the functionality and state of a device or service (target) in a machine interpretable manner. It defines an extensible markup language (XML) based language for describing a user interface socket.

ISO/IEC 24752 facilitates operation of information and electronic products through remote and alternative interfaces and intelligent agents. ISO/IEC 24752-3:2008 defines a language (presentation template markup language) for describing modality-independent user interface specifications, or presentation templates, associated with a user interface socket description as defined by ISO/IEC 24752-2.

This technical corrigendum corrects a defect in ISO/IEC 24754-2008. ISO/IEC 24754-2008 provides the minimum requirements for specifying document rendering systems. ISO/IEC 24754-2008 provides an abstract list of the features that a rendering system for an authored document may have. The list provides a frame of reference, against which the user and implementor can compare the features of document rendering systems. However, ISO/IEC 24754-2008 does not specify a concrete interchange syntax or direct how each document rendering system shall behave.

INCITS/ISO/IEC 24756:2009 [R2014], Information technology - Framework for specifying a common access profile (CAP) of needs and capabilities of users, systems, and their environments

ISO/IEC 24756:2009 defines a framework for specifying a common access profile (CAP) of needs and capabilities of users, computing systems, and their environments, including access supported by assistive technologies. It provides a basis for identifying and dealing with accessibility issues in a standardized manner across multiple platforms. It can be used to evaluate the accessibility of existing systems in particular environments for particular users.

INCITS/ISO/IEC 24759:2014 [2014], Information technology - Security techniques - Test requirements for cryptographic modules

This International Standard specifies the methods to be used by testing laboratories to test whether the cryptographic module conforms to the requirements specified in ISO/IEC 19790:2012. The methods are developed to provide a high degree of objectivity during the testing process and to ensure consistency across the testing laboratories.


ISO/IEC 24761:2009 specifies the structure and the data elements of Authentication Context for Biometrics (ACBio), which is used for checking the validity of the result of a biometric verification process executed at a remote site. ISO/IEC 24761:2009 allows any ACBio instance to accompany any data item that is involved in any biometric process related to verification and enrolment. The specification of ACBio is applicable not only to single modal biometric verification but also to multimodal fusion. ISO/IEC 24761:2009 specifies the cryptographic syntax of an ACBio instance.


Defines an interface for the secure, extensible, and interoperable management of a distributed and heterogeneous storage system. This interface uses an object-oriented, XML-based, messaging-based protocol designed to support the specific requirements of managing devices and subsystems in this storage environment. Using this protocol, this part of ISO/IEC 24775 describes the information available to a WBEM Client from an Information Technology - Storage Management compliant CIM WBEM Server.


Defines the core architecture and protocols in SMI-S. The components of SMI-S architecture include: Transport - communicating management information between constituents of the management system; Health and fault management - detecting failures through monitoring the state of storage components; General information about the object model; Names - how SMI-S uses names to allow applications to correlate across SMI-S and to other standards; Standard messages - how exceptions are presented to client applications; Service discovery - techniques clients use to discover SMI-S services; Installation and upgrade - recommendations for implementations.


Defines profiles that are supported by profiles defined in the other parts of the ISO/IEC 24775 series. The first few clauses provide background material that helps explain the purpose and profiles and recipes (a subset of a profile). Common port profiles are grouped together since they serve as transport-specific variations of a common model. The port profiles are followed by other common profiles.


Defines an interface for the secure, extensible, and interoperable management of a distributed and heterogeneous storage system. This interface uses an object-oriented, XML-based, messaging-based protocol designed to support the specific requirements of managing devices and subsystems in this storage environment. Using this protocol, this International Standard describes the information available to a WBEM Client from an Information technology - Storage Management compliant CIM WBEM Server.


Defines management profiles for Autonomous (top level) profiles for programs and devices whose central function is providing support and access to file data. In addition, it provides documentation of component profiles (or subprofiles) that deal with file systems and management interface functions that may be used by other autonomous profiles not included in this part of the standard.


Defines management profiles for Autonomous (top level) profiles for programs and devices whose central function is providing support for storage networking. This standard includes four autonomous profiles: Fabric, Switch, Extender and iSCSI to FC Gateway.

INCITS/ISO/IEC 24775-7:2014 [2016], Information technology -- Storage management -- Part 7: Host Elements

Defines management profiles for autonomous, component and abstract profiles for management of host-based storage devices. The autonomous profiles describe the management of a stand-alone host-based storage entity. The component profiles (or subprofiles) describe management of aspects of host-based storage entities that may be used by other autonomous profiles. Finally, this standard describes abstract profiles that may be used as a basis for creating additional Host-based autonomous profiles.


Models various details of the following objects of the media library for monitoring: Library, Drives, Changer Devices, Slots, IO Slots, SCSI Interfaces and SCSI and FC Target Ports, Physical Tapes, Physical Package and Magazines.

INCITS/ISO/IEC 24824-1:2007 [R2015], Information technology - Generic applications of ASN.1: Fast infoet

This Recommendation | International Standard specifies an ASN.1 type (see ITU-T Rec. X.680 | ISO/IEC 8824-1) whose abstract values represent instances of the W3C XML Information Set. It also specifies binary encodings for those values, using ASN.1 Encoding Control Notation (see ITU-T Rec. X.692 | ISO/IEC 8825-3). NOTE — These encodings are called fast infoet documents. This Recommendation | International Standard also specifies techniques that minimize the size of fast infoet documents; maximize the speed of creating and processing fast infoet documents; allow the specification (by the generator of a fast infoet document) of additional processing data. This standard specifies also specifies a Multipurpose Internet Mail Extensions (MIME) media type that identifies a Fast Infoet document.
INCITS/ISO/IEC 24824-2:2006 [R2015],
Information technology - Generic applications of ASN.1: Fast Web Services
This Recommendation | Standard specifies the messages and encodings that enable the use of Fast Web Services, together with the means of description of such services. The protocol used to support these services satisfies the requirements of the SOAP processing model (see W3C SOAP Part 1, clause 2) and is based on the transfer of: a) ASN.1 SOAP messages that contain embedded ASN.1 encoded values and embedded fast infoset documents; and b) fast infoset SOAP messages. This Recommendation | Standard also specifies: – an ASN.1 module for ASN.1 SOAP that defines the Envelope type (a value of this type corresponds to an ASN.1 SOAP message); – a conceptual mapping between ASN.1 SOAP messages and W3C SOAP messages (defined as an instance of the XML Infoset, see W3C SOAP Part 1, clause 5); – an extension to the W3C SOAP processing model for the processing of embedded ASN.1 encoded values; – the ASN.1 SOAP HTTP Binding, which is a modification and extension of the W3C SOAP HTTP Binding (see W3C SOAP Part 2, clause 7), for the transfer of ASN.1 SOAP messages; – support for the transfer of W3C SOAP message Infosets serialized as fast Infoset documents (fast Infoset SOAP messages) using the W3C SOAP HTTP Binding (see W3C SOAP Part 2, clause 7); – SOAP-oriented service descriptions that define the interface to and the semantics of Fast Web Services. Two Multipurpose Internet Mail Extensions (MIME) media type names are allocated to identify: – fast Infoset SOAP messages.

INCITS/ISO/IEC 24824-3:2008 [R2015],
Information technology - Generic applications of ASN.1: Fast infoset security
This Recommendation | International Standard specifies four (canonical Fast Infosets) algorithms that can be used in the application of W3C XML Signature (and provides URIs for them). It also specifies application-level extensions to the W3C XML Encryption processing rules for the encryption of part of an XML Infoset (see 8.1) serialized as a fast Infoset document and for the decryption of an encrypted part (see 8.3) that was serialized as a fast Infoset document. The use of any resulting W3C XML Signature information Items or W3C XML Encryption information items is not within the scope of this Recommendation | International Standard.

ISO/IEC 25062:2006 provides a standard method for reporting usability test findings. The format is designed for reporting results of formal usability tests in which quantitative measurements were collected, and is particularly appropriate for summative/comparative testing. The CIF does not indicate how to perform a usability test but provides guidance on how to report the results of a usability test. The CIF targets two audiences: usability professionals and stakeholders in an organization. Stakeholders can use the usability data to help make informed decisions concerning the release of software products or the procurement of such products.

INCITS/ISO/IEC 25434:2008 [R2014],
Information technology - Data interchange on 120 mm and 80 mm optical disk using +R DL format - Capacity: 8,55 Gbytes and 2,66 Gbytes per side (recording speed up to 16X)
This International Standard specifies the mechanical, physical and optical characteristics of 120 mm recordable optical disks with capacities of 8,55 Gbytes and 17,1 Gbytes. It specifies the quality of the recorded and unrecorded signals, the format of the data and the recording method, thereby allowing for information interchange by means of such disks. The data can be written once and read many times using a nonreversible method. These disks are identified as +R DL.

INCITS/ISO/IEC 25435:2006 [R2015], Data interchange on 60 mm Read-Only ODC - Capacity: 1,8 Gbytes (UMDMT)
This standard specifies the mechanical, physical and optical characteristics of a 60 mm, read-only ODC having a maximum capacity of 1,8 Gbytes. It specifies the physical format, the quality of the recorded signals, the format of the data and its modulation method, thereby allowing for information interchange by means of such ODCs. This standard specifies two types of ODCs, Type A and Type B: – Type A: Single layer disk with maximum recorded capacity of 0,9 GBytes; – Type B: Dual layer disk with maximum recorded capacity of 1,8 GBytes

This standard is the S390 architecture-specific Core part of the Linux Standard Base (LSB). It supplements the generic LSB Core module with those interfaces that differ between architectures. Interfaces described in ISO/IEC 23360-7 Core module that are contradictory to the specific Core shall be supplement the second edition of the Core interfaces may be supplemented by other modules; all modules are built upon the core.

INCITS/ISO/IEC 26300:2006 [R2012],
Information technology - Open Document for Office Applications (OpenDocument) v1.0
ISO/IEC 26300:2006 defines an XML schema for office applications and its semantics. The schema is suitable for office documents, including text documents, spreadsheets, charts and graphical documents like drawings or presentations, but is not restricted to these kinds of documents. ISO/IEC 26300:2006 provides high-level information suitable for editing documents. It defines suitable XML structures for office documents and is friendly to transformations using XSLT or similar XML-based tools.

This is the first technical corrigendum to the first amendment of ISO/IEC 26300:2006 and ISO/IEC 26300:2006 defines an XML schema for office applications and its semantics. The schema is suitable for office documents, including text documents, spreadsheets, charts and graphical documents like drawings or presentations, but is not restricted to these kinds of documents.

Technical corrigendum one corrects a defect in ISO/IEC 26300:2006. ISO/IEC 26300:2006 defines an XML schema for office applications and its semantics. The schema is suitable for office documents, including text documents, spreadsheets, charts and graphical documents like drawings or presentations, but is not restricted to these kinds of documents. ISO/IEC 26300:2006 provides high-level information suitable for editing documents. It defines suitable XML structures for office documents and is friendly to transformations using XSLT or similar XML-based tools.

This Technical Corrigendum should be read in conjunction with ISO/IEC 26300:2006 and the associated Technical Corrigendum 1. The current edition of ISO/IEC 26300 should be understood by first applying the changes specified in Technical Corrigendum 1, then the changes specified in this Technical Corrigendum. ISO/IEC 26300:2006 defines an XML schema for office applications and its semantics. The schema is suitable for office documents, including text documents, spreadsheets, charts and graphical documents like drawings or presentations, but is not restricted to these kinds of documents.


This is the third technical corrigendum to ISO/IEC 26300:2006 and ISO/IEC 26300:2006 defines an XML schema for office applications and its semantics. The schema is suitable for office documents, including text documents, spreadsheets, charts and graphical documents like drawings or presentations, but is not restricted to these kinds of documents.

INCITS/ISO/IEC 26925:2009 [R2014], Information technology - Data Interchange on 120 mm and 80 mm Optical Disk using +RW HS Format - Capacity: 4,7 and 1,46 Gbytes per Side (Recording speed 8X)

This International Standard specifies the mechanical, physical and optical characteristics of 120 mm rewriteable optical disks with capacities of 4,7 Gbytes and 9,4 Gbytes. It specifies the quality of the recorded and unrecorded signals, the format of the data and the recording method, thereby allowing for information interchange by means of such disks. The data can be written, read and overwritten many times using the phase change method. These disks are identified as +RW HS (High Speed).


This International Standard describes the overview and the vocabulary of information security management systems, which form the subject of the ISMS family of standards, and defines related terms and definitions. This International Standard is applicable to all types and sizes of organisation (e.g. commercial enterprises, government agencies, not-for-profit organisations).

INCITS/ISO/IEC 27003:2010 [2012], Information technology -- Security techniques -- Information security management system implementation guidance
ISO/IEC 27003:2010 focuses on the critical aspects needed for successful design and implementation of an Information Security Management System (ISMS) in accordance with ISO/IEC 27001:2005. It describes the process of ISMS specification and design from inception to the production of implementation plans. It describes the process of obtaining management approval to implement an ISMS, defines a project to implement an ISMS (referred to in ISO/IEC 27003:2010 as the ISMS project), and provides guidance on how to plan the ISMS project, resulting in a final ISMS project implementation plan.


Provides guidance on the development and use of measures and measurement in order to assess the effectiveness of an implemented information security management system (ISMS) and controls or groups of controls, as specified in ISO/IEC 27001

ISO/IEC 27005:2011 provides guidelines for information security risk management. It supports the general concepts specified in ISO/IEC 27001 and is designed to assist the satisfactory implementation of information security based on a risk management approach. Knowledge of the concepts, models, processes and terminologies described in ISO/IEC 27001 and ISO/IEC 27002 is important for a complete understanding of ISO/IEC 27005:2011. ISO/IEC 27005:2011 is applicable to all types of organizations (e.g. commercial enterprises, government agencies, non-profit organizations) which intend to manage risks that could compromise the organization’s information security.

INCITS/ISO/IEC 27006:2011 [2012], Information technology - Security techniques - Requirements for bodies providing audit and certification of information security management systems

This International Standard specifies requirements and provides guidance for bodies providing audit and certification of an information security management system (ISMS), in addition to the requirements contained within ISO/IEC 17021 and ISO/IEC 27001. It is primarily intended to support the accreditation of certification bodies providing ISMS certification.


This International Standard provides guidance on managing an information security management system (ISMS) audit programme, on conducting the audits, and on the competence of ISMS auditors, in addition to the guidance contained in ISO 19011. This International Standard is applicable to those needing to understand or conduct internal or external audits of an ISMS or to manage an ISMS audit programme.


The scope of this Recommendation | International Standard is to define guidelines supporting the implementation of information security management in telecommunications organizations. The adoption of this Recommendation | International Standard will allow telecommunications organizations to meet baseline information security management requirements of confidentiality, integrity, availability and any other relevant security property.


ISO/IEC 27033-3:2010 describes the threats, design techniques and control issues associated with reference network scenarios. For each scenario, it provides detailed guidance on the security threats and the security design techniques and controls required to mitigate the associated risks. Where relevant, it includes references to ISO/IEC 27033-4 to ISO/IEC 27033-6 to avoid duplicating the content of those documents.


This International Standard provides guidelines for specific activities in handling digital evidence, which are identification, collection, acquisition and preservation of digital evidence that may be of evidential value. This International Standard provides guidance to individuals with respect to common situations encountered throughout the digital evidence handling process and assists organizations in their disciplinary procedures and in facilitating the exchange of potential digital evidence between jurisdictions.

INCITS/ISO/IEC 28360:2012 [2013], Information technology - Office equipment - Determination of chemical emission rates from electronic equipment

This International Standard specifies methods to determine chemical emission rates of analyte from information and communication technology (ICT) and consumer electronics (CE) equipment during intended operation in an Emission Test Chamber (ETC). The methods comprise preparation, sampling (or monitoring) in a controlled ETC, storage and analysis, calculation and reporting of emission rates. This International Standard includes specific methods for equipment using consumables, such as printers, and equipment not using consumables, such as monitors and PCs.

INCITS/ISO/IEC 28361:2007 [R2015], Information technology - Telecommunications and information exchange between systems - Near Field Communication Wired Interface (NFC-WI)

This standard specifies the digital wire interface between a Transceiver and a Front-end. The specification includes the signal wires, binary signals, the state diagrams and the bit encodings for three data rates.


This International Standard provides a privacy framework which - specifies a common privacy terminology; - defines the actors and their roles in processing personally identifiable information (PII); - describes privacy safeguarding considerations; - provides references to known privacy principles for information technology. This International Standard is applicable to natural persons and organizations involved in specifying, procuring, architecting, designing, developing, testing, maintaining, administering, and operating information and communication technology systems or services where privacy controls are required for the processing of PII.

This standard defines the concepts of conformance testing for biometric data interchange formats and defines a general conformance testing framework. It specifies common (modality-neutral) elements of the testing methodology, such as test methods and procedures, implementation conformance claim, and test results reporting. It also provides the assertion language definition and sets forth other testing and reporting requirements, and outlines other aspects of the conformance testing methodology that are generally applicable and not modality-specific. As part of the conformance testing methodology, different types and levels of conformance testing are described, as well as their applicability. The conformance testing methodology specified in ISO/IEC 29109-1:2009 is concerned only with data interchange format records and systems that produce or use these records.


This is the first corrigendum to ISO/IEC 29109-1:2009 and ISO/IEC 29109-1:2009 defines the concepts of conformance testing for biometric data interchange formats and defines a general conformance testing framework. It specifies common (modality-neutral) elements of the testing methodology, such as test methods and procedures, implementation conformance claim, and test results reporting. It also provides the assertion language definition and sets forth other testing and reporting requirements, and outlines other aspects of the conformance testing methodology that are generally applicable and not modality-specific.


Actions

Specifies elements of conformance testing methodology, test assertions, and test procedures as applicable to ISO/IEC 19794-10. This part of the standard establishes test assertions of the structure of the hand geometry silhouette data format; test assertions of internal consistency by checking the types of values that may be contained within each field; and informative guidance for testing the consistency of selected encoded data fields with the input biometric data.


This standard specifies elements of conformance testing methodology, test assertions, and test procedures as applicable to the biometric data interchange format standard relating to finger minutiae data (i.e. ISO/IEC 19794-2).


This standard specifies elements of conformance testing methodology, test assertions, and test procedures as applicable to ISO/IEC 19794-4.


This is the first Technical Corrigendum to ISO/IEC 29109-4:2010 that specifies elements of conformance testing methodology, test assertions, and test procedures as applicable to ISO/IEC 19794-4. ISO/IEC 29109-4:2010 establishes test assertions of the structure of the finger image data format as specified in ISO/IEC 19794-4:2005 (Type A Level 1 as defined in ISO/IEC 29109-1:2009), etc.


ISO/IEC 29109-5:2014 specifies elements of conformance testing methodology, test assertions, and test procedures as applicable to two-dimensional face images defined in the ISO/IEC 19794-5:2005 biometric data interchange format standard for face image data. ISO/IEC 29109-5:2014 establishes test assertions of the structure of the face image data format as specified in ISO/IEC 19794-5:2005 (Type A Level 1 as defined in ISO/IEC 29109-1:2009), test assertions of internal consistency by checking the types of values that may be contained within each field (Type A Level 2 as defined in ISO/IEC 29109-1:2009).


Specifies elements of conformance testing methodology, test assertions, and test procedures as applicable to ISO/IEC 19794-6:2005. ISO/IEC 29109-6:2011 establishes test assertions of the structure of the iris image data format as specified in ISO/IEC 19794-6:2005 (Type A Level 1 as defined in ISO/IEC 29109-1:2009). Test assertions of internal consistency by checking the types of values that may be contained within each field (Type A Level 2 as defined in ISO/IEC 29109-1:2009), etc.

INCITS/ISO/IEC 29109-7:2011 [2013], Information technology -- Conformance testing methodology for biometric data interchange formats defined in ISO/IEC 19794 -- Part 7: Signature/sign time series data

ISO/IEC 29109-7:2011 specifies elements of conformance testing methodology, test assertions, and test procedures as applicable to ISO/IEC 19794-7. ISO/IEC 19794-7 defines two data interchange formats for signature/sign time series data, one for general use and one compact format for use with smart cards and other tokens.

INCITS/ISO/IEC 29109-8:2011 [2013], Information technology -- Conformance testing methodology for biometric data interchange formats defined in ISO/IEC 19794 -- Part 8: Finger pattern skeletal data

Specifies elements of conformance testing methodology, test assertions, and test procedures as applicable to ISO/IEC 19794-8:2006. It establishes test assertions of the structure of the finger pattern skeletal data format as specified in ISO/IEC 19794-8:2006 (Type A Level 1 as defined in ISO/IEC 29109-1:2009). Test assertions of internal consistency by checking the types of values that may be contained within each field (Type A Level 2 as defined in ISO/IEC 29109-1:2009).


Specifies a data record interchange format for recording, storing, and transmitting one or more hand vascular images. Each image is accompanied by image-specific metadata contained in a header record. ISO/IEC 29109-9:2011 establishes tests for checking the correctness of the binary record. It defines a testing methodology to ensure conformance of a vendor's application or service to ISO/IEC 19794-9:2007.

ISO/IEC 29115:2013 provides a framework for managing entity authentication assurance in a given context. In particular, it: - specifies four levels of entity authentication assurance; - specifies criteria and guidelines for achieving each of the four levels of entity authentication assurance; - provides guidance for mapping other authentication assurance schemes to the four LoAs; - provides guidance for exchanging the results of authentication that are based on the four LoAs; and - provides guidance concerning controls that should be used to mitigate authentication threats.

INCITS/ISO/IEC 29120-1:2015 [2016], Information technology - Machine readable test data for biometric testing and reporting - Part 1: Test reports

Establishes machine readable records for documenting the output of a biometric test, formats for data that ISO/IEC 19795 tests are required to report, and an ASN.1 syntax for test reports. This standard specifically does not require, prohibit, or otherwise specify, the format of biometric samples or templates used in a test, require, prohibit or otherwise specify, the encapsulation of biometric samples or templates used in a test, or regulate metrics for tests.


ISO/IEC 29121:2013 specifies a data migration method for long-term data storage. According to the standard, manufacturers are able to construct storage systems that use DVD-R, DVD-RW, DVD-RAM, +R, or +RW disks for information storage.


This International Standard establishes a technical base for the security proof of the specification of cryptographic protocols. This International Standard specifies design evaluation criteria for these protocols, as well as methods to be applied in a verification process for such protocols. This International Standard also provides definitions of different protocol assurance levels consistent with evaluation assurance components in ISO/IEC 15408.

INCITS/ISO/IEC 29136:2012 [2012], Information technology - User interfaces - Accessibility of personal computer hardware

ISO/IEC 29136:2012 provides requirements and recommendations for the accessibility of personal computer hardware, to be used when planning, developing, designing and distributing these computers. While it does not cover the behaviour of, or requirements for, assistive technologies, it does address connectivity of assistive technologies as an integrated component of interactive systems. Some requirements or recommendations in ISO/IEC 29136:2012 require software support; however, requirements and recommendations that solely focus on software are not included in ISO/IEC 29136:2012.

INCITS/ISO/IEC 29141-2009 [R2015], Information technology - Biometrics - Tenprint capture using biometric application programming interface (BioAPI)

This Standard specifies requirements for the use of ISO/IEC 19784-1, as amended by ISO/IEC 19784-1/Amd. 1 (BioAPI) for the purpose of performing a tenprint capture operation. It specifies a BDB format that is used to interact with a BioAPI framework (and hence with BSPs) to support an application wishing to perform a tenprint capture. It specifies a capture control block and a capture output block that conforming BSPs are required to support if they conform to this Standard.


ISO/IEC 29142-1:2013 establishes terms, symbols, notations and a framework for characterizing toner and ink cartridges used in printing devices that have a digital input printing path, including multi-function devices. It is intended for equipment used in office environments.

INCITS/ISO/IEC 29142-2:2013, Information technology -- Print cartridge characterization -- Part 2: Cartridge characterization data reporting

ISO/IEC 29142-2:2013 establishes the product and package labelling, and related reporting provisions for toner and ink cartridges used in printing devices that have a digital input printing path, including multi-function devices. It is intended for equipment used in office environments.


ISO/IEC 29142-3:2013 describes the principles and framework for environmental assessment of ink and toner cartridges used in printing devices that have a digital input printing path, including multi-function devices, including: a) the goals and definitions related to environmental responsibility; b) guidance to determine the relative benefits of reuse, recycling, recovery, and reduction techniques; c) identification and prioritization of environmental attributes according to each phase of the cartridge life-cycle; d) criteria for establishing environmentally sustainable practices.

INCITS/ISO/IEC 29150-2011 [2012], Information technology -- Security techniques -- Signcryption

This International Standard specifies four mechanisms for signcryption that employ public key cryptographic techniques requiring both the originator and the recipient of protected data to have their own public and private key pairs.

INCITS/ISO/IEC 29159-1:2010 [R2016], Information technology -- Biometric calibration, augmentation and fusion data -- Part 1: Fusion information format

Specifies a biometric fusion information format that establishes machine readable data formats to describe the statistics of comparison score inputs to a fusion process. Does not standardize comparison-score normalization processes, nor standardize or define fusion processes.


Provides a standard interface to hardware biometric modules designed to be integrated in embedded systems which can be constrained in memory and computational power. It specifies a full interface for such hardware-based biometric modules. This interface, called Embedded BioAPI, is defined by the specification of commands to be implemented by these modules. Such a specification is done on two levels.

INCITS/ISO/IEC 29171:2009 [R2015], Information technology - Digitally recorded media for information interchange and storage - Information Versatile Disk for Removable usage (iVDR) cartridge

This standard specifies the dimensional, mechanical and physical characteristics of an information Versatile Disk for Removable usage (iVDR) cartridge to enable mechanical interchangeability between data processing systems. An iVDR cartridge can contain hard disk drive technology or other suitable storage technologies. This standard specifies the environment in which iVDR cartridges are to be operated and stored, and specifies the dimensions and pin assignments of a connector employed by iVDR cartridges to enable data interchange. Together with ISO/IEC 24739-3 and a standard for volume and file structure, ISO/IEC 29171 enables full data interchange between data processing systems.


ISO/IEC 29182-1:2013 provides a general overview of the characteristics of a sensor network and the organization of the entities that comprise such a network. It also describes the general requirements that are identified for sensor networks.
ISO/IEC 29182-2:2013 is intended to facilitate the development of International Standards in sensor networks. It presents terms and definitions for selected concepts relevant to the field of sensor networks. It establishes a general description of concepts in this field and identifies the relationships among those concepts. It may also be used as guidance for development of other parts of ISO/IEC 29182 and any other sensor network related standard.

ISO/IEC 29182-3:2014 provides Sensor Network Reference Architecture (SNRA) views. The architecture views include business, operational, systems, and technical perspectives, and these views are presented in functional, logical, and/or physical views where applicable. ISO/IEC 29182-3:2014 focuses on high-level architecture views which can be further developed by system developers and implementers for specific applications and services.

The purpose of the ISO/IEC 29182 series is to provide guidance to facilitate the design and development of sensor networks, improve interoperability of sensor networks, and make sensor network components plug-and-play, so that it becomes fairly easy to add/remove sensor nodes to/from an existing sensor network. ISO/IEC 29182-4 presents models for the entities that enable sensor network applications and services according to the Sensor Network Reference Architecture (SNRA).

ISO/IEC 29182-5:2013 provides the definitions and requirements of sensor network (SN) interfaces of the entities in the Sensor Network Reference Architecture and covers the following aspects: - interfaces between functional layers to provide service access for the modules in the upper layer to exchange messages with modules in the lower layer; - interfaces between entities introduced in the Sensor Network Reference Architecture enabling sensor network services and applications.

ISO/IEC 29182-6:2014, describes and provides a compilation of sensor network applications for which International Standardized Profiles (ISPs) are needed, guidelines for the structured description of sensor network applications, and examples for structured sensor network applications. It does not cover ISPs for which drafting rules are described in ISO/IEC TR 10000. Due to the generic character of ISO/IEC 29182, fully developed ISPs will not be included in this International Standard.

specifies a method for measuring productivity of digital copying devices and multifunctional devices with various copying modes and a single one-sided original. It is applicable to digital copying devices and multifunctional devices. It is intended to be used for black-and-white and colour digital copying devices and multifunctional devices of any underlying marking technology. This International Standard includes instructions for the creation of test charts, test setup procedure, test procedure, and the reporting requirements for the digital copying productivity measurements.

INCITS/ISO/IEC 29191:2012 [2014], Information technology - Security techniques - Requirements for partially anonymous, partially unlinkable authentication
This International Standard provides a framework and establishes requirements for partially anonymous, partially unlinkable authentication.

This part of ISO/IEC 29192 specifies two block ciphers suitable for applications requiring lightweight cryptographic implementations: PRESENT: a lightweight block cipher with a block size of 64 bits and a key size of 80 or 128 bits; CLEFIA: a lightweight block cipher with a block size of 128 bits and a key size of 128, 192 or 256 bits.

This part of ISO/IEC 29192 specifies two dedicated keystream generators for lightweight stream ciphers: &amp;#61623; Enocoro: a lightweight keystream generator with a key size of 80 or 128 bits; Trivium: a lightweight keystream generator with a key size of 80 bits.

ISO/IEC 29192-4:2013 specifies three lightweight mechanisms using asymmetric techniques: a) an unilateral authentication mechanism based on discrete logarithms on elliptic curves; b) an authenticated lightweight key exchange (ALIKE) mechanism for unilateral authentication and establishment of a session key; c) an identity-based signature mechanism.

Addresses the fundamental requirements for planning and execution of environmental performance evaluations for biometric systems based on scenario and operational test methodologies, the specifications to define, establish, and measure specific conditions to assess, including requirements for equipment, the requirements for establishing a baseline performance in order to compare the influence of environmental parameters, a specification of the biometric evaluation including requirements for test population, test protocols, data to record, and test results, and procedures for carrying out the overall evaluation.

ISO/IEC 29361:2008 defines the WS-I Basic Profile 1.1, consisting of a set of non-proprietary Web services specifications, along with clarifications, refinements, interpretations and amplifications of those specifications which promote interoperability.

INCITS/ISO/IEC 29362-2014, Information technology -- Web Services Interoperability -- WS-I Attachments Profile Version 1.0
ISO/IEC 29362:2008 defines the WS-I Attachments Profile 1.0, consisting of a set of non-proprietary Web services specifications, along with clarifications and amendments to those specifications that are intended to promote interoperability. It complements the WS-I Basic Profile 1.1 (ISO/IEC 29361:2008) to add support for interoperable SOAP Messages with Attachments-based Web services.

ISO/IEC 29363:2008 defines the WS-I Simple SOAP Binding Profile 1.0, consisting of a set of non-proprietary Web services specifications, along with clarifications and amendments to those specifications which promote interoperability.

ISO/IEC 29500-1:2012 defines a set of XML vocabularies for representing word-processing documents, spreadsheets and presentations, based on the Microsoft Office 2008 applications. It specifies requirements for Office Open XML consumers and producers that comply to the strict conformance requirements for Office Open XML consumers and on the Microsoft Office 2008 applications. It specifies transitions, or PML transitional.


ISO/IEC 29500-2:2012 specifies a set of conventions that are used by Office Open XML documents to define the structure and functionality of a package in terms of a package model and a physical model.


ISO/IEC 29500-3:2012 describes a set of conventions that are used by Office Open XML documents to clearly mark elements and attributes introduced by future versions or extensions of Office Open XML documents, while providing a method by which consumers can obtain a baseline version of the Office Open XML document (a version without extensions) for interoperability.


ISO/IEC 29500-4:2012 defines features for backward-compatibility and that are useful for high-quality migration of existing binary documents to ISO/IEC 29500. These features are used only by documents of conformance class WML Transitional, XML Transitional, or PML Transitional.

INCITS/ISO/IEC 29642:2009 [R2014], Information technology -- Data interchange on 120 mm and 80 mm optical disk using +RW DL format - Capacity: 8,55 Gbytes and 2,66 Gbytes per side (recording speed 2,4x)

This international Standard specifies the mechanical, physical and optical characteristics of 120 mm rewritable optical disks with capacities of 8,55 Gbytes and 17,1 Gbytes. It specifies the quality of the recorded and unrecorded signals, the format of the data and the recording method, thereby allowing for information interchange by means of such disks. The data can be written, read and overwritten many times using the phase change method. These disks are identified as +RW DL.


For any or all biometric sample types as necessary, this part of ISO/IEC 29794 establishes terms and definitions that are useful in the specification, and use of quality metrics; recommends the purpose and interpretation of biometric quality scores; defines the format and placement of quality data fields in biometric data interchange formats; suggests methods for developing biometric sample datasets for the purpose of quality score normalization; and suggests a format for exchange of quality algorithm results.

INCITS/ISO/IEC 30111:2013 [2014], Information technology - Security techniques - Vulnerability handling processes

ISO/IEC 30111:2013 gives guidelines for how to process and resolve potential vulnerability information in a product or online service. ISO/IEC 30111:2013 is applicable to vendors involved in handling vulnerabilities.

INCITS/ISO/IEC 3561:1976 [R2015], Information processing - Interchangeable magnetic six-disk pack - Track format

This Standard specifies the track format characteristics for the six-disk pack to be used for data interchange (see ISO 2864). The 7-bit coded character set specified in ISO 646 has been adopted, though, by agreement between the interchange parties, the 7-bit or 8-bit extensions specified in ISO 2022 may be used.

INCITS/ISO/IEC 3563:1976 [R2015], Information processing - Interchangeable magnetic single-disk cartridge (top loaded) - Track format

This Standard specifies the track format characteristics for the single-disk cartridge (top loaded) to be used for data interchange (see ISO 3562). The 7-bit coded character set specified in ISO 646 has been adopted, though, by agreement between the interchange parties, the 7-bit or 8-bit code extensions specified in ISO 2022 may be used. However, it should be noted that in this International Standard plain binary numbers in 8-bit bytes are used in the control field to define the control information.

INCITS/ISO/IEC 3564:1976 [R2015], Information processing - Interchangeable magnetic eleven-disk pack - Physical and magnetic characteristics

This Standard specifies the general, physical, and magnetic characteristics for the physical interchange of magnetic eleven-disk packs for use in electronic data processing systems. It does not apply to a specific design. It defines only the parameters relevant for interchange.

INCITS/ISO/IEC 3692:1996 [R2015], Information processing - Reels and cores for 25,4 mm (1 in) perforated paper tape for information interchange - Dimensions

This Standard lays down the dimensions of take-up (or storage) reels with separable flanges, and of cores, so that rolls of perforated tape may be interchanged among machines of various manufacturers. It is also intended to serve as a guide in the co-ordination of equipment design. A compatible reel and core are described. These can be used together or either one can be used separately to transfer tape from one machine to another.

INCITS/ISO/IEC 38500:2015 [2017], Information technology -- Governance of IT for the organization

This Standard provides guiding principles for members of governing bodies of organizations (which can comprise owners, directors, partners, executive managers, or similar) on the effective, efficient, and acceptable use of information technology (IT) within their organizations. It also provides guidance to those advising, informing, or assisting governing bodies.


SOAP Version 1.2 (SOAP) is a lightweight protocol intended for exchanging structured information in a decentralized, distributed environment. It uses XML technologies to define an extensible messaging framework providing a message construct that can be exchanged over a variety of underlying protocols. The framework has been designed to be independent of any particular programming model and other implementation specific semantics.


ISO/IEC 40230:2011 specifies an abstract feature for optimizing the transmission and/or wire format of a SOAP message by selectively encoding portions of the message, while still presenting an XML Infoset to the SOAP application.
Web Services Description Language (WSDL) and mechanisms can be used to associate policies with the subjects to which they apply. ISO/IEC 40270:2011 defines two general purposes for policies: to specify the characteristics of entities in a Web services system, and to provide a set of numeric codes that are independent of language-derived codes and as such is intended to provide a common basis for the international exchange of information containing human sex data.


ISO/IEC 40500:2012 [2014] (Web Content Accessibility Guidelines (WCAG) 2.0) covers a wide range of recommendations for making Web content more accessible. Following these guidelines will make content accessible to a wider range of people with disabilities, including blindness and low vision, deafness and hearing loss, learning disabilities, cognitive limitations, limited movement, speech disabilities, photo-sensitivity and combinations of these. Following these guidelines will also often make your Web content more usable to users in general.

INCITS/ISO/IEC 4337-1977 [R2015], Information processing - Interchangeable magnetic twelve-disk pack (100 Mbytes)

This Standard specifies the general, physical, and magnetic characteristics and the pre-initialization for the physical interchange of 100 Mbytes magnetic twelve-disk packs, for use in electronic data processing systems.


This Standard specifies the general, physical, and magnetic characteristics and the pre-initialization for the physical interchange of 100 Mbytes magnetic twelve-disk packs, for use in electronic data processing systems.

INCITS/ISO/IEC 4909-2006 [R2016], Identification cards -- Financial transaction cards -- Magnetic stripe data content for track 3

This International Standard establishes specifications for financial transaction cards using track 3 and is intended to permit interchange based on the use of magnetic stripe encoded information. It specifies the data content and physical location of read/write information on track 3 and is to be used in conjunction with the relevant parts of ISO/IEC 7811 and ISO/IEC 7812.

INCITS/ISO/IEC 5218:2004 [R2014], Information interchange - Representation of Human Sexes

ISO/IEC 5218:2004 specifies a uniform representation of human sexes for the interchange of information. It provides a set of numeric codes that are independent of language-derived codes and as such is intended to provide a common basis for the international exchange of information containing human sex data.

INCITS/ISO/IEC 5653:1980 [R2015], Information processing - Interchangeable magnetic twelve-disk pack (200 Mbytes)

This Standard specifies the general, physical, and magnetic characteristics and the pre-initialization for the physical interchange of 200 Mbytes magnetic twelve-disk packs, for use in electronic data processing systems.


Defines symbols to be used in information processing documentation and gives guidance on conventions for their use in data flowcharts, program flowcharts, system flowcharts, program network charts, system resources charts. Applicable in conjunction with ISO 2382/1.

INCITS/ISO/IEC 6429:1992 [S2007], Information Technology – Control Functions for Coded Character Sets

This International Standard defines control functions and their coded representations for use in a 7-bit code, an extended 7-bit code, an 8-bit code or an extended 8-bit code, if such a code is structured in accordance with International Standard ISO 2022.

INCITS/ISO/IEC 646-1991 [R2013], Information technology - ISO 7-bit coded Character Set for Information Interchange

Specifies a set of 128 control and graphic characters such as letters, digits and symbols with their coded representation. Applies to alphabets of the Latin script.


This part of ISO/IEC 6523 specifies a structure for globally and unambiguously identifying organizations, and parts thereof, for the purpose of information interchange. This part of ISO/IEC 6523 also makes recommendations regarding cases where prior agreements may be concluded between interchange partners. This part of ISO/IEC 6523 does not specify file organization techniques, storage media, languages, etc. to be used in its implementation.


This part of ISO/IEC 6523 specifies the procedure for registration of organization identification schemes, and the requirements for the administration of International Code Designator values, to designate these organization identification schemes.
INCITS/ISO/IEC 6596-2-1985 [S2012],
Information Processing - Data Interchange on 130 mm (5.25 in) Flexible Disk Cartridges using Two-Frequency Recording at 7,958 fpm (48 tpi), on One Side - Part 2: Track Format

This part of ISO 6596 specifies the magnetic characteristics, the track layout, and a track format to be used on a 130 mm (5.25 in) flexible disk cartridge, recorded at 7,958 fpm on one side using two-frequency recording at a track density of 1.9 tracks per millimetre (tpmm) (48 tracks per inch (tpi)), which is intended for data interchange between data processing systems.

INCITS/ISO/IEC 6937-2001 [R2012], Information technology - Coded graphic character set for text communication - Latin alphabet

This International Standard a) specifies the coded representation of the character; b) specifies a repertoire of the Lating alphabetic and non-alphabetic characters for the communication of text in many European languages using the Lating script; c) specifies rules for the definitions and use of graphic character subrepertoires, i.e., subsets of the specified character repertoire.

INCITS/ISO/IEC 7065-1:1985 [R2015], Information processing - Data interchange on 200 mm (8 in) flexible disk cartridges using modified frequency modulation recording at 13,262 fpm (48 tpi), on both sides - Part 1: Dimensional, physical and magnetic characteristics

This Standard contains the dimensional, physical and magnetic characteristics of 200 mm (8 in) flexible disk cartridges recording at 13,262 fpm, 1.9 tpm (48 tpi), on both sides using modified frequency modulation recording. Together with the labelling scheme specified in ISO 7665, ISO 7065/1 and 2 provide for full data interchange between data processing systems. Provides physical interchangeability between data processing systems.

INCITS/ISO/IEC 7185:1990 [S2008], Programming Language PASCAL

This standard specifies the semantics and syntax of the computer programming language PASCAL by specifying requirements for a processor and for a conforming program. Two levels of compliance are defined for both processors and programs. As this standard is being submitted for stabilization maintenance, INCITS will consider requests for change and information on the submittal of such requests.


Specifies the procedures to be followed in preparing, publishing, and maintaining a register of graphic characters. Annex A (Advisory Group) forms an integral part of this standard. Annex B (Forms for proposal) is for information only.

INCITS/ISO/IEC 7487-1:1993 [R2015], Information technology - Data Interchange on 130 mm (5.25 in) flexible disk cartridges using modified frequency modulation recording at 7,958 fpm (48 tpi), on both sides - ISO type 202 - Part 1: Dimensional, physical and magnetic characteristics

This standard specifies the dimensional (environment and transportation, dimension of jacket, liner and disk), physical (flammability, coercivity magnetic stripe (including any protective overlay) on an identification card, the encoding technique, and coded character sets. It takes into consideration both human and machine aspects and states minimum requirements.


ISO/IEC 7501-3:2005 is a short form endorsement of the International Civil Aviation Organization (ICAO) Document Doc 9303 Part 3 - Size-1 and Size-2 Machine Readable Official Travel Documents. ICAO Doc 9303 Part 3 specifies generic formats and minimum data elements for visual inspection and machine reading of official travel documents in the ID-1 and ID-2 card formats containing standardized, globally interoperable machine readable optical character recognition (OCR) data, which may at the option of Governments, be accepted in lieu of a passport as defined in Annex 9 (Chapter 3, paragraph 3.4) to the Convention on International Civil Aviation year 1946 (as revised).

INCITS/ISO/IEC 7810-2003 [R2013], Identification Cards - Physical Characteristics

One of a series of standards describing the characteristics for identification cards as defined in the definitions clause and the use of such cards for international interchange. This International Standard specifies the physical characteristics of identification cards including card materials, construction, characteristics, and dimensions for four sizes of cards.


This part of ISO/IEC 7811 is one of a series of International Standards describing the parameters for identification cards as defined in the definitions clause and the use of such cards for international interchange. This part of ISO/IEC 7811 specifies requirements for embossed characters on identification cards. The embossed characters are intended for transfer of data either by use of imprinters or by visual or machine reading. It takes into consideration both human and machine aspects and states minimum requirements.


Specifies requirements for a low coercivity magnetic stripe (including any protective overlay) on an identification card, the encoding technique and coded character sets. It takes into consideration both human and machine aspects and states minimum requirements.


This International Standard defines the characteristics for identification cards as defined in Clause 4 of this part of ISO/IEC 7811 and the use of such cards for international interchange. This part of ISO/IEC 7811 specifies requirements for a high coercivity magnetic stripe (including any protective overlay) on an identification card, the encoding technique, and coded character sets. It takes into consideration both human and machine aspects and states minimum requirements.
INCITS/ISO 7811-7:2014, Identification cards - Recording technique - Part 7: Magnetic stripe - High coercivity, high density

This part of ISO/IEC 7811 is one of a series of international Standards describing the characteristics for identification cards as defined in the definitions clause and the use of such cards for international interchange. This part of ISO/IEC 7811 specifies requirements for a high coercivity magnetic stripe (including any protective overlay) on an identification card and encoding technique. It takes into consideration both human and machine aspects and states minimum requirements.

INCITS/ISO 7811-8:2014 [2016], Identification cards - Recording technique - Part 8: Magnetic stripe - Coercivity of 51.7 kA/m (650 Oe)

Defines the characteristics for identification cards as defined in Clause 4 of this part of ISO/IEC 7811, and the use of such cards for international interchange. This part of ISO/IEC 7811 specifies requirements for a 51.7 kA/m (650 Oe) magnetic stripe (including any protective overlay) on an identification card. The encoding technique and coded character sets are not defined, however, the specifications of ISO/IEC 7811-2 may be used. It takes into consideration both human and machine aspects and states minimum requirements.


Specifies the physical characteristics of a tactile identifier mark used by visually-impaired card holders to distinguish their cards. It defines the area on the card for the tactile identifier mark (TIM) and the layout of Braille style embossed dots arranged in patterns to enable easy tactile recognition.


Specifies a numbering system for the identification of the card issuers, the format of the issuer number (PAN). It describes the application and registration procedures for numbers issued in accordance with ISO/IEC 7812-1. ISO/IEC 7812-1 specifies the numbering system for the identification of issuers of identification cards used in international and/or inter-industry interchange.


ISO/IEC 7812-2:2007 is one of a series of International Standards describing the parameters for identification cards, and the use of such cards for international and/or inter-industry interchange. It describes the application and registration procedures for numbers issued in accordance with ISO/IEC 7812-1. ISO/IEC 7812-1 specifies the numbering system for the identification of issuers of identification cards used in international and/or inter-industry interchange.

INCITS/ISO 7813-2001 [R2013], Tactile technology - Identification cards - Financial transaction cards

ISO/IEC 7813-2001 specifies the data structure and data content of magnetic tracks 1 and 2, which are used to initiate financial transactions. It takes into consideration both human and physical aspects and states minimum requirements of conformity. It references layout, recording techniques, numbering systems, registration procedures, but not security requirements.

INCITS/ISO 7813:2006 [2008], Information technology - Identification cards - Financial transaction cards

ISO/IEC 7813-2006 specifies the data structure and data content of magnetic tracks 1 and 2, which are used to initiate financial transactions. It takes into consideration both human and physical aspects and states minimum requirements of conformity. It references layout, recording techniques, numbering systems, registration procedures, but not security requirements.

INCITS/ISO 7816-1:1998/AM1-2003 [R2009], Identification cards - Integrated circuit(s) cards with contacts - Part 1: Physical characteristics - Amendment 1: Maximum height of the IC contact surface

Specifies the physical characteristics of integrating circuit(s) cards with contacts. It applies to identification cards of the ID-1 card type, which may include embossing and/or a magnetic stripe, as specified in American National Standard for Identification.

INCITS/ISO 7816-1:2011[2014], Identification cards - Integrated circuit cards - Part 1: Cards with contacts - Physical characteristics

ISO/IEC 7816-1:2011 specifies the physical characteristics of integrated circuit cards with contacts. It applies to identification cards of the ID-1 card type, which can include embossing and/or a magnetic stripe and/or tactile identifier mark as specified in ISO/IEC 7811. Test methods are specified in ISO/IEC 10373-1. ISO/IEC 7816-1:2011 applies to cards which have a physical interface with electrical contacts. It does not, however, define the nature, number and position of the integrated circuits in the cards.

INCITS/ISO 7816-10:1999 [R2014], Identification cards - Integrated circuit(s) cards with contacts - Part 10: Electronic signals and answer to reset for synchronous cards

This part of ISO/IEC 7816 specifies the power, signal structures, and the structure for the answer to reset between an integrated circuit(s) card with synchronous transmission and an interface device such as a terminal. The specifications in ISO/IEC 7816-3 apply where appropriate, unless otherwise stated here. It also covers signal rates, operating conditions, and communication with the integrated circuit(s) card. This part of ISO/IEC 7816 specifies two types of synchronous cards: type 1 and type 2.


This part of ISO/IEC 7816 specifies security related interindustry commands to be used for personal verification with biometric methods in integrated circuit(s) cards. It also defines the data structure and data access methods for use of the card as a carrier of the biometric reference data and/or as the device to perform the verification of a personal biometric (on-card matching). Identification of persons using biometric methods is outside the scope of this standard.

INCITS/ISO 7816-12:2005 [R2013], Identification cards - Integrated circuit cards - Part 12: Cards with contacts - USB electrical interface and operating procedures

This part of ISO/IEC 7816 specifies the operating conditions of an integrated circuit card that provides a USB interface. Figure 1 shows the assignment of the contact fields for a USB interface and - to illustrate interoperability - the assignment as used in ISO/IEC 7816-3.


ISO/IEC 7816-13:2007 specifies commands for application management in a multi-application environment. These commands cover the entire life cycle of applications in a multi-application integrated circuit card, and the commands can be used before and after the card is issued to the cardholder. ISO/IEC 7816-13:2007 does not cover the implementation within the card and/or the outside world.


This part of ISO/IEC 7816 specifies an application in a card. This application contains information on cryptographic functionality. This part of ISO/IEC 7816 defines a common syntax and format for the cryptographic information and mechanisms to share this information whenever appropriate.
ISO/IEC 7816


ISO/IEC 7816-1:2004 [R2016], Identification cards - Integrated circuit cards -- Part 1: Cryptographic information application - Amendment 1: Examples of the use of the cryptographic information application


ISO/IEC 7816-2:2007 specifies the dimensions and locations for each of the contacts on integrated circuit(s) cards of an ID-1 card type. It also provides information on the way to identify which standards define the use of the contacts.


This part of ISO/IEC 7816 specifies the power and signal structures, and information exchange between an integrated circuit card and an interface device such as a terminal.


Intended to be used in any sector of activity. It specifies: a) contents of command-response pairs exchanged at the interface, b) means of retrieval of data elements and data objects in the card, c) structures and contents of historical bytes to describe operating characteristics of the card, d) structures for applications and data in the card, as seen at the interface when processing commands, e) access methods to files and data in the card, f) a security architecture defining access rights to files and data in the card, g) means and mechanisms for identifying and addressing applications in the card, h) methods for secure messaging, i) access methods to the algorithms processed by the card. It does not describe these algorithms.

ISO/IEC 7816-5:2004 [R2014], Identification cards - Integrated circuit cards - Part 5: Registration of application providers

This part of ISO/IEC 7816 specifies a registration procedure for application providers, and establishes the authorities and procedures to ensure and optimize the reliability of this registration.


This document specifies, directly or by reference, data elements, including composite data elements, that may be used in interindustry interchange. It identifies the following characteristics of each data element: &#63719; identifier; name;&#63719; description and reference; format and coding (if not available in other ISO International Standards or parts of ISO/IEC 7816).

ISO/IEC 7816-7:1999 [R2014], Identification cards - Integrated circuit(s) cards with contacts - Part 7: Interindustry commands for Structured Card Query Language (SCQL)

This part of ISO/IEC 7816 specifies the concept of a SCQL database (SCQL = Structured Card Query Language based on SQL, see ISO 9075) and the related interindustry enhanced commands.

ISO/IEC 7816-8:2004 [R2014], Identification cards - Integrated circuit cards - Part 8: Commands for security operations

ISO/IEC 7816-8:2004 specifies interindustry commands for integrated circuit cards (either with contacts or without contacts) that may be used for cryptographic operations. These commands are complementary to and based on the commands listed in ISO/IEC 7816-4. Annexes are provided that give examples of operations related to digital signatures, certificates and the import and export of asymmetric keys. The choice and conditions of use of cryptographic mechanisms may affect card exportability. The evaluation of the suitability of algorithms and protocols is outside the scope of ISO/IEC 7816-8.


ISO/IEC 7816-9:2004 specifies interindustry commands for integrated circuit cards (both with contacts and without contacts) for card and file management, e.g. file creation and deletion. These commands cover the entire life cycle of the card and therefore some commands may be used before the card has been issued to the cardholder or after the card has expired. An annex is provided that shows how to control the loading of data (secure download) into the card, by means of verifying the access rights of the loading entity and protection of the transmitted data with secure messaging. The loaded data may contain, for example, code, keys and applets.

ISO/IEC 8378-1:1986 [R2015], Information processing - Data interchange on 130 mm (5.25 in) flexible disk cartridges using modified frequency modulation recording at 7 958 fpprd, 3,8 tpmm (96 tpi), on both sides - Part 1: Dimensional, physical and magnetic characteristics

This standard provides the dimensional, physical and magnetic characteristics of 130 mm (5.25 in) flexible disk cartridges for data interchange between EDP systems with modified frequency modulation recording on 80 tracks on each side and recorded at 7 958 fpprd, 3,8 tpmm (96 tpi). Applicable in conjunction with ISO 8378 and ISO 8378/2 or 8378/3.

ISO/IEC 8484-1987 [R2013], Information technology - Magnetic stripes on savingsbooks

ISO/IEC 8484:2007 specifies the characteristics and location of a magnetic stripe on a savingsbook and the use of such savingsbooks for international interchange. Compatibility with international interchange systems is provided through the requirements of ISO/IEC 8484:2007, enabling a savingsbook with a magnetic stripe to be read and possibly encoded in a device that is compatible with reading identification cards used in international interchange. It takes into consideration both human and machine aspects and states minimum requirements.

ISO/IEC 8484:2007 [2008], Information technology - Magnetic stripes on savingsbooks

ISO/IEC 8484:2007 specifies the characteristics and location of a magnetic stripe on a savingsbook and the use of such savingsbooks for international interchange. Compatibility with international interchange systems is provided through the requirements of ISO/IEC 8484:2007, enabling a savingsbook with a magnetic stripe to be read and possibly encoded in a device that is compatible with reading identification cards used in international interchange. It takes into consideration both human and machine aspects and states minimum requirements.

This part of ISO 8630 specifies the quality of recorded signals, the track layout, and a track format to be used on 130 mm (5.25 in), 13 262 fprad flexible disk cartridges intended for data interchange between data processing systems.


ISO/IEC 8632 provides a file format suitable for the storage and retrieval of picture description information. The file format consists of an ordered set of elements that may be used to describe pictures in a way that is compatible between systems of different architectures, compatible with devices of differing capabilities and design, and meaningful to application constituencies. This picture description includes the capability for describing static images. This part of ISO/IEC 8632 describes the format using an abstract syntax.


Technical Corrigendum 1


Technical Corrigendum 2


This part of ISO/IEC 8632 specifies a binary encoding of the Computer Graphics Metafile. For each of the elements specified in ISO/IEC 8632-1, this part specifies an encoding in terms of data types.


This part of ISO/IEC 8632 specifies a clear text encoding of the Computer Graphics Metafile. For each of the elements specified in ISO/IEC 8632-1, a clear text encoding is specified. Allowed abbreviations are specified. The overall format of the metafile and the means by which comments may be interspersed in the metafile is specified.


ISO/IEC 8824-1:2008 specifies a standard notation called Abstract Syntax Notation One (ASN.1) that is used for the definition of data types, values, and constraints on data types. ISO/IEC 8824-1:2008 defines a number of simple types, with their tags, and specifies a notation for referencing these types and for specifying values of these types; defines mechanisms for constructing new types from more basic types, and specifies a notation for defining such types and assigning them tags, and for specifying values of these types; defines character sets (by reference to other ITU-T Recommendations and International Standards) for use within ASN.1


ISO/IEC 8824-2:2008 is part of Abstract Syntax Notation One (ASN.1) and provides notation for specifying information object classes, information objects and information object sets.


ISO/IEC 8824-3:2008 is part of Abstract Syntax Notation One (ASN.1) and provides notation for specifying user-defined constraints, table constraints, and content constraints.


ISO/IEC 8824-4:2008 is part of Abstract Syntax Notation One (ASN.1) and defines notation for parameterization of ASN.1 specifications.


ISO/IEC 8825-1:2008 specifies a set of basic encoding rules that can be used to derive the specification of a transfer syntax for values of types defined using the notation specified in ISO/IEC 8824-1, ISO/IEC 8824-2, ISO/IEC 8824-3, and ISO/IEC 8824-4, collectively referred to as Abstract Syntax Notation One or ASN.1. These basic encoding rules can also be applied for decoding such a transfer syntax in order to identify the data values being transferred. ISO/IEC 8825-1:2008 also specifies a set of canonical and distinguished encoding rules that restrict the encoding of values to just one of the alternatives provided by the basic encoding rules.


ISO/IEC 8825-2:2008 specifies a set of Packed Encoding Rules that can be used to derive a transfer syntax for values of types defined in ISO/IEC 8824-1. These Packed Encoding Rules can also be applied for decoding such a transfer syntax in order to identify the data values being transferred.


ISO/IEC 8825-3:2008 defines Encoding Control Notation (ECN): a notation for specifying encodings of ASN.1 types or of parts of types. It provides several mechanisms for such specification, including direct specification of the encoding using standardized notation; specification of the encoding by reference to standardized encoding rules; specification of the encoding of an ASN.1 type by reference to an encoding structure; specification of the encoding using non-ECN notation. It also provides the means to link the specification of encodings to the type definitions to which they are to be applied.


This Recommendation / International Standard specifies a set of Basic XML Encoding Rules (XER) that may be used to derive a transfer syntax for values of types defined in ITU-T Rec. X.680 | ISO/IEC 8824-1 and ITU-T Rec. X.681 | ISO/IEC 8824-2.
ISO/IEC 8825-4:2008 specifies a set of basic XML Encoding Rules (XER) that can be used to derive a transfer syntax for values of types defined in ISO/IEC 8824-1 and ISO/IEC 8824-2. It also specifies a set of Canonical XML Encoding Rules (CXER) which provide constraints on the basic XML Encoding Rules and produce a unique encoding for any given ASN.1 value. ISO/IEC 8825-4:2008 further specifies a set of extended XML Encoding Rules (EXTENDED-XER) which adds further encoder options, and also allows the ASN.1 specifier to vary the encoding that would be produced by BASIC-XER.

INCITS/ISO/IEC 8859-1-1998 [R2013],
Information technology - 8-bit single-byte coded graphic character sets - Part 1: Latin Alphabet No. 1 (8-Bit ASCII) (Revision and Resignation of X3.134.2)
This part of ISO/IEC 8859 specifies a set of 191 coded graphic characters identified as Latin alphabet No. 1. This set of coded graphic characters is intended for use in data and text processing applications and also for information interchange.

INCITS/ISO/IEC 8859-10-1998 [R2013],
Information technology - 8-bit single-byte coded graphic character sets - Part 10: Latin alphabet No. 6
This part of ISO/IEC 8859 specifies a set of 191 coded graphic characters identified as Latin alphabet No. 6. This set of coded graphic characters is intended for use in data and text processing applications and also for information interchange. The set contains graphic characters used for general purpose applications in typical office environments in at least the following languages: Danish, English, Estonian, Finnish, German, Latin, Lithuanian, Norwegian, Polish, Slovene and Swedish.

INCITS/ISO/IEC 8859-13-2008 [R2013],
Information technology - 8-bit single-byte coded graphic character sets - Part 13: Latin Alphabet No. 7
This part of ISO/IEC 8859 specifies a set of 191 coded graphic characters identified as Latin alphabet No. 7. This set of coded graphic characters is intended for use in data and text processing applications and also for information interchange. The set contains graphic characters used for general purpose applications in typical office environments in at least the following languages: Danish, English, Estonian, Finnish, German, Latin, Latvian, Lithuanian, Norwegian, Polish, Slovene and Swedish.

INCITS/ISO/IEC 8859-14-2008 [R2013],
Information technology - 8-bit single-byte coded graphic character sets - Part 14: Latin alphabet No. 8
This set of coded graphic characters is intended for use in data and text processing applications and also for information interchange. The set contains graphic characters used for general purpose applications in typical office environments in at least the following languages: Albanian, Basque, Breton, Catalan, Cornish, Danish, Dutch, English, French (with restrictions, see Annex A.1, Notes), Frisian, Galician, German, Greenlandic, Irish Gaelic (old and new orthographies), Italian, Latin, Luxembourgish, Manx Gaelic, Norwegian, Portuguese, Rhaeto-Romantic, Scottish Gaelic, Spanish, Swedish, and Welsh.

Information technology - 8-bit single-byte coded graphic character sets - Part 15: Latin Alphabet No.9
This set of coded graphic characters is intended for use in data and text processing applications and also for information interchange. The set contains graphic characters used for general purpose applications in typical office environments in at least the following languages: Albanian, Basque, Breton, Catalan, Cornish, Danish, Dutch, English, Estonian, Faroese, Finnish, French, Friisian, Galician, German, Greenlandic, Icelandic, Irish Gaelic (new orthography), Italian, Latin, Luxembourgish, Norwegian, Portuguese, Rhaeto-Romantic, Scottish Gaelic, Spanish, and Swedish.

INCITS/ISO/IEC 8859-11:2001 [R2013],
Information technology - 8-bit single-byte coded graphic character sets - Part 11: Latin/Thai alphabet character set
This part of ISO/IEC 8859 specifies a set of 183 coded graphic characters identified as Latin/Thai alphabet character set. This set of coded graphic characters is intended for use in data and text processing applications and also for information interchange. The set contains graphic characters used for general purpose applications in typical office environments in at least the following languages: Thai, English and Latin.

INCITS/ISO/IEC 8859-16:2001 [R2015],
Information technology - 8-bit single-byte coded graphic character sets - Part 16: Latin alphabet No. 10
This part of ISO/IEC 8859 specifies a set of 191 coded graphic characters identified as Latin alphabet No. 10. This set of coded graphic characters is intended for use in data and text processing applications and also for information interchange. The set contains graphic characters used for general purpose applications in typical office environments in at least the following languages: Albanian, Croatian, English, Finnish, French, German, Hungarian, Irish Gaelic (new orthography), Italian, Latin, Polish, Romanian, and Slovenian. This set of coded graphic characters may be regarded as a version of an 8-bit code according to ISO/IEC 2022 or ISO/IEC 4873 at level 1. This part of ISO/IEC 8859 may not be used in conjunction with any other parts of ISO/IEC 8859. If coded characters from more than one part are to be used together, by means of code extension techniques, the equivalent coded character sets from ISO/IEC 10367, or their corresponding G1 sets from the ISO International Register of Coded Character Sets to be Used with Escape Sequences, should be used instead within a version of ISO/IEC 4873 at level 2 or level 3. The coded characters in this set may be used in conjunction with coded control functions selected from ISO/IEC 6429. However, control functions are not used to create composite graphic symbols from two or more graphic characters (see clause 6).

INCITS/ISO/IEC 8859-2:1999 [R2015],
Information technology - 8-bit single-byte coded graphic character sets - Part 2: Latin alphabet No. 2
This part of ISO/IEC 8859 specifies a set of 191 coded graphic characters identified as Latin alphabet No. 10. This set of coded graphic characters is intended for use in data and text processing applications and also for information interchange. The set contains graphic characters used for general purpose applications in typical office environments in at least the following languages: Albanian, Croatian, English, Finnish, French, German, Hungarian, Irish Gaelic (new orthography), Italian, Latin, Polish, Romanian, and Slovenian. This set of coded graphic characters may be regarded as a version of an 8-bit code according to ISO/IEC 2022 or ISO/IEC 4873 at level 1. This part of ISO/IEC 8859 may not be used in conjunction with any other parts of ISO/IEC 8859. If coded characters from more than one part are to be used together, by means of code extension techniques, the equivalent coded character sets from ISO/IEC 10367, or their corresponding G1 sets from the ISO International Register of Coded Character Sets to be Used with Escape Sequences, should be used instead within a version of ISO/IEC 4873 at level 2 or level 3. The coded characters in this set may be used in conjunction with coded control functions selected from ISO/IEC 6429. However, control functions are not used to create composite graphic symbols from two or more graphic characters (see clause 6).

This part of ISO/IEC 8859 specifies a set of 184 coded graphic characters identified as Latin alphabet No. 3. This set of coded graphic characters is intended for use in data and text processing applications and also for information interchange. The set contains graphic characters used for general purpose applications in typical office environments in at least the following languages: Esperanto and Maltese, and if needed in conjunction with these, English, French (with restrictions, see Annex A.1, Notes), German, Italian, Latin and Portuguese. Coding of Turkish characters using this part is deprecated, that specified in part 9 is to be used. This set of coded graphic characters may be regarded as a version of an 8-bit code according to ISO/IEC 10367 should be used instead within a version of ISO/IEC 4873 at level 2 or level 3. The ISO/IEC 10367 should be used instead within a version of ISO/IEC 4873 at level 1. This part of ISO/IEC 8859 may not be used in conjunction with any other parts of ISO/IEC 8859. If coded characters from more than one part are to be used together, by means of code extension techniques, the equivalent coded character sets from ISO/IEC 10367 should be used instead within a version of ISO/IEC 4873 at level 2 or level 3. The coded characters in this set may be used in conjunction with coded control functions selected from ISO/IEC 6429. However, control functions are not used to create composite graphic symbols from two or more graphic characters (see clause 6).

INCITS/ISO/IEC 8859-4:1998 [R2013], Information technology - 8-bit single-byte coded graphic character sets Part 4: Latin alphabet No. 4

This part of ISO/IEC 8859 specifies a set of 191 coded graphic characters identified as Latin alphabet No. 4. This set of coded graphic characters is intended for use in data and text processing applications and also for information interchange. The set contains graphic characters used for general purpose applications in typical office environments in at least the following languages: Danish, English, Estonian, Finnish, German, Greenlandic, Latin, Latvian, Lithuanian, Norwegian, Sami (but see Annex A.1, Notes), Slovene and Swedish.


This part of ISO/IEC 8859 specifies a set of 191 coded graphic characters identified as the Latin/ Cyrillic alphabet. This set of coded graphic characters is intended for use in data and text processing applications and also for information interchange. The set contains graphic characters used for general purpose applications in typical office environments in at least the following languages: Bulgarian, Byelorussian, English, Latin, (Slavic) Macedonian, Russian, Serbian and Ukrainian. This set of coded graphic characters may be regarded as a version of an 8-bit code according to ISO/IEC 2022 or ISO/IEC 4873 at level 1. This part of ISO/IEC 8859 may not be used in conjunction with any other parts of ISO/IEC 8859. If coded characters from more than one part are to be used together, by means of code extension techniques, the equivalent coded character sets from ISO/IEC 10367 should be used instead within a version of ISO/IEC 4873 at level 2 or level 3. The coded characters in this set may be used in conjunction with coded control functions selected from ISO/IEC 6429. However, control functions are not used to create composite graphic symbols from two or more graphic characters (see clause 6).


This part of ISO/IEC 8859 specifies a set of 146 coded graphic characters identified as Latin/Arabic alphabet. This set of coded graphic characters is intended for use in data and text processing applications and also for information interchange. The set contains graphic characters used for general purpose applications in typical office environments in at least the following languages: Arabic, English and Latin. Some of the characters in this set are combining characters (see clause 6). This set of coded graphic characters may be regarded as a version of an 8-bit code according to ISO/IEC 2022 or ISO/IEC 4873 at level 1. This part of ISO/IEC 8859 may not be used in conjunction with any other parts of ISO/IEC 8859. If coded characters from more than one part are to be used together, by means of code extension techniques, the equivalent coded character sets from ISO/IEC 10367 should be used instead within a version of ISO/IEC 4873 at level 2 or level 3. The coded characters in this set may be used in conjunction with coded control functions selected from ISO/IEC 6429. However, control functions are not used to create composite graphic symbols from two or more graphic characters (see clause 6).

INCITS/ISO/IEC 8859-7:2003 [R2013], Information technology - 8-bit single-byte coded graphic character sets - Part 7: Latin/Greek alphabet

ISO/IEC 8859-7:2003 specifies a set of 188 coded graphic characters identified as Latin/Greek alphabet. This set of coded graphic characters is intended for use in data and text processing applications and also for information interchange. The set contains graphic characters used for general purpose applications in typical office environments in at least the following languages: English, Greek, and Latin.

INCITS/ISO/IEC 8859-8:1999 [R2015], Information technology - 8-bit single-byte coded graphic character sets - Part 8: Latin/Hebrew alphabet

This part of ISO/IEC 8859 specifies a set of 155 coded graphic characters identified as Latin/Hebrew alphabet. This set of coded graphic characters is intended for use in data and text processing applications and also for information interchange. The set contains graphic characters used for general purpose applications in typical office environments in at least the following languages: English, Hebrew, Latin. It is not intended for pointed Hebrew. This set of coded graphic characters may be regarded as a version of an 8-bit code according to ISO/IEC 2022 or ISO/IEC 4873 at level 1. This part of ISO/IEC 8859 may not be used in conjunction with any other parts of ISO/IEC 8859. If coded characters from more than one part are to be used together, by means of code extension techniques, the equivalent coded character sets from ISO/IEC 10367 should be used instead within a version of ISO/IEC 4873 at level 2 or level 3. The coded characters in this set may be used in conjunction with coded control functions selected from ISO/IEC 6429. However, control functions are not used to create composite graphic symbols from two or more graphic characters (see clause 6).


This part of ISO/IEC 8859 specifies a set of 191 coded graphic characters identified as Latin alphabet No. 5. This set of coded graphic characters is intended for use in data and text processing applications and also for information interchange. The set contains graphic characters used for general purpose applications in typical office environments in at least the following languages: Albanian, Basque, Breton, Catalan, Danish, Dutch, English, Faroese, Finnish, French (with restrictions, see Annex A.1, Notes), Frisian, Galician, German, Greenlandic, Irish Gaelic (new orthography), Italian, Latin, Luxemburgish, Norwegian, Portuguese, Rhaeto-Romanc, Scottish Gaelic, Spanish, Swedish and Turkish.

INCITS/ISO/IEC 8860-1:1987 [R2015], Information processing - Data interchange on 90 mm (3.5 in) flexible disk cartridges using modified frequency modulation recording at 7 958 fptrad on 80 tracks on each side - Part 1: Dimensional, physical and magnetic characteristics

This standard provides the dimensional, physical and magnetic characteristics of the cartridge so as to provide physical interchangeability between data processing systems. Provides for full data interchangeability between data processing systems in conjunction with the ISO standards 8860-2 and 9293, and applies, moreover, in conjunction with ISO 683-13.
INCITS/ISO/IEC 9075-2:10-2008 [R2013], Information technology -- Database Languages -- SQL -- Part 10: Object language bindings (SQL/OLB) ISO/IEC 9075-10:2008 defines extensions to the SQL language to support embedding of SQL statements into programs written in the Java programming language (Java is a registered trademark of Sun Microsystems, Inc.). In addition, it specifies mechanisms to ensure binary portability of resulting applications.

INCITS/ISO/IEC 9075-10:2008/Cor 1:2012, Information technology -- Database languages -- SQL -- Part 10: Object Language Bindings (SQL/OLB) TECHNICAL CORRIGENDUM 1 This is the first Technical Corrigendum to ISO/IEC 9075-10:2008 that defines extensions to the SQL language to support embedding of SQL statements into programs written in the Java programming language (Java is a registered trademark of Sun Microsystems, Inc.). In addition, it specifies mechanisms to ensure binary portability of resulting applications.


INCITS/ISO/IEC 9075-13-2008 [R2013], Information technology -- Database languages -- SQL -- Part 13: SQL Routines and Types Using the Java TM Programming Language (SQL/JRT) ISO/IEC 9075-13:2008 specifies the ability to invoke static methods written in the Java programming language as SQL-invoked routines and to use classes defined in the Java programming language as SQL structured user-defined types. (Java is a registered trademark of Sun Microsystems, Inc.)

INCITS/ISO/IEC 9075-13-2008/Cor 1:2012, Information technology -- Database languages -- SQL -- Part 13: SQL Routines and Types Using the Java TM Programming Language (SQL/JRT) TECHNICAL CORRIGENDUM 1 This is the first Technical Corrigendum to ISO/IEC 9075-13:2008 that specifies the ability to invoke static methods written in the Java programming language as SQL-invoked routines and to use classes defined in the Java programming language as SQL structured user-defined types. (Java is a registered trademark of Sun Microsystems, Inc.)

INCITS/ISO/IEC 9075-14:2011/Cor 1:2013 [2014], Information technology -- Database languages -- SQL -- Part 14: XML-Related Specifications (SQL/XML), TECHNICAL CORRIGENDUM 1 This corrigendum corrects a technical defect in the base standard, ISO/IEC 9075-14:2011, which defines ways in which SQL can be used in conjunction with XML. It defines ways of importing and storing XML data in an SQL database, manipulating it within the database and publishing both XML and conventional SQL-data in XML form.

INCITS/ISO/IEC 9075-2:2011 [2012], Information technology -- Database languages -- SQL -- Part 2: Foundation (SQL/Foundation) ISO/IEC 9075-2:2011 defines the data structures and basic operations on SQL-data. It provides functional capabilities for creating, accessing, maintaining, controlling, and protecting SQL-data. Both static and dynamic variants of the language are proved. In addition to direct invocation, bindings are provided for the programming languages Ada, C, COBOL, Fortran, M, Pascal, and PL/I.

INCITS/ISO/IEC 9075-2:2011/Cor 1:2013[2014], Information technology -- Database languages -- SQL -- Part 2: Foundation (SQL/Foundation), TECHNICAL CORRIGENDUM 1 This corrigendum corrects a technical defect in the base standard, ISO/IEC 9075-2:2011, which defines the data structures and basic operations on SQL-data. It provides functional capabilities for creating, accessing, maintaining, controlling, and protecting SQL-data. Both static and dynamic variants of the language are proved. In addition to direct invocation, bindings are provided for the programming languages Ada, C, COBOL, Fortran, M, Pascal, and PL/I.
INCITS/ISO/IEC 9075-4:2011 [2012],
Information technology - Database languages - SQL - Part 4: Persistent Stored Modules (SQL/PSM)
ISO/IEC 9075-4:2011 specifies the syntax and semantics of statements to add a procedural capability to the SQL language in functions and procedures. It includes statements to direct the flow of control, define variables, make assignments and handle exception conditions.

INCITS/ISO/IEC 9075-4:2011/Cor 1:2013 [2014],
Information technology -- Database languages -- SQL - Part 4: Persistent Stored Modules (SQL/PSM), TECHNICAL CORRIGENDUM 1
This corrigendum corrects a technical defect in the base standard, ISO/IEC 9075-4:2011, which specifies the syntax and semantics of statements to add a procedural capability to the SQL language in functions and procedures. It includes statements to direct the flow of control, define variables, make assignments and handle exception conditions.

INCITS/ISO/IEC 9075-9-2008 [R2013],
Information technology - Database Languages - SQL - Part 9: Management of External Data (SQL/MED)
ISO/IEC 9075-9:2008 defines extensions to SQL to support management of external data through the use of foreign-data wrappers and datalink types.

INCITS/ISO/IEC 9075-9-2008/Cor 1:2012,
Information technology -- Database languages -- SQL - Part 9: Management of External Data (SQL/MED) TECHNICAL CORRIGENDUM 1
This is the first Technical Corrigendum to ISO/IEC 9075-9:2008 that defines extensions to SQL to support management of external data through the use of foreign-data wrappers and datalink types.

INCITS/ISO/IEC 9160-1988 [S2008],
Information Processing - Data Encipherment - Physical Layer Interoperability Requirements
Applies to systems for encipherment of ADP information in the physical layer of data communications. This is the second public review for this standard. It originated in the February 14, 1997 issue of Standards Action and is being resubmitted now due to substantive changes to the text

INCITS/ISO/IEC 9171-1:1990 [S2009],
Information Technology - 130 mm Optical Disk Cartridge, Write Once, for Information Interchange - Part 1: Unrecorded Optical Disk Cartridge
This part of ISO/IEC 9171 specifies definitions of essential concepts, the environment in which the characteristics are to be tested, the environments in which the cartridge is to be operated and stored, the mechanical, physical and dimensional characteristics of the case and of the optical disk, the optical characteristics and the recording characteristics for recording the information once and for reading it many times, so as to provide physical interchangeability between data processing systems.

INCITS/ISO/IEC 9171-2:1990 [S2008],
Information Technology - 130 mm Optical Disk Cartridge, Write Once, for Information Interchange - Part 2: Recording Format
Specifies two formats for the physical disposition of the tracks and sectors, the error correction codes, the modulation methods used for recording and the quality of the recorded signals. A prerequisite for conformance with this part of ISO/IEC 9171 is the conformance with its part One.

INCITS/ISO/IEC 9281-1-1990 [R2013],
Information Technology - Picture Coding Methods - Part 1: Identification
This part of ISO/IEC 9281 specifies the identification methods for coding of pictorial information in digital form. It does not specify the contents of the data field of a picture entity. For instance, this field may also contain audio and/or animation data associated with the data specifying the picture(s).

INCITS/ISO/IEC 9281-2-1990 [R2013],
Information technology -- Picture coding methods -- Part 2: Procedure for registration
This part of ISO/IEC 9281 specifies the procedures to be followed by a Registration Authority in preparing, maintaining and publishing a register of identifiers allocated to picture coding methods.

INCITS/ISO/IEC 9282-1-1988 [R2013],
Information processing - Coded representation of pictures - Part 1: Encoding principles for picture representation in a 7-bit or 8-bit environment
This part of ISO 9282 defines the coding principles to be used in interchanging pictures consisting of graphic images in a /-bit or 8-bit environment - the data structures to be used to represent the primitives describing a picture - the general datatypes which can be used as operands within a primitive.

Specifies the volume and file structure of disk cartridges for the interchange of information between users of information processing systems. It also specifies an optional record structure.

INCITS/ISO/IEC 9496:2003 [R2015], CHILL - The ITU-T programming language
This standard defines the ITU-T programming language CHILL. CHILL is a strongly typed, block structured and object-oriented language designed primarily for the implementation of large and complex embedded systems. CHILL was designed to provide reliability and run time efficiency, at the same time sufficient flexibility and powerfulness to encompass the required range of applications. CHILL also provides facilities that encourage piecewise and modular development of large systems.

INCITS/ISO/IEC 9529-1:1989 [R2015],
Information processing systems - Data interchange on 90 mm (3,5 in) flexible disk cartridges using modified frequency modulation recording at 15 916 fprad, on 80 tracks on each side - Part 1: Dimensional, physical and magnetic characteristics
This standard specifies the dimensional, physical and magnetic characteristics of the 90 mm (3,5 in) flexible disk cartridge using modified frequency modulation recording at 15 916 fprad on 80 tracks on each side, so as to provide physical interchangeability between data processing systems.

INCITS/ISO/IEC 9541-1:2012 [2013],
Information technology -- Font information interchange -- Part 1: Architecture
ISO/IEC 9541 defines a method of naming glyphs and glyph collections, independent of any document encoding technique; it assumes that one or more methods of associating document encoding techniques with glyph identifiers used in font resources will be provided by text processing systems. ISO/IEC 9541-1:2012 specifies the architecture of a font resource, i.e. the font description, font metrics, glyph description and glyph metrics properties required for font references and the interchange of font resources.

INCITS/ISO/IEC 9541-2:2012 [2013],
Information technology - Font information interchange - Part 2: Interchange format
ISO/IEC 9541 specifies the architecture of font resources, as well as the formats for font interchange amongst information processing systems. ISO/IEC 9541 also specifies the architecture and formats that can be used to construct font references in general electronic document interchange. ISO/IEC 9541-2:2012 specifies the interchange formats for font information, and the minimum subsets of that information required for interchange. ISO/IEC 9541-2:2012 requires the property definitions as defined in ISO/IEC 9541-1.

INCITS/ISO/IEC 9541-3:2012 [2013],
Information technology - Font information interchange - Part 3: Glyph shape representation
ISO/IEC 9541-3:2012 specifies the architecture and interchange formats of glyph shape representations. Font resources represented using the architecture and interchange formats defined in ISO/IEC 9541-1 and ISO/IEC 9541-2 are used in various document processing environments in which the RELAX NG (ISO/IEC 19757-2) parsing algorithm is recognized. The encoding of font resource information as defined in ISO/IEC 9541-3:2012 is specified in RELAX NG representation for persistent generation of font resources for use in these processing environments.
INCITS/ISO 9541-1:2009 [R2014], Information Technology - Font Information Interchange - Part 4: Application-Specific Extensions

ISO/IEC 9541 specifies the architecture of font resources, as well as the formats for font interchange among information processing systems. It also specifies the architecture and formats that can be used to construct font references in general electronic document interchange. ISO/IEC 9541-4:2009 specifies the correspondence between ISO/IEC 9541 font resource and ISO/IEC 14496-22 Open Font Format file (OFF), to define ISO/IEC 9541 font resource from a given OFF file. The classification (required or optional), syntax, and possible values of the properties are defined in ISO/IEC 9541-1 and ISO/IEC 9541-2.

INCITS/ISO/IEC 9541-4:2009/Cor 1:2013, Information technology - Font information interchange -- Part 4: Harmonization to Open Font Format, TECHNICAL CORRIGENDUM 1


This International Standard specifies a protocol which is used by Network Layer entities operating ISO 8473 in End Syst.ems and Intermediate Systems (referred to herein as ES and IS respectively) to maintain routing information. The Protocol herein described relies upon the provision of a connectionless-mode underlying service.


Specifies a set of functions for computer graphics programming, the Programmer's Hierarchical Interactive Graphics Systems (PHIGS). PHIGS is a graphics system for application programs that produce computer generated pictures on output devices.


This part of ISO/IEC 9592 specifies a language independent nucleus of a graphics system. For integration into a programming language, PHIGS is embedded in a language-dependent layer obeying the particular conventions of that language. This standard specifies such a language-dependent layer for the FORTRAN language.


This part of ISO/IEC 9592 specifies a clear-text encoding of the PHIGS archive file. For each of the archive file elements specified in ISO/IEC 9592-2, a clear text encoding is specified. This part of ISO/IEC 9592 specifies the overall format of the archive file and the means by which comments may be interspersed in the archive file.


This Amendment 1 to ISO/IEC 9593-1:1990 that specifies a language-independent nucleus of a graphics system. For integration into a programming language, PHIGS is embedded in a language-dependent layer obeying the particular conventions of that language. This standard specifies such a language-dependent layer for the FORTRAN language.


This is Amendment 1 to ISO/IEC 9592-1:1990 that specifies a language-independent nucleus of a graphics system. For integration into a programming language, PHIGS is embedded in a language-dependent layer obeying the particular conventions of that language. This standard specifies such a language-dependent layer for the FORTRAN language.


This is Amendment 2 to ISO/IEC 9593-1:1990 that specifies a language-independent nucleus of a graphics system. For integration into a programming language, PHIGS is embedded in a language-dependent layer obeying the particular conventions of that language. This standard specifies such a language-dependent layer for the FORTRAN language.


This is Amendment 1 to ISO/IEC 9593-2:1995 that specifies a language-independent nucleus of a graphics system. For integration into a programming language, PHIGS is embedded in a language-dependent layer obeying the particular conventions of that language. This standard specifies such a language-dependent layer for the FORTRAN language.


This is Amendment 1 to ISO/IEC 9593-3:2009 that specifies a language independent nucleus of a graphics system. For integration into a programming language, PHIGS is embedded in a language-dependent layer obeying the particular conventions of that language. This standard specifies such a language-dependent layer for the Ada computer programming language.


This is Technical Corrigendum 1 to ISO/IEC 9593-3:2009/AM1:1995 that specifies a language-independent nucleus of a graphics system. For integration into a programming language, PHIGS is embedded in a language-dependent layer obeying the particular conventions of that language. This standard specifies such a language-dependent layer for the C language.


This is Technical Corrigendum 2 to ISO/IEC 9593-3:2009/AM1:1995 that specifies a language-independent nucleus of a graphics system. For integration into a programming language, PHIGS is embedded in a language-dependent layer obeying the particular conventions of that language. This standard specifies such a language-dependent layer for the C language.


This is Amendment 1 to ISO/IEC 9593-4:1991 that specifies a language-independent nucleus of a graphics system. For integration into a programming language, PHIGS is embedded in a language-dependent layer obeying the particular conventions of that language. This standard specifies such a language-dependent layer for the C language.
Information technology - Computer Graphics - Programmers Hierarchical Interactive Graphics System (PHIGS) language bindings - Part 4: C - Amendment 2: Incorporation of PHIGS amendments
This is the second amendment to ISO/IEC 9593-4:1991 that specifies a language independent nucleus of a graphics system. ISO/IEC 9593-4:1991 specifies also a language dependent layer for the C language. Annexes A, B, C, D and E are for information only.

This Recommendation | International Standard specifies the behaviour of DSAs taking part in the distributed Directory application. The allowed behaviour has been designed so as to ensure a consistent service given a wide distribution of the DIB across many DSAs. The Directory is not intended to be a general purpose database system, although it may be built on such systems. It is assumed that there is a considerably higher frequency of queries than of updates.


INCITS/ISO 9594-1:2005 [2005],
Information Technology - Open Systems Interconnection - The Directory: Overview of concepts, models and services
ISO/IEC 9594-1:2005 includes specifications for how information about objects, e.g. persons, is organized, created, maintained and retrieved. It provides provisions for protecting stored information through authentication and access control specifications. ISO/IEC 9594-1:2005 introduces the concepts of the Directory and the DIB (Directory Information Base), and overviews the services and capabilities which they provide. It is intended to give an introduction to the other parts of ISO/IEC 9594. It is not an implementation specification.

INCITS/ISO 9594-1:2008 [2013],
Information Technology - Open Systems Interconnection - The Directory: Overview of concepts, models and services
The Directory provides the directory capabilities required by OSI applications, OSI management processes, other OSI layer entities, and telecommunications services.

INCITS/ISO 9594-2:2005 [2005],
Information Technology - Open Systems Interconnection - The Directory: Models
ISO/IEC 9594-2:2005 includes specifications for how information about objects, e.g. persons, is organized, created, maintained and retrieved. It also gives provisions for protecting stored information through authentication and access control specifications. ISO/IEC 9594-2:2005 provides a number of different models for the Directory as a framework for the other ISO/IEC 9594 parts

INCITS/ISO 9594-2:2008 [2013],
Information Technology - Open Systems Interconnection - The Directory: Models
The models defined in ISO/IEC 9594-2:2008 provide a conceptual and terminological framework for the other parts of ISO/IEC 9594, which define various aspects of the Directory.

INCITS/ISO 9594-3:2008 [2013],
Information Technology - Open Systems Interconnection - The Directory: Abstract service definition
ISO/IEC 9594-3:2008 defines in an abstract way the externally visible service provided by the Directory.

INCITS/ISO 9594-4:2005 [2008],
Information Technology - Open Systems Interconnection - The Directory: Procedures for distributed operation
ISO/IEC 9594-4:2005 provides specifications for how information about objects, e.g. persons, is organized, created, maintained and retrieved. It also gives provisions for protecting stored information through authentication and access control specifications. ISO/IEC 9594-4:2005 specifies the procedures by which the distributed components of the Directory interwork in order to provide a consistent service to its users. This includes defining procedures for interworking with LDAP.

INCITS/ISO 9594-4:2008 [2013],
Information Technology - Open Systems Interconnection - The Directory: Procedures for distributed operation
ISO/IEC 9594-4:2008 specifies the behaviour of DSAs taking part in the distributed Directory application. The allowed behaviour has been designed so as to ensure a consistent service given a wide distribution of the DIB across many DSAs.

INCITS/ISO 9594-5:2005 [2005],
Information Technology - Open Systems Interconnection - The Directory: Protocol specifications

INCITS/ISO 9594-5:2008 [2013],
Information Technology - Open Systems Interconnection - The Directory: Protocol specifications

INCITS/ISO 9594-6:2005 [2005],
Information Technology - Open Systems Interconnection - The Directory: Selected attribute types
ISO/IEC 9594-6:2005 provides specifications for how information about objects, e.g. persons, is organized, created, maintained and retrieved. It also gives provisions for protecting stored information through authentication and access control specifications. ISO/IEC 9594-6:2005 defines a number of attribute types, matching rules and context types which may be found useful across a range of applications of the Directory. One particular use for many of the attributes defined is in the formation of names, particularly for the classes of object defined in ISO/IEC 9594-7.

INCITS/ISO 9594-6:2008 [2013],
Information Technology - Open Systems Interconnection - The Directory: Selected attribute types
ISO/IEC 9594-6:2008 defines a number of attribute types and matching rules which may be found useful across a range of applications of the Directory.

INCITS/ISO 9594-7:2005 [2005],
Information Technology - Open Systems Interconnection - The Directory: Selected object classes
ISO/IEC 9594-7:2005 provides specifications for how information about objects, e.g. persons, is organized, created, maintained and retrieved. It also gives provision for protecting stored information through authentication and access control specifications. ISO/IEC 9594-7:2005 defines a number of selected object classes and name forms which may be useful across a range of applications of the Directory. An object class definition specifies the attribute types which are relevant to the objects of that class. A name form definition specifies the attributes to be used in forming names for the objects of a given class.

INCITS/ISO 9594-7:2008 [2013],
Information Technology - Open Systems Interconnection - The Directory: Selected object classes
ISO/IEC 9594-7:2008 defines a number of object classes and name forms that may be found useful across a range of applications of the Directory. The definition of an object class involves listing a number of attribute types that are relevant to objects of that class. The definition of a name form involves naming the object class to which it applies and listing the attributes to be used in forming names for objects of that class. These definitions are used by the administrative authority that is responsible for the management of the directory information. 
ISO/IEC 9594-8:2005 specifies three frameworks and a number of data objects that can be used to authenticate and secure the communication between two entities, e.g. between two directory service entities or between a web browser and web server. The data objects can also be used to prove the source and integrity of data structures such as digitally signed documents.

ISO/IEC 9594-8:2008 addresses some of the security requirements in the areas of authentication and other security services through the provision of a set of frameworks upon which full services can be based.

ISO/IEC 9594-9:2005 provides specifications for how information about objects, e.g. persons, is organized, created, maintained and retrieved. It also gives provisions for protecting stored information through authentication and access control specifications.
ISO/IEC 9594-9:2005 specifies a shadow service which DSAs may use to replicate Directory information. The service allows Directory information to be replicated among DSAs to improve service to Directory users, and provides for the automatic updating of this information.

ISO/IEC 9594-9:2008 specifies a shadow service which DSAs may use to replicate Directory information. The service allows Directory information to be replicated among DSAs to improve service to Directory users. The shadowed information is updated, using the among DSAs to improve service to Directory users, service allows Directory information to be replicated with virtual device management, coordinate space control, and error control. Annexes A and B form an integral part of this standard. Annex C is for information only.

Describes those functions of the interface concerned with virtual device management, coordinate space control, and error control. Annexes A and B form an integral part of this standard. Annex C is for information only.

Describes those functions of the interface concerned with output primitives and associated attributes and controls for creating graphical pictures. Annexes A and B form an integral part of this standard. Annexes C, D, E, F, G and H are for information only.

Describes those functions of the interface concerned with the creation, modification, and manipulation of graphical pictures using segments. Annexes A and B form an integral part of this standard. Annexes C and D are for information only.

Describes those functions of the interface concerned with obtaining graphical and non-graphical input from a virtual device. Defines also functions to support echoing of input operations on separate virtual devices.

Describes those functions of the interface concerned with creating, modifying, retrieving, and displaying portions of an image stored as pixel data. Annexes A and B form an integral part of this standard. Annexes C, D, E and F are for information only.

Specifies a character encoding of the Computer Graphics Interface. For each of the functions specified in ANSI/ISO/IEC 9637 an encoding is specified. Provides a highly compact representation of the data, suitable for applications that require the data to be of minimum size and suitable for transmission with character-oriented transmission services.

Specifies a Binary Encoding of the Computer Graphics Interface (CGI) data stream. For each of the functions syntaxes in clause 5 and clause 6 of ISO/IEC 9636-2, ISO/IEC 9636-3, ISO/IEC 9636-4, ISO/IEC 9636-5, and ISO/IEC 9636-6, an encoding is specified in terms of an opcode and a sequence of parameters of specified data types. For each of these data types, an explicit representation in terms of bits, 8-bit and 16-bit entities is specified. For some data types, the exact representation depends on a type and/or precision for the data as used in the data stream.

The Computer Graphics Interface (CGI) (ISO/IEC 9636), specifies a language independent standard interface between device-independent and device-dependent parts of a graphics system. For integration into a programming language, CGI is embedded in a language dependent layer obeying the particular conventions of that language. This part of ISO/IEC 9638 specifies such a language dependent layer for the Ada programming language.

ISO/IEC 9796-2:2010 specifies three digital signature schemes giving message recovery, two of which are deterministic (non-randomized) and one of which is randomized. The security of all three schemes is based on the difficulty of factorizing large numbers. All three schemes can provide either total or partial message recovery.

INCITS/ISO/IEC 9796-3-2008 [R2013], Information technology - Security techniques - Digital signature schemes giving message recovery - Part 3: Discrete logarithm based mechanisms
This part of ISO/IEC 9796 specifies six digital signature schemes giving message recovery. The security of these schemes is based on the difficulty of the discrete logarithm problem, which is defined on a finite field or an elliptic curve over a finite field. This part of ISO/IEC 9796 also defines an optional control field in the hash-token, which can provide added security to the signature. This part of ISO/IEC 9796 specifies randomized mechanisms. The mechanisms specified in this part of ISO/IEC 9796 give either total or partial message recovery.

ISO/IEC 9797-1:2011 specifies six MAC algorithms that use a secret key and an n-bit block cipher to calculate an m-bit MAC. ISO/IEC 9797-1:2011 can be applied to the security services of any security architecture, process, or application.
This part of ISO/IEC 9797 specifies three MAC algorithms that use a secret key and a hash-function (or its round-function) with an n-bit result to calculate an m-bit MAC. These mechanisms can be used as data integrity mechanisms to verify that data has not been altered in an unauthorized manner. They can also be used as message authentication mechanisms to provide assurance that a message has been originated by an entity in possession of the secret key.


ISO/IEC 9797-3:2011 specifies the following Message Authentication Code (MAC) algorithms that use a secret key and a universal hash-function with an n-bit result to calculate an m-bit MAC based on the block ciphers specified in ISO/IEC 18033-3 and the stream ciphers specified in ISO/IEC 18033-4: 1. UMAC; 2. Badger; 3. Poly1305-AES; 4. GMAC.


ISO/IEC 9798-1:2010 specifies an authentication model and general requirements and constraints for entity authentication mechanisms which use security techniques. These mechanisms are used to corroborate that an entity is the one that is claimed. An entity to be authenticated proves its identity by showing its knowledge of a secret. The mechanisms are defined as exchanges of information between entities and, where required, exchanges with a trusted third party.


ISO/IEC 9798-2:2008 specifies entity authentication mechanisms using symmetric encryption algorithms. Four of the mechanisms provide entity authentication between two entities where no trusted third party is involved; two of these are mechanisms to unilaterally authenticate one entity to another, while the other two are mechanisms for mutual authentication of two entities. The remaining mechanisms require a trusted third party for the establishment of a common secret key, and realize mutual or unilateral entity authentication.


This standard specifies entity authentication mechanisms using symmetric encryption algorithms. Four of the mechanisms provide entity authentication between two entities where no trusted third party is involved; two of these are mechanisms to unilaterally authenticate one entity to another, while the other two are mechanisms for mutual authentication of two entities. The remaining mechanisms require a trusted third party for the establishment of a common secret key, and realize mutual or unilateral entity authentication. The mechanisms specified in ISO/IEC 9798-2:2008 use time variant parameters such as time stamps, sequence numbers, or random numbers to prevent valid authentication information from being accepted at a later time or more than once. If no trusted third party is involved and a time stamp or sequence number is used, one pass is needed for unilateral authentication, while two passes are needed to achieve mutual authentication. If no trusted third party is involved and a challenge and response method employing random numbers is used, two passes are needed for unilateral authentication, while three passes are required to achieve mutual authentication. If a trusted third party is involved, any additional communication between an entity and the trusted third party requires two extra passes in the communication exchange.


This part of ISO/IEC 9798 specifies entity authentication mechanisms using digital signatures based on asymmetric techniques. Two mechanisms are concerned with the authentication of a single entity (unilateral authentication), while the remaining mechanisms for mutual authentication of two entities. A digital signature is used to verify the identity of an entity. A trusted third party may be involved.


This part of ISO/IEC 9798 specifies entity authentication mechanisms using a cryptographic check function. Two mechanisms are concerned with the authentication of a single entity (unilateral authentication), while the remaining mechanisms are for mutual authentication of two entities.


This standard specifies entity authentication mechanisms using zero-knowledge techniques: - mechanisms based on identities and providing unilateral authentication; - mechanisms based on integer factorization and providing unilateral authentication; - mechanisms based on discrete logarithms with respect to numbers that are either prime or composite, and providing unilateral authentication; - mechanisms based on asymmetric encryption systems and providing either unilateral authentication, or mutual authentication; - mechanisms based on discrete logarithms on elliptic curves and providing unilateral authentication. These mechanisms are constructed using the principles of zero-knowledge techniques, but they are not necessarily zero-knowledge according to the strict definition for every choice of parameters.


ISO/IEC 9798-6:2010 specifies eight entity authentication mechanisms based on manual data transfer between authenticating devices. Four of these mechanisms are improved versions of mechanisms specified in ISO/IEC 9798-6:2005 since they use less user input and achieve more security. Such mechanisms can be appropriate in a variety of circumstances where there is no need for an existing public key infrastructure, shared secret keys or passwords.


This standard is intended for reference by other specifications when the functionality of commitment, concurrency and recovery is required.


This standard is to be applied by reference from other specifications. This is done within such specifications by reference to the CCR services defined in ITU-T Rec. X.8511/ISO/IEC 9804.


This standard is one of a set of international standards produced to facilitate the interconnection of information processing systems.
INCITS/ISO/IEC 9834-6:2005 [R2015], Information technology - Open Systems Interconnection - Procedures for the operation of OSI Registration Authorities: Registration of application processes and application entities

This standard specifies the procedures applicable to the registration of application processes and application entities. No requirement for an international registration authority has been identified; therefore these procedures apply to registration at any point in the ASN.1 object identifier tree. This standard does not cover the registration of application-process types or application-entity types. No requirement for such registration has been identified.

INCITS/ISO/IEC 9834-9:2008 [R2015], Information technology - Open Systems Interconnection - Procedures for the operation of OSI Registration Authorities: Registration of object identifier arcs for applications and services using tag-based identification

This standard specifies the procedures for operating the Registration Authority for object identifiers under the arc (joint-iso-itu-t(2) tag-based(27)), that supports tag-based applications and services.

INCITS/ISO/IEC 9899:2011 [2012], Information technology - Programming language - C

This International Standard specifies the form and establishes the interpretation of programs written in the C programming language.

INCITS/ISO/IEC 9973:2014, Information technology - Computer graphics, image processing and environmental data representation - Procedures for registration of items

ISO/IEC 9973:2013 specifies procedures to be followed in preparing, maintaining and publishing the International Register of Items for any standard whose classes of items are applicable to this register. The items that may be registered fall into several broad categories including: - computer graphics concepts, - data structures used by relevant standards, - spatial and environmental concepts, and - profiles of relevant standards.

INCITS/ISO/IEC 9983:1995 [S2008], Information Technology - Designation of Unrecorded Flexible Disk Cartridges

Specifies an identifier to appear on each flexible disk cartridge (FDC) and the minimum information to appear on packages of unrecorded flexible disk cartridges. The information according to this International Standard shall appear on cartridges and on packages of unrecorded flexible disk cartridges available to end uses.

INCITS/ISO/IEC TR 11580-2009, Information technology - Framework for describing user interface objects, actions and attributes

ISO/IEC TR 11580:2007 defines a format for describing user interface objects, actions and attributes. It provides a basis for standardizing the names and properties of user interface objects, actions and attributes across multiple applications and platforms.


Amendment 1 to ISO/IEC 19794-2:2005

ITSDF (Industrial Truck Standards Development Foundation, Inc.)

ANSI/ITSDF B56.1-2016, Safety Standard for Low Lift and High Lift Trucks

This Standard defines the safety requirements relating to the elements of design, operation, and maintenance of low lift and high lift powered industrial trucks controlled by a riding or walking operator, and intended for use on compacted, improved surfaces.

ANSI/ITSDF B56.10-2006 (R2012), Safety Standard for Manually Propelled High Lift Industrial Trucks

This Standard defines the safety requirements relating to the elements of design, operation, and maintenance of manually propelled high-lift industrial trucks controlled by a walking operator, and intended for use on compacted, improved surfaces.

ANSI/ITSDF B56.11-8-2015, Safety Standard for Seat Belt (Lap-Type) Anchorage Systems for Powered Industrial Trucks

This procedure provides the performance and testing requirements for anchorage systems of lap-type belts (seat belts) provided with counterbalanced, center control, high lift trucks that have a sit-down, non-levitating operator.

ANSI/ITSDF B56.11.1-2012, Double Race or Bi-Level Swivel and Rigid Industrial Casters

This standard establishes dimensional standards and load capacity criteria for double race or bi-level swivel and rigid industrial casters in order to provide for the overall interchangeability of a complete caster.

ANSI/ITSDF B56.11.4-2013, Hook-Type Forks and Fork Carriers for Powered Industrial Forklift Trucks

The scope of this Standard encompasses standards relative to hook-type fork carriers and the attaching elements of fork arms and load handling attachments for forklift trucks, in relation to manufacturers rated capacities of trucks up to and including 11,000 kg (24,000 lb).

ANSI/ITSDF B56.11.5-2014, Measurement of Sound Emitted by Low Lift, High Lift, and Rough Terrain Powered Industrial Trucks

This Standard establishes the conditions, test procedures, environment, and instrumentation for the determination and reporting of the A-weighted sound pressure level of electric battery and internal combustion engine powered, low lift, high lift, and rough terrain industrial trucks.

ANSI/ITSDF B56.11.6-2005 (R2013), Evaluation of Visibility From Powered Industrial Trucks

This Standard establishes the conditions, procedures, equipment, and acceptability criteria for evaluating visibility from powered industrial trucks. It applies to internal combustion engine powered and electric high lift, counterbalanced, sit-down rider industrial trucks up to and including 10 000 kg (22,000 lb) capacity.

ANSI/ITSDF B56.11.7-2011, Liquidified Petroleum Gas (LPG) Fuel Cylinders (Horizontal or Vertical) Mounting - Liquid Withdrawal - for Powered Industrial Trucks

This Standard establishes dimensions for LPG fuel cylinders used on powered industrial trucks.

ANSI/ITSDF B56.14-200x, Safety Standard for Vehicle Mounted Forklift Trucks

This Standard defines the safety requirements relating to the elements of design, operation, and maintenance of industrial and rough terrain vehicle mounted forklifts controlled by a riding operator.

ANSI/ITSDF B56.5-2012, Safety Standard for Guided Industrial Vehicles and Automated Functions of Manned Industrial Vehicles

This Standard defines the safety requirements relating to the elements of design, operation, and maintenance of powered, not mechanically restrained, unmanned automatic guided industrial vehicles and the system of which the vehicles are apart.

ANSI/ITSDF B56.6-2016, Safety Standard for Rough Terrain Forklift Trucks

This Standard defines the safety requirements relating to the elements of design, operation, and maintenance of rough terrain forklift trucks. These trucks are intended for operation on unimproved natural terrain as well as the disturbed terrain of construction sites.

ANSI/ITSDF B56.8-2011, Standards Safety for Personnel and Burden Carriers

This Standard defines safety requirements relating to the elements of design, operation, and maintenance of powered personnel and burden carriers having three or more wheels, a maximum speed not exceeding 40 km/h (25 mph), and a payload capacity not exceeding 4536 kg (10,000 lb). This Standard does not include vehicles intended primarily for earth moving or over-the-road hauling, or unmanned automatic guided vehicles.
ANSI/ITSDF B56.9-2012, Safety Standard for Operator Controlled Industrial Tow Tractors
This Standard defines the safety requirements relating to the elements of design, operation, and maintenance of operator controlled industrial tow tractors up to and including 66750 N (15,000 lb) maximum rated drawbar pull of a non-braked load.

JCSEE (Joint Committee on Standards for Educational Evaluation)
This standard has 27 component parts, which together represent a national consensus of what is most important to sound personnel evaluations and personnel evaluation systems in education. The component parts require that personnel evaluations be ethical, fair, useful, feasible, and accurate. Propriety is addressed in 7 components, utility in 6, feasibility in 3, and 11 address accuracy.

ANSI/JCSEE PgES3-2010, The Program Evaluation Standard
This standards addresses the quality of educational program and project evaluations and metaevaluations of educational evaluations.

KCMA (Kitchen Cabinet Manufacturers Association)
Performance and construction standard for factory manufactured, factory finished kitchen and vanity cabinets.

LEO (Leonardo Academy, Inc.)
ANSI/LEO 4000-2015, LEO-4000 American National Standard for Sustainable Agriculture
Establishes a comprehensive framework and common set of environmental, social, and economic metrics by which to determine whether an agricultural crop has been produced and handled in a sustainable manner, from soil preparation and seed planting through production, harvest, post-harvest handling, and distribution for sale. In the future this standard language will be expanded to include animal production.

ANSI/LEO 5000-2011, LEO 5000 - Standard for Emissions Inventories, Offsets and Reduction Credits
Develop a comprehensive framework and sustainability metrics that (1) Provide transparent reporting of the scope of emissions sources being addressed and how emissions, sequestration and offsets are calculated, which will help companies and consumers to make sense of claims made by businesses about their emission reduction and offset achievement, (2) Avoid the traditional one-dimensional approach of targeting single emissions by addressing the full range of emissions types, including those that negatively affect climate and those that negatively affect human health and (3) Fill in the gap left by current climate emissions standards by addressing existing forests.

ANSI/LEO 8000-2011, Standard for Sustainable Electronic Gaming Machines
The goal of this process has been to help the gaming industry identify and communicate the sustainability parameters of their products and services and to allow industry purchasers to identify their sustainability preferences when purchasing gaming equipment and services. The standard development committee has developed comprehensive frameworks and sustainability metrics that assess environmental, social, and economic performance at all levels of the gaming industry’s supply and delivery chain and encourages continuous improvement in overall sustainability performance.

LIA (ASC Z136) (Laser Institute of America)
ANSI Z136.1-2013, Standard for Safe Use of Lasers
This standard provides recommendations for the safe use of lasers and laser systems that operate at wavelengths between 180 nm and 1 mm.

ANSI Z136.2-2012, Standard for Safe Use of Optical Fiber Communication Systems Utilizing Laser Diode and LED Sources
This standard addresses the hazards of and provides guidance for the safe use, maintenance, service, and installation (manufacture) of optical communications systems (OCS) utilizing laser diodes or light-emitting diodes (LED) operating at wavelengths between 600 nm and 1 mm, and not intended for visual communications. For purposes of the standard, optical communication systems include end-to-end optical fiber based links (optical fiber communications systems - OFCS), fixed terrestrial point-to-point free-space links (free space optical communications systems - FSOCs), or a combination of both.

ANSI Z136.3-2011, Standard for Safe Use of Lasers in Health Care
This standard provides guidance for the safe use of lasers in health care. Specific processes are provided to protect anyone who might become exposed to laser radiation and to assist in establishing a program that promotes the safe use of health care lasers.

ANSI Z136.4-2010, Recommended Practice for Laser Safety Measurements for Hazard Evaluation
This document provides adequate, practical guidance for necessary measurement procedures used for classification and hazard evaluation of lasers. This document is intended to provide guidance for manufacturers, laser safety officers (LSOs), and trained laser users.

ANSI Z136.5-2009, American National Standard for Safe Use of Lasers in Educational Institutions
This standard addresses laser safety concerns and situations characteristic of the educational environment. This standard is intended for faculty and students using lasers at primary, secondary and college levels of education excluding graduate level research laboratories. The wavelength range of interest includes the ultraviolet, visible, and infrared regions of the electromagnetic spectrum, specifically the wavelength range from 0.18 micrometer (micrometer) to 1 millimeter (mm).

ANSI Z136.6-2015, Standard for Safe Use of Lasers Outdoors
This standard provides guidance for the safe use of potentially hazardous lasers and laser systems in outdoor environments. Products and applications covered include laser light shows, lasers used for outdoor scientific research, and military lasers. It also provides guidance for controlling disability glare from exposure to non-injurious levels of visible laser light, which might interfere with sensitive or critical tasks. Lasers used for fixed, terrestrial point-to-point free-space optical telecommunications are not covered in this document.

This standard provides recommendations for the testing requirements and labeling of protective equipment (devices) designed for use with lasers and laser systems that operate at wavelengths between 180 nm and 1 mm.

ANSI Z136.8-2012, Standard for Safe Use of Lasers in Research, Development or Testing
This standard provides recommendations for the safe use of lasers and laser systems that operate at wavelengths between 180 nm and 1 mm, and are used to conduct research or use in a research, development, or testing environment.

ANSI Z136.9-2013, Standard for Safe Use of Lasers in Manufacturing Environments
This standard provides recommendations for the safe use of lasers and laser systems that operate at wavelengths between 180 nm and 1 mm, used in the manufacturing environment. Laser applications in the manufacturing environment include, but not limited to: laser alignment, leveling, inventory, metrology, fabrication, material processing, and machine vision.

MedBiq (MedBiquitous Consortium)
Activity Report leverages the Healthcare Professional Profile and the Healthcare Learning Object Metadata. It contains one or more activity reports that describe in detail the healthcare professional, the continuing education or certification activity in which he/she participated, the professional’s interaction with the activity, the continuing education credit certificate awarded, point-of-care learning data, and the organization reporting the activity.

ANSI/MEDBIQ CF.10.1-2012, Competency Framework
Competency Framework leverages the Healthcare Learning Object Metadata and references external competency definitions of different formats. It contains metadata about the framework as well as relationships (hierarchical and non-hierarchical) among competency objects and potentially existing frameworks that comprise the competency framework.
ANSI/MEDBIQ CI.10.1-2013 Corrigenda, Curriculum Inventory Corrigenda
The id attributes for events, sequence blocks, and integration blocks are defined as strings, and their use is required. Unfortunately, the string datatype allows for null values, and XML documents containing null values for id attributes validate against this scheme. The logic of the Curriculum Inventory architecture is dependent on referencing the identifiers for events, sequence blocks, and integration blocks, so the validation of documents with null ids poses a significant problem. The corrigenda for the standard correct these errors.

ANSI/MEDBIQ CI.10.1-2013, Curriculum Inventory
Curriculum Inventory reports on the events, objectives/outcomes/competencies, milestones/performance levels, themes, and structure of a program of health professions education and provides some metadata about the program and reporting period. It supports the description of curricula across the continuum of professional education and training.

Healthcare Learning Object Metadata extends the IEEE Learning Object Metadata standard for describing educational resources. Healthcare-specific extensions include metadata relevant to learning objects, assets, and events, including credit information, target audience, content expiry date, date and location information for live events, modality, commercial support information, disclosures, clinical history, magnification, orientation, radiograph type, and specimen type, among others. It also supports referencing medical terminologies.

ANSI/MEDBIQ ME.10.1-2009, MedBiquitous Medical Education Metrics
The MedBiquitous Medical Education Metrics standard (MEMs) provides a common XML format for exchanging evaluation data for clinical education designed to improve the performance of healthcare professionals. Version 1 of MEMs includes an activity description, participation metrics, learner demographics, participant activity evaluation, and knowledge assessment data.

ANSI/MEDBIQ PF.10.1-2015, Performance Framework
Performance Framework leverages the Healthcare Learning Object Metadata and references competency definitions. It contains metadata about the framework as well as definitions of performance levels, relationships of performance levels to one another on a continuum, and relationships of performance levels to competency objects.

ANSI/MEDBIQ PP.10.1-2008, Healthcare Professional Profile
The Professional Profile provides a common XML format for describing the following information about one or more healthcare professionals: Name, Address, Unique identifiers, Education, Training, Certifications, Licenses, Notices and disciplinary actions from state boards, Academic appointments, Occupation (including privileges and specialty), Personal data, Membership in professional organizations.

ANSI/MEDBIQ VP.10.1-2010, MedBiquitous Virtual Patient
The MedBiquitous Virtual Patient standard provides a common XML format for describing computer-based clinical simulation for medical education, including Virtual Patient Data (patient demographics, clinical data, narrative text, and educational feedback), media resources, data availability model (allows for aggregations of data to be constructed), activity model (creates paths through the content and dictates how the learner interacts with the virtual patient), and a player specification (indicates how a player interprets other components for delivery to the learner).

MHI (ASC MHC) (Material Handling Industry)
ANSI MH1-2016, Pallets, Slip Sheets, and Other Bases for Unit Loads
Applies to pallets used in the Unit-load method of assembling, stacking, storing, handling, and transporting materials and products. Defines terminology and nomenclature associated with pallets; applies to pallets irrespective of components and materials used in their fabrication; provides a series of recommended pallet dimensions and sizes; describes procedures for pallet sampling, inspection and testing; indicates procedures for designating pallet requirements. Intended for designers, manufacturers, distributors and users of pallets.

ANSI MH1-14-2016, Pallets - Molded, Wood-Based Composite
This standard applies to molded, wood-based composite pallets commonly referred to as presswood pallets. They are made entirely of compression molded, highly processed wood flakes and resin. This standard is in 3 parts. Part #1 - Prescriptive standard applying to the manufacture of the pallet. Part #2 - Performance and use standard applying to the functionality and environmental aspects of the pallet, and, Part #3 - Addresses the recycling of the pallet. The standard does not address safety associated with the use of presswood pallets.

ANSI MH10.8.12-2011, Unit loads and transport packages - Component marking
Provides for common structure for encoding data to be marked on electronic components to facilitate automation. Provides a means for components to be marked and read in a fixed environment for subsequent manufacturing operations. Intended applications include, but are not limited to component traceability and component tracking.

ANSI MH10.8.13-2016, Material Handling - Label testing procedures for pressure-sensitive adhesive labels to be used for bar codes, other markings, and as carriers for other AIDC media.
This standard will include the language lost in the migration of CEAS56 to MH10.8.1 and then to ANSI ISO 15394, CEAS624 to MH10.8.6 and then to ANSI ISO 23742, CEAS211 to MH10.8.7 and then to ANSI ISO 28219. This standard will also codify in an ANSI standard the valuable guidance provided in MIL-L-61002, Labels, pressure-sensitive adhesive, for bar codes and other markings.

ANSI MH10.8.2-2016, Data Identifier and Application Identifier Standard
This standard provides a comprehensive dictionary of MH 10/SC 8 Data Identifiers and GS1 Application Identifiers, provides for the assignment of new Data Identifiers, as required, and provides a document detailing the correlation, or mapping, of Data Identifiers to Application Identifiers, where a correlation exists.

ANSI MH10.8.3-2002 (R2012), Standard for Material Handling - Syntax for High Capacity ADC Media
Specifies a transfer structure, syntax, and coding of messages and data formats when using high-capacity ADC media between trading partners, specifically between suppliers and recipients, and where applicable, in support of carrier applications, such as bills of lading and carrier sortation and tracking.

ANSI MH10.8.6-2013, Standard for Material Handling - Bar Codes and Two-Dimensional (2D) Symbols for Product Packaging
This standard is an application standard for the marking of product packages with linear bar code and two-dimensional symbols. It defines minimum requirements for identifying product packages that are distributed outside the originating location. It specifies label data content and requirements, including data element requirements; data representation; rules for encoding of mandatory and optional elements in machine-readable symbols; and human readable information.

ANSI MH10.8.8-2011, Radio Frequency Identification for Packages, Parcels, and Flat Mail
Provides guidance for the use of radio frequency identification (RFID) for the handling and tracking of packages, parcels, and flat mail. Identifies minimum data requirements as well as semantic and syntactical recommendations. Further provides specific recommendations for the air interface communications of RFID devices based on the application requirements identified by the carriers.

This standard is being developed to consistently guide a reader through the correct processes of validating an implementation of IUID policy, specifically in the creation of properly formatted, decoded, and displayed Data Matrix Symbols.
MHI (Material Handling Industry)


Specifies, for an Automatic Identification and Data Capture (AIDC) reader manufacturer, the preferred output of an AIDC reader when processing ISO/IEC 15434 formatted data. The standard is intended to cover the processing of all AIDC media. It specifies that the output be provided in an XML format suitable for display in Internet Explorer and usable in other applications. The specifications are intended to cover the output from processing of all current and future Format Indicators included in ISO/IEC 15434.


The standard applies to industrial pallet racks, movable shelf racks, and stacker racks made of cold-formed or hot-rolled steel structural members. It does not apply to other types of racks, such as drive-in or drive-through racks, cantilever racks, portable racks, etc. or to racks made of material other than steel.

ANSI MH24.2-2016, Power-Operated Vertical Carousels and Vertical Lift Modules

This proposed Standard applies to power-operated storage equipment typically referred to as vertical storage carousels and vertical lift modules. The objective of this standard is to provide guidance to the user so they may eliminate or minimize the hazards described within Section 4 of the proposed standard. These hazards can arise during installation, start up, operation, maintenance, testing, and dismantling of the equipment.


This standard is established to provide a guideline for design, testing, fabrication and utilization of welded-wire mesh rack decking utilized as an accessory for industrial steel storage racks. It applies to uniformly loaded rack decking fabricated from welded-wire mesh with permanently attached reinforcements for use in storage racks. The purpose for such rack decking is to provide storage capability by creating a surface in conjunction with a rack, upon which to place materials that may be on pallets, in containers, or in some other form.

ANSI MH27.1-2016, Patented Track Underhung Cranes and Monorail Systems

This standard applies to underhung cranes whose end trucks operate on the lower flange of a patented-track runway section; and to carriers (trolleys) operating on single-track patented-track monorail systems, including all curves, switches, transfer devices, lift and drop sections, and associated equipment.

ANSI MH27.2-2017, Enclosed Track Underhung Cranes and Monorail Systems

This standard applies to underhung cranes whose end trucks operate on the inner flange of a runway using enclosed track section & S94; and to trolleys (carriers) operating on singlerack monorail systems, including all curves, switches, transfer devices, lift and drop sections, and associated equipment.

ANSI MH28.2-2012, Design and Testing of Boltless Metal-Wood Shelving

This standard applies to Boltless Metal-Wood Shelving exclusively used for the storage by hand of small to bulky type material. The shelving framing is composed of boltless connections. Units consist of cold-formed steel members supporting a surface of particleboard, mat-formed wood particle-board, plywood or other wood products.

ANSI MH28.3-2009, Design, Manufacture, and Installation of Industrial Steel Work Platforms

Addresses means of egress, guarding, materials, structural design, fabrication, and loading for an industrial steel work platform. This standard is intended to be applied to the design, manufacturing, installation, and maintenance of such structures. An industrial steel work platform is a prefabricated elevated platform in an industrial environment, pre-designed using a steel framing system. Flooring may include other structural or non-structural elements such as, but not limited to, concrete, steel, or engineered wood products.

ANSI MH29.1-2012, Safety Requirements for Industrial Scissors Lifts

Mobile and stationary industrial scissors lifts raise, lower and position materials and personnel in various applications, but are different from aerial work platforms (AWP) and elevators. This revision better illustrates that personnel operate and may be raised or lowered by industrial scissors lifts. This standard now defines dock lifts, work access lifts and lift tables as the three categories of industrial scissors lifts and identifies their differences and similarities. The responsibilities of manufacturers, users, owners and operators have been enhanced.

ANSI MH30.1-2015, Performance and Testing Requirements for Dock Leveling Devices

A dock leveling device spans and compensates for space and height differentials between a loading dock and a transport vehicle to facilitate freight transfers in an effective and efficient manner. This standard serves as a guide for designers, manufacturers, sellers, installers, owners, users and government bodies of dock levelers and to provide guidelines for the design and testing of dock levelers, promote the understanding of the responsibilities and to provide a uniform means of comparison.


This proposed Specification applies to free-standing and top-tiered cantilevered storage racks made of cold formed or hot rolled steel members. The Specification covers integrity of installations, loading and forces (including seismic), design procedures, design of columns and arms, bracing design, connections and special design provisions.

ANSI/MH30.2-2015, Performance and Testing of Portable Dock Leveling Devices

Defines performance and testing requirements for the design, use and maintenance of portable dock leveling devices of the type generally referred to as dockboards and dockplates. Provides definitions of dockboard and dockplate types and component parts, product requirements and considerations, and owner responsibilities. Buyers and specifiers may use this standard to ensure equal comparison of various manufacturers’ representations as to the features and performance of the dock leveling devices.

ANSI/MH30.3-2015, Performance and Testing of Vehicle Restraining Systems

This standard defines performance and testing requirements with regard to design, use, and maintenance of trailer restraining devices. This standard provides definitions of trailer restraining device types and component parts. Requirements and owner responsibilities are discussed. Buyers and specifiers of loading dock trailer restraint devices may use this standard to ensure equal comparison of various manufacturers’ representations as to features and performance of the devices.

ANSI/MHI ECMA 15-2010, Specifications for Cable-less Controls for Electric Overhead Traveling Cranes

Provides information regarding the requirements, safety benefits and applications for radio-frequency directional devices used in controlling the movements and actions of electric overhead traveling cranes in material handling applications. The scope is limited to remote or cable-less controlling devices that utilize radio frequency as a means of transmitting directions and information to electric overhead traveling cranes.

ANSI/MHI ICWM-2012, The ICWM Performance Standard for Casters and Wheels

Provides a common basis for evaluating the safety, durability, structural adequacy, and technical requirements for category specific casters and wheels (Furniture Chair Casters, Furniture Non-Chair Casters, Industrial Casters, Institutional and Medical Equipment Bed Casters). Defines industry terms, specific tests, equipment/methods that can be used, conditions of tests, and minimum acceptance levels used in evaluation. These acceptance levels are based on field and test experiences.

MSS (Manufacturers Standardization Society)

ANSI/MSS SP-114-2007, Corrosion Resistant Pipe Fittings Threaded and Socket Welding Class 150 and 1000

This Standard Practice is for corrosion resistant pipe fittings, threaded and socket welding; involving Class 150 and 1000. This standard establishes requirements for the following: a) Pressure-temperature ratings, b) Size and method of designating openings of reducing fittings, c) Marking, d) Minimum requirements for materials, e) Dimensions and tolerances, f) Threading, and g) Tests. This Standard Practice also applies to Class 150 and Class 1000 square head plugs, hex head plugs and bushings, locknuts, and threaded and socket welding unions.
ANSI/MSS SP-134-2012, Valves for Cryogenic Service, including Requirements for Body/Bonnet Extensions

This Standard Practice covers requirements for material, design, dimensions, fabrication, non-destructive examination and pressure testing of stainless steel and other alloy cryogenic service valves with body/bonnet extensions. Requirements for check valves for cryogenic service, which may not require body/bonnet extensions, are also covered. This standard applies to cryogenic gate, globe, butterfly, ball, and check valves, and may be used in conjunction with other valve-specific standards; including the following identified in this Standard Practice as a parent standard: ASME B16.34, API 600, API 602, API 603, API 608, API 609, and API 6D (identical to ISO 14313).

ANSI/MSS SP-135-2016, High Pressure Knife Gate Valves

MSS SP-135 covers the construction requirements for lug- and wafer- type, knife gate valves made from ASME Code materials and meeting the applicable gate valve requirements of ASME B16.34. This Standard Practice covers flanged body designs compatible with ASME B16.5 flanges for NPS 2 (DN 50) through NPS 24 (DN 600) and ASME B16.47 Series A flanges for NPS 26 (DN 650) through NPS 48 (DN 1200). As an alternative, it also pertains valves that do not meet the body wall thickness of ASME B16.34, but shall be qualified by a proof test. The Class 150, 300, and 600 dimensional, material, and other requirements of this Standard Practice shall apply to these valves.

ANSI/MSS SP-138-2014, Quality Standard Practice for Oxygen Cleaning of Valves and Fittings

This Standard Practice outlines the general requirements for cleaning, inspection, testing, and packaging of valves and fittings intended to be used in Oxygen service environments. Proper design and material compatibility for Oxygen systems is outside the scope of this Standard Practice. Review copy is a BSR draft only. Revises previous BSR/MSS SP-138-2009 (orig. BSR-8 submission). Identified stakeholder are unchanged. Originally developed under MSS Committee 407 & 304. Committee Chair: C. Davilla.

ANSI/MSS SP-144-2013, Pressure Seal Bonnet Valves

This Standard Practice covers construction requirements for steel and alloy valves having pressure seal bonnets in the size range of NPS 2 (DN 50) through NPS 50 (DN 1250) and Pressure Classes 600, 900, 1500, 2500, and 4500. This standard applies to gate, globe, and check valves and may be used in conjunction with other valve-specific standards; including the following identified in this Standard Practice as parent valve standards: API 594, API 600, API 603, API 623, and ASME B16.34.

ANSI/MSS SP-25-2013, Standard Marking System for Valves, Fittings, Flanges, and Unions

This marking system applies to valves, fittings, flanges, and unions used in piping connections which include (but are not limited to) flanged, soldered, brazed, threaded, or welded joints. These specified markings serve to identify the manufacturer, the rating designation, materials of construction and special service limitations imposed by the manufacturer. They are used for product identification and to assist in proper application. Review copy is a marked-up BSR draft. Revises previous BSR/MSS SP-25-2008 (orig. BSR-8 submission). Due to previous ANSI/MSS ballot results the draft standard was revised/approved by MSS and is being re-balloted (showing mark-up) within ANSI process. Identified stakeholder are unchanged. Originally developed under MSS Committee 302 (Committee Chair: J. Ballun). U.S. customary units in this Standard Practice are the standard; the SI (metric) units are also included for reference.

ANSI/MSS SP-44-2016, Steel Pipeline Flanges

Covers pressure-temperature ratings, materials, dimensions, tolerances, marking, and testing for steel pipeline flanges. The welding neck type flanges shall be forged steel, and the blind flanges may be made from either forged steel or from steel plate. Dimensional and tolerance requirements for NPS 10 and smaller are provided by reference to ASME B16.5. Note that SP-44 covers construction details not covered by another current standard, including P/T ratings, of products made of high-yield strength materials (e.g., for users that have flanged joints, flanged valves, and flanged fittings).


Allows visual evaluation of surface irregularities in steel castings for valves, flanges, fittings, and other piping components. This standard establishes requirements for the following: (a) Visual surface irregularity acceptance standards for steel parts; (b) Supplements requirements in identified ASTM Standards; (c) Provides a series of referenced photographs typical of the various surface irregularities; and (d) Illustrations of generally acceptable and generally rejectable quality.


ANSI/MSS SP-96-2017, Terminology for Valves, Fittings, and Their Related Components

The SP-96 standard lists and defines principle terms, acronyms, and abbreviations that are widely used to describe valves, fittings, and related components. It is comprised of separate sections which contain (1) Acronyms for organizations whose documents are applicable to valves, fittings, and related components, and a brief summary of the applicable area of interest; (2) A glossary of terms used within the valve and fittings industry, including standards developers, to describe design, operation, and performance characteristics; and (3) Abbreviations commonly used in the valve and fittings industry.

MTS (Institute for Market Transformation to Sustainability)


The 2.0 Integrative Process Standard defines how key building and design professionals work together in the design and construction of sustainable buildings & Communities, to best achieve the project goals efficiently and at a lower cost and risk.

NAAMM (National Association of Architectural Metal Manufacturers)


This standard provides guidance for those specifying or designing pipe railings systems. The standard is in the process of being incorporated into a more extensive document, but until that document is complete, it is desired to reaffirm the current version.


Standard provides a method to determine size of flagpole based on wind load on both pole and flag. Calculation procedure utilizes charts and tables based on variables including wind speed, height of pole, pole material, and flag size.

ANSI/NAAMM HMMA 801-2012, Glossary of Terms for Hollow Metal Doors and Frames

This standard was developed by the HMMA Division of NAAMM to provide their opinion and guidance on the definition of terms used with hollow metal doors and frames.

ANSI/NAAMM HMMA 841-2013, Tolerances and Clearances for Commercial Hollow Metal Doors and Frames

This standard was developed by the HMMA Division of NAAMM to provide guidance on tolerances and clearances for commercial hollow metal doors and frames. It has been reviewed and updated for consistency with other NAAMM/HMMA standards.
ANSI/NACE Standard MR0103-2012, Materials Resistant to Sulfide Stress Cracking in Corrosive Petroleum Refining Environments
This standard establishes material requirements for resistance to sulfide stress cracking (SSC) in sour refinery process environments, i.e., environments that contain wet hydrogen sulfide (H2S). Specifically, this standard is directed at the prevention of SSC of equipment (including pressure vessels, heat exchangers, piping, valve bodies, and pump and compressor cases) and components used in the refining industry.

ANSI/NACE Standard TM0177-2016, Laboratory Testing of Metals for Resistance to Sulfide Stress Cracking and Stress Corrosion Cracking in H2S Environments
This standard addresses testing of metals subjected to tensile stresses for resistance to cracking failure in low-pH aqueous environments containing H2S. The test method covers sulfide stress cracking (room temperature, atmospheric pressure) and stress corrosion cracking (elevated temperatures and pressures). Four test methods are described.

ANSI/NACE Standard TM0284-2016, Evaluation of Pipeline and Pressure Vessel Steels for Resistance to Hydrogen-Induced Cracking
This standard establishes a test method for evaluating the resistance of pipeline and pressure vessel steels to HIC caused by hydrogen absorption from aqueous sulfide corrosion. Details are provided on the size, number, location, and orientation of test specimens to be taken from each steel product form - pipes, plates, fittings, and flanges.

ANSI/NACE Standard TMXXXX-2016, Test Method for Monitoring Atmospheric Corrosion Rate by Electrochemical Measurements
This standard test method provides guidance on the specification, selection, and use of sensors for monitoring atmospheric corrosion using electrochemical techniques. It addresses the use of electrochemical sensors in a bare metal condition or with protective coatings. It encompasses sensor elements for measurement of free corrosion, galvanic corrosion, and conductance for assessing atmospheric corrosion. This standard is intended to be submitted for consideration as an ISO standard.

NALFA (North American Laminate Flooring Association)

ANSI/NALFA LF-01-2010, Laminate Flooring Specifications and Test Methods
The product standard shall apply to the performance of residential and commercial uses of laminate flooring. The Standard will be useful in guiding/assisting manufacturers and educating suppliers and consumers about the minimum performance of laminate flooring in residential, light commercial, commercial and heavy commercial settings.

ANSI/NALFA LF-02-2010, Sustainability Assessment of Laminate Flooring
The performance standard shall provide an assessment tool for the sustainability properties, the “green” value, and related performance of consumer and commercial laminate flooring.

NASBLA (National Association of State Boating Law Administrators)

ANSI/NASBLA 102-2017, Basic Boating Knowledge - Sailing
This Standard applies to basic sailing knowledge education and proficiency assessment in the United States, U.S. territories, and the District of Columbia. This document establishes the national standard for basic recreational sailing knowledge with a primary focus on safety and mitigation of risks associated with recreational sail boating. This Standard contains the basic knowledge elements that a beginner (entry-level) operator should have in order to safely operate a small sailboat of less than 26 feet in length by day in light to moderate winds (up to 12 knots) and sea conditions. Auxiliary power knowledge is not included. On-water skills are not included.

ANSI/NASBLA 103-2016, Basic Boating Education - Power
This is the minimum required standard that applies to all basic boating courses in the U.S. states and territories and District of Columbia. Its purpose is to establish the national standard for use by course providers to meet the needs of recreational boaters for basic boating knowledge in order to identify and reduce primary risk factors and mitigate their effects on recreational boating.

NASPO (North American Security Products Organization)

ANSI/NASPO SA-2015, NASPO Security Management System
The requirements set forth in this standard apply to the management of common security risks that an organization must treat to protect its sustainability, the interest of the customer, and its goods and services. While the common criteria defined in this standard typify a great majority of the security risks that must be mitigated, it cannot anticipate all specific risks to an organization.

ANSI/NASPO SD 01-2014, Minimum security requirements for security documents
The scope of this standard is to establish the minimum security requirements for security documents. Based upon a risk assessment, these requirements shall establish the minimum number and types of security technologies that shall be incorporated into a class or type of security document. In addition this standard shall establish the minimum requirements necessary for the secure manufacture and distribution of those security documents.

NBBPVI (National Board of Boiler and Pressure Vessel Inspectors)

ANSI/NB-23-2017, National Board Inspection Code (NBIC)
NB-23 provides requirements and guidelines for the installation, inspection, repair, and alteration of pressure retaining items and pressure relief valves.

NCPDP (National Council for Prescription Drug Programs)

The NCPDP Audit Transaction Standard Implementation Guide was developed to meet the industry needs for electronic communication for audit requests, responses and final outcomes especially as they affect the pharmacy industry.

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The Benefit Integration Standard Implementation Guide supports the communication of accumulator data in a standard format via transactions that are used to facilitate the delivery and receipt of this information. These transactions provide administrative efficiencies and allow for an industry standard to be used to share accumulator data (such as deductible and out of pocket) between Benefit Partners to administer integrated benefits for a member.
The Benefit Integration Standard Implementation Guide supports the communication of accumulator data in a standard format via transactions that are used to facilitate the delivery and receipt of this information. These transactions provide administrative efficiencies and allow for an industry standard to be used to share accumulator data (such as deductible and out of pocket) between Benefit Partners to administer integrated benefits for a member.

The NCPDP Billing Unit Standard Implementation Guide is intended to meet two needs within the pharmaceutical drug claim industry: 1) provide practical guidelines for software developers and 2) to ensure a consistent implementation of standardized billing units.

ANSI/NCPDP BUS v3.1-2015, NCPDP Billing Unit Standard v3.1
The NCPDP Billing Unit Standard Implementation Guide is intended to meet two needs within the pharmaceutical drug claim industry: 1) provide practical guidelines for software developers and 2) provide guidelines for consistent implementation of drug/product packaging for use in all applicable NCPDP Standards.

ANSI/NCPDP FB V2.0-2008, Formulary and Benefit Standard Version 2.0
Formulary and Benefit Standard provides a standard means for pharmacy benefit payers (including health plans and Pharmacy Benefit Managers) to communicate formulary and benefit information to prescribers via technology vendor systems.

ANSI/NCPDP FB V2.1-2008a, Formulary and Benefit Standard Version 2.1
Formulary and Benefit Standard provides a standard means for pharmacy benefit payers (including health plans and Pharmacy Benefit Managers) to communicate formulary and benefit information to prescribers via technology vendor systems.

ANSI/NCPDP FB v3.0-2011, Formulary and Benefit Standard v3.0
Formulary and Benefit Standard provides a standard means for pharmacy benefit payers (including health plans and Pharmacy Benefit Managers) to communicate formulary and benefit information to prescribers via technology vendor systems.

ANSI/NCPDP FB v4.0-2013, NCPDP Formulary and Benefit Standard v4.0-201x
Formulary and Benefit Standard provides a standard means for pharmacy benefit payers (including health plans and Pharmacy Benefit Managers) to communicate formulary and benefit information to prescribers via technology vendor systems.

ANSI/NCPDP FB v4.1-2013, NCPDP Formulary and Benefit Standard v4.1-201x
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ANSI/NCPDP FB v4.2-2014, NCPDP Formulary and Benefit Standard v4.2-201x
Formulary and Benefit Standard provides a standard means for pharmacy benefit payers (including health plans and Pharmacy Benefit Managers) to communicate formulary and benefit information to prescribers via technology vendor systems.

ANSI/NCPDP FB v4.3-2015, NCPDP Formulary and Benefit Standard v4.3
Formulary and Benefit Standard provides a standard means for pharmacy benefit payers (including health plans and Pharmacy Benefit Managers) to communicate formulary and benefit information to prescribers via technology vendor systems.

ANSI/NCPDP FB v4.4-2015, NCPDP Formulary and Benefit Standard v4.4
Formulary and Benefit Standard provides a standard means for pharmacy benefit payers (including health plans and Pharmacy Benefit Managers) to communicate formulary and benefit information to prescribers via technology vendor systems.

ANSI/NCPDP FB v50-2016, NCPDP Formulary and Benefit Standard v50
Formulary and Benefit Standard provides a standard means for pharmacy benefit payers (including health plans and Pharmacy Benefit Managers) to communicate formulary and benefit information to prescribers via technology vendor systems.

Financial Information Reporting is a process whereby a patient, under one plan sponsor, has changed from one benefit plan PBM to another benefit plan PBM and point-in-time financial information is moved from the previous PBM to the new PBM. This information is necessary for the new PBM to accurately process claims and attribute plan balances and status for reporting to the plan sponsor. The implementation guide addresses the industry need to standardize the exchange of this information between plans.

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ANSI/NCPDP FIR v1.3-2017, NCPDP Financial Information Reporting Standard v1.3
Financial Information Reporting is a process whereby a patient, under one plan sponsor, has changed from one benefit plan PBM to another benefit plan PBM and point-in-time financial information is moved from the previous PBM to the new PBM. This information is necessary for the new PBM to accurately process claims and attribute plan balances and status for reporting to the plan sponsor. The implementation guide addresses the industry need to standardize the exchange of this information between plans.

ANSI/NCPDP Medical Rebate Standard v01.00 -2011, NCPDP Medical Rebate Data Submission Implementation Guide v1.0-201x
Provides a uniform data format for health plans’ rebate submissions to multiple manufacturers throughout the industry. Implementation of the medical template also eliminates the need for manufacturers to create internal mapping processes to standardize unique data formats from each health plan or third party administrator.

ANSI/NCPDP Medical Rebate Standard v02.00 -2013, NCPDP Medical Rebate Data Submission Implementation Guide v02.00 -201x
The purpose of the medical rebate template is to provide a uniform data format for health plans’ rebate submissions to multiple manufacturers throughout the industry. Implementation of the medical template also eliminates the need for manufacturers to create internal mapping processes to standardize unique data formats from each health plan or third party administrator.

ANSI/NCPDP Medical Rebate Standard v02.01 -2013, NCPDP Medical Rebate Data Submission Standard v02.01
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ANSI/NCPDP Medical Rebate Standard v02.02 -2014, NCPDP Medical Rebate Data Submission Implementation Guide v02.02 -201x
The purpose of the medical rebate template is to provide a uniform data format for health plans’ rebate submissions to multiple manufacturers throughout the industry. Implementation of the medical template also eliminates the need for manufacturers to create internal mapping processes to standardize unique data formats from each health plan or third party administrator.
The Standard provides a standardized format for the electronic submission of rebate information from Pharmacy Management Organizations (PMOs) to Pharmaceutical Industry Contracting Organizations (PICOs). The four (4) file formats are intended to be used in an integrated manner, with the utilization file being supported by the plan, formulary, and market basket files. However, any of the four (4) files may be used independently. The Standard Flat File layouts provide detailed information on the file design and requirements for each of the four (4) files.

ANSI/NCPDP MR v05.00-2011, Manufacturer Rebate Utilization, Plan, Formulary, Market Basket, and Reconciliation Flat File Standard v05.00

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ANSI/NCPDP MR v06.00-2013, NCPDP Manufacturer Rebate Utilization, Plan, Formulary, Market Basket, and Reconciliation Flat File Standard v06.00-201x

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The standard is intended to meet an industry need to standardize communication of claim information from the payer of last resort to other payers.

ANSI/NCPDP MS v4.0-2013, NCPDP Medicaid Subrogation Implementation Guide v4.0-201x

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The NCPDP Prior Authorization Transfer Standard Implementation Guide was developed to define the file format and correct usage for electronically transferring existing prior authorization data between payer/processors. This standard can be used between payer/processors when transitioning clients, performing system database or platform changes, or other scenarios where an existing prior authorization record is stored in one location and needs to be moved to another.

ANSI/NCPDP PA Transfer v2.0-2013, NCPDP Prior Authorization Transfer Standard v2.0 -201x

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Client Groups, Pharmacy Benefit Managers (PBMs), Fiscal Agents, Vendors, and Administrative Oversight Organizations need the ability to share post-adjudicated pharmacy claim data. The data is used to support 1) Auditing of services 2) Retrospective DUR review 3) Statistical reporting 4) Evaluate Health Care 5) Evaluate Contractor performance 6) Develop and evaluate capitation rates 7) Pay reinsurance (stop loss) to contractors and 8) Develop fee for service payment rates. In the current environment, data is shared in an inefficient manner because a common industry-wide format does not exist.


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The goal of this implementation guide is to support the development of a common format for post-adjudicated pharmacy claim data, which is used to meet the needs of the pharmacy industry to support the communication of patient pharmacy transaction data. The implementation of this standard will provide administrative efficiencies and allow for an industry standard to be used for all entities sharing historical health care data.

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The basic function of the Prescription Transfer Standard is to be able to transfer prescription data in a standardized layout. Two layouts, a fixed length and a variable length format, were developed to provide more flexibility in the amount of data that needs to be transferred without making it a requirement in all cases. Both layouts include data elements required for the transfer of prescription data.

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ANSI/NCPDP SC 2013011-2013, NCPDP SCRIPT Standard 2013011
The standard provides general guidelines for developers of pharmacy or physician management systems who wish to provide prescription transmission functionality to their clients. The standard addresses the electronic transmission of new prescriptions, prescription refill requests, prescription fill status notifications, and cancellation notifications.

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ANSI/NCPDP SC 2014101-2014, NCPDP SCRIPT Standard 2014101
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ANSI/NCPDP SC 2015071-2015, NCPDP SCRIPT Standard 2015071
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ANSI/NCPDP SC 20130401-2013, NCPDP SCRIPT Standard 20130401
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ANSI/NCPDP SC 2013071-2013, NCPDP SCRIPT Standard 2013071
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ANSI/NCPDP SC Standard 2013011-2013, NCPDP SCRIPT Standard 2013011
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ANSI/NCPDP SC Standard 2014072-2014, NCPDP SCRIPT Standard 2014072
The standard provides general guidelines for developers of pharmacy or physician management systems who wish to provide prescription transmission functionality to their clients. The standard addresses the electronic transmission of new prescriptions, prescription refill requests, prescription fill status notifications, and cancellation notifications.

ANSI/NCPDP SC Standard 2016041-2016, NCPDP SCRIPT Standard 2016041
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ANSI/NCPDP SC Standard 2016071-2016, NCPDP SCRIPT Standard 2016071
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ANSI/NCPDP SC Standard 2017011-2017, NCPDP SCRIPT Standard 2017011
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ANSI/NCPDP SC V10.1-2007, Prescriber/Pharmacist Interface SCRIPT Version 10.1
The standard provides general guidelines for developers of pharmacy or physician management systems who wish to provide prescription transmission functionality to their clients. The standard addresses the electronic transmission of new prescriptions, prescription refill requests, prescription fill status notifications, and cancellation notifications.

ANSI/NCPDP SC V10.10-2010, NCPDP SCRIPT Standard v10.10
The standard provides general guidelines for developers of pharmacy or physician management systems who wish to provide prescription transmission functionality to their clients. The standard addresses the electronic transmission of new prescriptions, prescription refill requests, prescription fill status notifications, and cancellation notifications.

ANSI/NCPDP SC V10.11-2010, NCPDP SCRIPT Standard v10.11
The standard provides general guidelines for developers of pharmacy or physician management systems who wish to provide prescription transmission functionality to their clients. The standard addresses the electronic transmission of new prescriptions, prescription refill requests, prescription fill status notifications, and cancellation notifications.

ANSI/NCPDP SC V10.3-2008, Prescriber/Pharmacist Interface SCRIPT Version 10.3
The standard provides general guidelines for developers of pharmacy or physician management systems who wish to provide prescription transmission functionality to their clients. The standard addresses the electronic transmission of new prescriptions, prescription refill requests, prescription fill status notifications, and cancellation notifications.

ANSI/NCPDP SC V10.4-2008, Prescriber/Pharmacist Interface SCRIPT Version 10.4
The standard provides general guidelines for developers of pharmacy or physician management systems who wish to provide prescription transmission functionality to their clients. The standard addresses the electronic transmission of new prescriptions, prescription refill requests, prescription fill status notifications, and cancellation notifications.
ANSI/NCPDP SC V10.5-2008, SCRIPT Standard v10.5
The standard provides general guidelines for developers of pharmacy or physician management systems who wish to provide prescription transmission functionality to their clients. The standard addresses the electronic transmission of new prescriptions, prescription refill requests, prescription fill status notifications, and cancellation notifications.

ANSI/NCPDP SC V10.6-2008, SCRIPT Standard Implementation Guide Version 0.6
The standard provides general guidelines for developers of pharmacy or physician management systems who wish to provide prescription transmission functionality to their clients. The standard addresses the electronic transmission of new prescriptions, prescription refill requests, prescription fill status notifications, and cancellation notifications.

ANSI/NCPDP SC V10.7-2009, SCRIPT Standard v10.7
The standard provides general guidelines for developers of pharmacy or physician management systems who wish to provide prescription transmission functionality to their clients. The standard addresses the electronic transmission of new prescriptions, prescription refill requests, prescription fill status notifications, and cancellation notifications.

ANSI/NCPDP SC V10.8-2009, SCRIPT Standard v10.8
The standard provides general guidelines for developers of pharmacy or physician management systems who wish to provide prescription transmission functionality to their clients. The standard addresses the electronic transmission of new prescriptions, prescription refill requests, prescription fill status notifications, and cancellation notifications.

ANSI/NCPDP SC V10.9-2009, SCRIPT Standard v10.9
The standard provides general guidelines for developers of pharmacy or physician management systems who wish to provide prescription transmission functionality to their clients. The standard addresses the electronic transmission of new prescriptions, prescription refill requests, prescription fill status notifications, and cancellation notifications.

ANSI/NCPDP SCRIPT 2015041-2015, NCPDP SCRIPT Standard 2015041
The standard provides general guidelines for developers of pharmacy or physician management systems who wish to provide prescription transmission functionality to their clients. The standard addresses the electronic transmission of new prescriptions, prescription refill requests, prescription fill status notifications, and cancellation notifications.

The standard provides general guidelines for developers of pharmacy or physician management systems who wish to provide prescription transmission functionality to their clients. The standard addresses the electronic transmission of new prescriptions, prescription refill requests, prescription fill status notifications, and cancellation notifications.

ANSI/NCPDP Sig V1.0-2008, Sig Standard Version 1.0
This NCPDP Structured and Codified Sig Format Implementation Guide is intended to standardize the portion of an electronic prescription containing the directions for using existing, accepted electronic transmission standards, such as NCPDP SCRIPT, Health Level 7 (HL7), and ASTM Continuity of Care Records (CCR). This document is intended to facilitate communication between prescribers and pharmacists, to improve the efficiency of the prescribing and dispensing activities and to help reduce the opportunity for errors.

ANSI/NCPDP Specialized Standard 2010121
-2011, NCPDP Specialized Standard 2010121xxxx
The NCPDP Specialized Standard will house transactions that are not eprescribing but are part of the NCPDP XML environment. The standard provides general guidelines for developers of systems who wish to provide business functionality of these transactions to their clients. The guide describes a set of transactions and the implementation of these transactions.

ANSI/NCPDP Specialized Standard 2011071
-2011, NCPDP Specialized Standard 2011071
Houses transactions that are not eprescribing but are part of the NCPDP XML environment. The standard provides general guidelines for developers of systems who wish to provide business functionality of these transactions to their clients. The guide describes a set of transactions and the implementation of these transactions.

ANSI/NCPDP Specialized Standard 2012031
-2012, NCPDP Specialized Standard 2012031
The NCPDP Specialized Standard will house transactions that are not eprescribing but are part of the NCPDP XML environment. The standard provides general guidelines for developers of systems who wish to provide business functionality of these transactions to their clients. The guide describes a set of transactions and the implementation of these transactions.

ANSI/NCPDP Specialized Standard 2013011
-2013, NCPDP Specialized Standard 2013011
The NCPDP Specialized Standard will house transactions that are not eprescribing but are part of the NCPDP XML environment. The standard provides general guidelines for developers of systems who wish to provide business functionality of these transactions to their clients. The guide describes a set of transactions and the implementation of these transactions.

ANSI/NCPDP Specialized Standard 20130401
-2013, NCPDP Specialized Standard 20130401
The NCPDP Specialized Standard will house transactions that are not eprescribing but are part of the NCPDP XML environment. The standard provides general guidelines for developers of systems who wish to provide business functionality of these transactions to their clients. The guide describes a set of transactions and the implementation of these transactions.

ANSI/NCPDP Specialized Standard 2013071
-2013, NCPDP Specialized Standard 2013071
The NCPDP Specialized Standard will house transactions that are not eprescribing but are part of the NCPDP XML environment. The standard provides general guidelines for developers of systems who wish to provide business functionality of these transactions to their clients. The guide describes a set of transactions and the implementation of these transactions.

ANSI/NCPDP Specialized Standard 2013101
-2013, NCPDP Specialized Standard 2013101
The NCPDP Specialized Standard will house transactions that are not eprescribing but are part of the NCPDP XML environment. The standard provides general guidelines for developers of systems who wish to provide business functionality of these transactions to their clients. The guide describes a set of transactions and the implementation of these transactions.

ANSI/NCPDP Specialized Standard 2014072
-2014, NCPDP Specialized Standard 2014072
The NCPDP Specialized Standard will house transactions that are not eprescribing but are part of the NCPDP XML environment. The standard provides general guidelines for developers of systems who wish to provide business functionality of these transactions to their clients. The guide describes a set of transactions and the implementation of these transactions.

ANSI/NCPDP Specialized Standard 2014101
-2014, NCPDP Specialized Standard 2014101
The NCPDP Specialized Standard will house transactions that are not e-prescribing but are part of the NCPDP XML environment. The standard provides general guidelines for developers of systems who wish to provide business functionality of these transactions to their clients. The guide describes a set of transactions and the implementation of these transactions.

ANSI/NCPDP Specialized Standard 2015041
-2015, NCPDP Specialized Standard 2015041
The NCPDP Specialized Standard will house transactions that are not eprescribing but are part of the NCPDP XML environment. The standard provides general guidelines for developers of systems who wish to provide business functionality of these transactions to their clients. The guide describes a set of transactions and the implementation of these transactions.
ANSI/NCPDP Specialized Standard 2015071 -2015, NCPDP Specialized Standard 2015071
The NCPDP Specialized Standard will house transactions that are not e-prescribing but are part of the NCPDP XML environment. The standard provides general guidelines for developers of systems who wish to provide business functionality of these transactions to their clients. The guide describes a set of transactions and the implementation of these transactions.

ANSI/NCPDP Specialized Standard 2016041 -2016, NCPDP Specialized Standard 2016041
The NCPDP Specialized Standard will house transactions that are not e-prescribing but are part of the NCPDP XML environment. The standard provides general guidelines for developers of systems who wish to provide business functionality of these transactions to their clients. The guide describes a set of transactions and the implementation of these transactions.

ANSI/NCPDP Specialized Standard 2017011 -2017, NCPDP Specialized Standard 2017011
The NCPDP Specialized Standard will house transactions that are not e-prescribing but are part of the NCPDP XML environment. The standard provides general guidelines for developers of systems who wish to provide business functionality of these transactions to their clients. The guide describes a set of transactions and the implementation of these transactions.

ANSI/NCPDP TC VC.4-2007, Telecommunication Standard Version C.4
The standard supports the format for electronic communication of pharmacy service-related billing, prior authorization processing, and information reporting between pharmacies and other responsible parties. This standard addresses the data format and content and other appropriate telecommunication requirements.

ANSI/NCPDP TC VD.0-2007, Telecommunication Standard Version D.0
The standard supports the format for electronic communication of pharmacy service-related billing, prior authorization processing, and information reporting between pharmacies and other responsible parties. This standard addresses the data format and content and other appropriate telecommunication requirements.

ANSI/NCPDP TC VD.1-2009, Telecommunication Standard Version D.1
The standard supports the format for electronic communication of pharmacy service-related billing, prior authorization processing, and information reporting between pharmacies and other responsible parties. This standard addresses the data format and content, the transmission protocol and other appropriate telecommunication requirements.

ANSI/NCPDP TC VD.2-2009, Telecommunication Standard Version D.2
The standard supports the format for electronic communication of pharmacy service-related billing, prior authorization processing, and information reporting between pharmacies and other responsible parties. This standard addresses the data format and content, the transmission protocol and other appropriate telecommunication requirements.

ANSI/NCPDP TC VD.3-2010, Telecommunication Standard Version D.3
The standard supports the format for electronic communication of pharmacy service-related billing, prior authorization processing, and information reporting between pharmacies and other responsible parties. This standard addresses the data format and content, the transmission protocol and other appropriate telecommunication requirements.

ANSI/NCPDP TC VD.4-2010, NCPDP Telecommunication Standard Version D.4
The standard supports the format for electronic communication of pharmacy service-related billing, prior authorization processing, and information reporting between pharmacies and other responsible parties. This standard addresses the data format and content, the transmission protocol and other appropriate telecommunication requirements.

ANSI/NCPDP TC VD.5-2010, NCPDP Telecommunication Standard vD.5
The standard supports the format for electronic communication of pharmacy service-related billing, prior authorization processing, and information reporting between pharmacies and other responsible parties. This standard addresses the data format and content, the transmission protocol and other appropriate telecommunication requirements.

ANSI/NCPDP TC VD.6-2011, NCPDP Telecommunication Standard vD.6
The standard supports the format for electronic communication of pharmacy service-related billing, prior authorization processing, and information reporting between pharmacies and other responsible parties. This standard addresses the data format and content, the transmission protocol and other appropriate telecommunication requirements.

ANSI/NCPDP TC VD.7-2011, NCPDP Telecommunication Standard vD.7
Supports the format for electronic communication of pharmacy service-related billing, prior authorization processing, and information reporting between pharmacies and other responsible parties. This standard addresses the data format and content, the transmission protocol and other appropriate telecommunication requirements.

ANSI/NCPDP TC VD.8-2011, NCPDP Telecommunication Standard vD.8
The standard supports the format for electronic communication of pharmacy service-related billing, prior authorization processing, and information reporting between pharmacies and other responsible parties. This standard addresses the data format and content, the transmission protocol and other appropriate telecommunication requirements.

ANSI/NCPDP TC vD.9-2012, NCPDP Telecommunication Standard Implementation Guide D.9 201x
The standard supports the format for electronic communication of pharmacy service-related billing, prior authorization processing, and information reporting between pharmacies and other responsible parties. This standard addresses the data format and content, the transmission protocol and other appropriate telecommunication requirements.

ANSI/NCPDP TC vE.0-2013, NCPDP Telecommunication Standard vE.0-201x
The standard supports the format for electronic communication of pharmacy service-related billing, prior authorization processing, and information reporting between pharmacies and other responsible parties. This standard addresses the data format and content, the transmission protocol and other appropriate telecommunication requirements.

ANSI/NCPDP TC vE.1-2013, NCPDP Telecommunication Standard vE.1-201x
The standard supports the format for electronic communication of pharmacy service-related billing, prior authorization processing, and information reporting between pharmacies and other responsible parties. This standard addresses the data format and content, the transmission protocol and other appropriate telecommunication requirements.

ANSI/NCPDP TC vE.2-2013, NCPDP Telecommunication Standard vE.2-2013
The standard supports the format for electronic communication of pharmacy service-related billing, prior authorization processing, and information reporting between pharmacies and other responsible parties. This standard addresses the data format and content, the transmission protocol and other appropriate telecommunication requirements.

ANSI/NCPDP TC vE.3-2013, NCPDP Telecommunication Standard vE.3-2013
The standard supports the format for electronic communication of pharmacy service-related billing, prior authorization processing, and information reporting between pharmacies and other responsible parties. This standard addresses the data format and content, the transmission protocol and other appropriate telecommunication requirements.

ANSI/NCPDP TC vE.4-2014, NCPDP Telecommunication Standard vE.4-2014
The standard supports the format for electronic communication of pharmacy service-related billing, prior authorization processing, and information reporting between pharmacies and other responsible parties. This standard addresses the data format and content, the transmission protocol and other appropriate telecommunication requirements.
ANSI/NCPDP TC vE5-2014, NCPDP Telecommunication Standard vE5-201x
The standard supports the format for electronic communication of pharmacy service-related billing, prior authorization processing, and information reporting between pharmacies and other responsible parties. This standard addresses the data format and content, the transmission protocol and other appropriate telecommunication requirements.

ANSI/NCPDP TC vE6-2014, NCPDP Telecommunication Standard vE6
The standard supports the format for electronic communication of pharmacy service-related billing, prior authorization processing, and information reporting between pharmacies and other responsible parties. This standard addresses the data format and content, the transmission protocol and other appropriate telecommunication requirements.

ANSI/NCPDP TC vE7-2015, NCPDP Telecommunication Standard vE7
The standard supports the format for electronic communication of pharmacy service-related billing, prior authorization processing, and information reporting between pharmacies and other responsible parties. This standard addresses the data format and content, the transmission protocol and other appropriate telecommunication requirements.

ANSI/NCPDP TC vE8-2016, NCPDP Telecommunication Standard vE8
The standard supports the format for electronic communication of pharmacy service-related billing, prior authorization processing, and information reporting between pharmacies and other responsible parties. This standard addresses the data format and content, the transmission protocol and other appropriate telecommunication requirements.

ANSI/NCPDP vEB-2017, NCPDP Telecommunication Standard vEB
The standard supports the format for electronic communication of pharmacy service-related billing, prior authorization processing, and information reporting between pharmacies and other responsible parties. This standard addresses the data format and content, the transmission protocol and other appropriate telecommunication requirements.

This implementation guide is to support the development of a common format for pharmacy claim data, which is used to meet the needs of the pharmacy industry to support the reporting requirements of claim data to states or their designees. The implementation of this standard will provide administrative efficiencies and allow for an industry standard to be used for all entities sharing historical health care data.

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ANSI/NCSBN 001-2015, Criminal Background Checks for Licensure as a Nurse
The National Council of State Boards of Nursing proposes this standard which would require a biometrics-based state and federal criminal background check for all applicants consistent with Public Law 92-544. It is the purpose of this Standard to assist each state to pass legislation consistent with Public Law 92-544 to require state and federal fingerprint-based criminal background checks. The Standard is written to allow the use of new biometric technologies as they emerge. The Standard applies specifically to applications for licensure by examination, endorsement, reactivation, reinstatement and renewal.

ANSI/NCSBN-002-2016, Reporting of Disciplinary Actions by Boards of Nursing
This 30 day review period is restricted to enhancements made to standard NCSBN - 002. The changes revolve around providing a more flexible and consistent period of time for boards of nursing to report disciplinary action. The change from 10 working days to no later than 15 calendar days received a much wider acceptance from the boards, recognizing that different states have different calendars that they manage by.

ANSI/NCSBN-003-2016, Primary Source Verification of Licensure by Endorsement
This 30 day review period is restricted to enhancements made to standard NCSBN - 003. A definition for Secure Electronic Transmission was added to clarify action taken and intent.

NCSLI (ASC Z540) (National Conference of Standards Laboratories)
ANSI NCSLI Z540.3-2006 (R2013), Requirements for the Calibration of Measuring and Test Equipment
This National Standard will establish the technical requirements for the calibration of measuring and test equipment through the use of a system of functional components. Collectively, these components are used to manage and assure that the accuracy and reliability of the measuring and test equipment are in accordance with identified performance requirements. In addition, this National Standard includes and updates the relevant calibration system requirements for measuring and test equipment described by the previous standards such as Part II of ANSI/NCSL Z540.1 (R2002) and Military Standard 49662A.


NEBB (National Environmental Balancing Bureau)
ANSI/NEBB 5120-2016, Technical Retro-Commissioning of Existing Buildings Standard
This standard describes the technical retro-commissioning procedures utilized for existing building technical systems for the improvement and optimization of Indoor Environmental Quality and Comfort and Energy and Water utility usage reduction. It defines the technical work procedures, testing and system adjustments that are required to improve system performance by optimizing existing systems. This standard may be utilized in tandem with existing energy audit standards as a technical performance standard.

NECA (National Electrical Contractors Association)
ANSI/NECA 1-2006 (R2015), Standard for Good Workmanship in Electrical Construction
This standard describes what is meant by installing equipment in a ‘neat and workmanlike manner’ in accordance with A chapter 20221, as required by the National Electrical Code, Section 110.12.
ANSI/NECA 100-2006 (R2013), Symbols for Electrical Construction Drawings

This publication describes graphic symbols used to represent electrical wiring and equipment on construction drawings. In this publication, the term "electrical" is used to include electrical, electronic, and communications systems covered by the National Electrical Code (NFPA 70). This publication also summarizes recommended drawing practices for electrical construction drawings.

ANSI/NECA 101-2006 (R2013), Standard for Installing Steel Conduits (Rigid, IMC, EMT)

This standard describes installation procedures for steel metal conduit (RMC), steel intermediate metal conduit (IMC), and steel electrical metallic tubing (EMT). Conduit with supplementary PVC coating is also included. This publication is intended to enhance electrical safety by: 1. Aiding installer in meeting the "neat and workmanlike" requirements 2. Reducing future repair needs 3. Providing for future expansion to avoid electrical overload 4. Creating an installation which will protect the wire conductors from mechanical abuse 5. Providing electrical continuity of the raceway system

ANSI/NECA 104-2012, Standard for Installing Aluminum Building Wire and Cable

Describes installation procedures and design considerations for aluminum building wire and cable in residential, commercial, institutional and industrial applications not exceeding 600 volts.

ANSI/NECA 120-2012, Standard for Installing Armored Cable (Type AC) and Metal-Clad Cable (Type MC)

This standard covers the installation of Type AC cable and Type MC cables, which are used for electrical wiring for residential, commercial and industrial occupancies. It also includes information on fittings and other accessories necessary for a quality installation of these cable systems.

ANSI/NECA 130-2016, Standard for Installing and Maintaining Wiring Devices

This standard describes the installation and maintenance procedures for wiring devices. Consumer Product

ANSI/NECA 169-2016, Standard for Installing and Maintaining Arc-Fault Circuit Interrupters (AFCIs) and Ground-Fault Circuit Interrupters (GFCIs)

This standard describes the installation and maintenance procedures for arc-fault circuit interrupters (AFCIs) and ground-fault circuit interrupters (GFCIs).

ANSI/NECA 200-2016, Standard for Installing and Maintaining Temporary Electric Power at Construction Sites

This standard describes temporary electrical power and lighting systems at construction sites, operating at 600 volts or less. It covers the planning, installation, expansion, maintenance, cutover, and removal of the temporary power system. This standard is intended to ensure a safe, adequate, functional, and reliable temporary electrical power system for all trades at construction sites

ANSI/NECA 202-2013, Installing and Maintaining Industrial Heat Tracing Systems

This standard describes procedures for installation, testing, and documentation of electrical freeze protection and process heat tracing systems. Heat tracing cable types covered by this publication include: self-regulating heating cables, and mineral insulated (MI) heating cables.

ANSI/NECA 230-2016, Standard for Selecting, Installing, and Maintaining of Electric Motors and Motor Controllers

This standard describes recommended procedures for selecting and installing stationary electric motors and motor controllers rated 1000 volts or less. It also covers routine maintenance procedures to be followed after the installation is complete.

ANSI/NECA 305-2010, Standard for Fire Alarm System Job Practices

This standard describes practices for installing, testing, and maintaining fire alarm systems. These job practices represent a minimum level of quality for fire alarm system installations.

ANSI/NECA 402-2014, Standard for Installing and Maintaining Motor Control Centers

This standard describes the installation and maintenance procedures for low-voltage motor control centers (MCCs) rated 600 VAC or less with a horizontal bus rating of 2,500 amperes or less. MCCs may be assembled with factory-installed dry-type transformers and panelboards. The testing and maintenance of such dry-type transformers is addressed in NEC 409, Standard for Installing and Maintaining Dry-Type Transformers (ANSI). The testing and maintenance of such panelboards is addressed in NECA 407, Standard for Installing and Maintaining Panelboards (ANSI).

ANSI/NECA 404-2014, Standard for Installing Generator Sets

This standard describes installation procedures for generators and related accessories and systems that are permanently installed for on-site standby or emergency power generation that are typically fueled by natural gas or diesel. Such generators may be defined as 'emergency systems' or 'legally-required standby systems' intended to supply power for emergency or life-safety applications in accordance with NFPA 70, National Electrical Code.

ANSI/NECA 407-2015, Standard for Installing and Maintaining Panelboards

This standard describes installation and maintenance procedures for panelboards, and special procedures used after adverse operating conditions such as a short-circuit, ground-fault, or immersion in water. This standard applies to panelboards rated 600 Volts AC or less, with main disconnects or lugs rated 1600 Amperes or less, and with feeder or branch circuit overcurrent devices rated 1200 Amperes or less. This publication applies to single panelboards, multi-section panelboards, and load centers that are installed in the field and used for distributing power for commercial, institutional, and industrial loads in nonhazardous locations both indoors and outdoors.

ANSI/NECA 408-2015, Standard for Installing and Maintaining Busways

This standard describes the installation and maintenance procedures for feeder and plug-in busways and accessories rated 600 Volts AC or less, and 100 Amperes or more, installed above ground. It also covers periodic routine maintenance procedures for busway, and special procedures used after adverse operating conditions such as a short-circuit, ground-fault, or immersion in water.

ANSI/NECA 409-2015, Standard for Installing and Maintaining Dry-Type Transformers

This standard describes the installation and maintenance procedures for single- and three-phase general purpose dry-type distribution and power transformers and associated accessories rated 600 Volts AC or less, and 0.25 kVA or more. This publication applies to indoor and outdoor, ventilated and non-ventilated, two-winding transformers used for supplying power, heating, and lighting loads for commercial, institutional, and industrial use in nonhazardous locations.

ANSI/NECA 410-2013, Standard for Installing and Maintaining Liquid-Filled Transformers

This standard describes installation procedures for pad-mounted, sealed, self-cooled or fan-cooled, compartmental, single- and three-phase liquid filled distribution and power transformers with primary windings rated from 2400 volts to 35 kV AC, nominal, and rated from 75 kVA through 5000 kVA, and associated accessories, designed for outdoor installation at grade level with underground entrance of primary and secondary conductors, and used for supplying power, heating and lighting loads for commercial, institutional, and industrial use in nonhazardous locations. It also covers periodic routine maintenance procedures for transformers.

ANSI/NECA 411-2014, Standard for Installing and Maintaining Uninterruptible Power Supplies (UPS)

This standard describes installation and maintenance procedures for permanently installed, static, three-phase Uninterruptible Power Supplies (UPSs) rated 30 kVA or more and rated 600 Volts or less, and related battery systems installed indoors or outdoors for commercial and industrial applications. UPSs described herein are solid-state power systems that provide continuous regulated AC power at the output terminals, while operating from either an AC power source or from a battery system.

ANSI/NECA 412-2012, Standard for Installing and Maintaining Photovoltaic Power Systems

Describes the application procedures for installing photovoltaic power systems and components.

ANSI/NECA 413-2012, Standard for Installing and Maintaining Electric Vehicle Supply Equipment (EVSE)

This standard describes the procedures for installing and maintaining AC Level 1, AC Level 2 and fast charging DC (initially known in the industry as AC Level 3 and currently known in the industry as DC Level 2) Electric Vehicle Supply Equipment (EVSE).
ANSI/NECA 416-2016, Recommended Practice for Installing Stored Energy Systems
This standard describes installation practices for stored energy systems such as battery systems, flywheels, capacitors, and smart chargers used for vehicle-to-grid (V2G) applications.

ANSI/NECA 420-2014, Standard for Fuse Applications
This standard describes application and installation practices and procedures for low-voltage, medium-voltage, and high-voltage fuses. This publication applies to all classifications of fuses used for overcurrent protection of distribution, utilization, and control equipment used for power, heating, and lighting loads for commercial, and industrial use in nonhazardous indoor and outdoor locations.

ANSI/NECA 430-2016, Standard for Installing and Maintaining Medium-Voltage Switchgear
This standard describes site preparation, installation, and maintenance procedures for medium-voltage switchgear. This standard is not intended to cover manufacturing or types of switchgear. These switchgears may be classified as either metal-clad switchgear or metal-enclosed switchgear.

ANSI/NECA 505-2010, Standard for Installing and Maintaining High Mast, Roadway and Area Lighting
This Standard describes the installation and maintenance procedures for high mast, roadway, area, and sport lighting systems installed outdoors for commercial, institutional, and industrial applications. This Standard applies to high intensity discharge lighting luminaires rated 600 Volts and less and mounted on poles. This Standard does not apply to specialized applications or installations with special environmental or regulatory conditions.

ANSI/NECA 600-2014, Standard for Installing and Maintaining Medium-Voltage Cable
This standard describes installation procedures for shielded and non-shielded solid-dielectric medium-voltage cables rated from 2001 Volts to 35,000 Volts AC and installed in conduits or ducts, or direct-buried. This publication applies to single-and multi-conductor cables used for distributing power for commercial, institutional, and industrial locations both indoors and outdoors.

ANSI/NECA 700-2016, Standard for Installing Overcurrent Protection to Achieve Selective Coordination
This standard describes the application procedures for selecting and adjusting low-voltage overcurrent protective devices to achieve selective coordination.

ANSI/NECA 701-2013, Standard for Energy Management, Demand Response and Energy Solutions
This standard describes methods and procedures used for performing energy conservation surveys, controlling and managing energy consumption, implementing and evaluating energy conservation measures for residential, commercial and industrial applications.

ANSI/NECA 90-2015, Standard for Commissioning Building Electrical Systems
This standard describes installation procedures for commissioning newly installed or retrofitted building electrical systems and equipment. It defines the process of commissioning building electrical systems and provides sample guidelines for attaining optimum system performances that conform to design, specification, and industry accepted codes and standards. This standard is not intended to cover commissioning processes for every type of electrical system and references other specific NEIS documents where such information is provided.

ANSI/NECA/BICSI 607-2010, Telecommunications - Bonding and Grounding - Planning and Installation Methods for Commercial Buildings
This (proposed) American National Standard specifies aspects of planning and installation of telecommunications bonding and grounding systems within a commercial building (see Figure 1). This standard is intended to enhance the planning, specification and layout of an effective telecommunications bonding and grounding system. Additionally, this standard specifies installation requirements for components of the telecommunications bonding and grounding system.

ANSI/NECA/FOA 301-2016, Standard for Installing and Testing Fiber Optic Cables
This standard describes procedures for installing and testing cabling networks that use fiber optic cables and related components to carry signals for communications, security, control and similar purposes. It defines a minimum level of quality for fiber optic cable installations.

ANSI/NECA/NEMA 105-2015, Standard for Installing Metal Cable Tray Systems
NEMA VE 2 addresses shipping, handling, storing, and installing cable tray systems and provides information on maintenance and system modification.

NEMA (ASC C119) (National Electrical Manufacturers Association)

ANSI C119.0-2015, Testing Methods and Equipment Common to the ANSI C119 Family of Standards - For Electric Connectors
This standard covers methods and equipment for performing the connector qualification tests common to the ANSI C119 family of standards. Tests that are unique to only one ANSI C119 product standard are not covered in this document and are described in the applicable product standard.

ANSI C119.1-2016, Electric Connectors - Sealed Insulated Underground Connector Systems Rated 600 V
Covers sealed insulated underground connector systems rated at 600 V for utility applications and establishes electrical, mechanical and sealing requirements.

ANSI C119.4-2016, Connectors for Use between Aluminum-to-Aluminum and Aluminum-to-Copper Conductors Designed for Normal Operation at or Below 93°C and Copper-to-Copper Conductors Designed for Normal Operation at or Below 100°C
This standard covers connectors used for making electrical connections between aluminum-to-aluminum or aluminum-to-copper or copper-to-copper conductors used on distribution and transmission lines for electric utilities. This standard establishes the electrical and mechanical test requirements for electrical connectors. Additional optional tests are shown in the annexes. This standard is not intended to recommend operating conditions or temperatures.

ANSI C119.5-2009, Insulation Piercing Connector Systems, rated 600 volts or less (low voltage aerial bundled cables and insulated and non-insulated line wires)
This standard covers insulation piercing connectors used for making electrical connections between insulated, insulated-to-bare, and bare-to-bare conductors rated 600 V or less and 90°C (low voltage aerial bundled cables and bare and insulated line wires) on overhead distribution lines for electric utilities. Underground insulation piercing connector systems rated at 600 V are covered by ANSI C119.1. Since cable and insulation types exist in very different types and configurations, insulation piercing connectors can not be designed for the full range of cable and insulation possibilities (cable cross-section and material, insulation material and thickness). The manufacturer is to indicate the cable and insulation types the connector is designed for, and conformity to this standard shall be established by testing with these cable and insulation types. This standard establishes the electrical, mechanical and environmental test requirements for electrical insulation piercing connectors. This standard is not intended to recommend operating conditions or temperatures.

ANSI C119.6-2011, Standard for Electric Connectors - Non-Sealed, Multipoor Connector Systems Rated 600 V or Less for Aluminum and Copper Conductors
Covers non-sealed, multipoint distribution connectors rated 600 V or less used to make electrical connections between aluminum-to-aluminum, aluminum-to-copper or copper-to-copper conductors for above-grade electric utility applications.

NEMA CC 1-2009, Electric Power Connection for Substations
This standard covers uninsulated connectors and bus supports that are made of metal and intended for use with conductors or bus made of copper or aluminum alloy and found in substations. Connectors that are supplied in equipment are covered by the equipment standards and are excluded from this standard.
NEMA (ASC C12) (National Electrical Manufacturers Association)

ANSI C12.1-2016, Code for Electricity Metering
Establishes acceptable performance criteria for new types of ac watthour meters, demand meters, demand registers, pulse devices and auxiliary devices. Describes acceptable in-service performance levels for meters and devices used in revenue metering.

ANSI C12.10-2011, Physical Aspects of Watthour Meters - Safety Standard
Covers the physical aspects of both detachable and bottom-connected watthour meters and associated registers. These include ratings, internal wiring arrangements, pertinent dimensions, markings and other general specifications. Refer to the latest versions of ANSI C12.1 and ANSI C12.20 for performance requirements.

ANSI C12.11-2006 (R2014), Standard for Instrument Transformers for Revenue Metering 10kV Bil through 350 kV Bil (0.6 kV NSV through 69 kV NSV)
This Standard covers the general requirements, metering accuracy, thermal ratings, and dimensions applicable to current transformers and inductively coupled voltage transformers for revenue metering. 10 kV basic lightning impulse insulation level (BIL) through 350 kV Bil for 0.6 kV nominal system voltage (NSV) through 69 kV NSV.

ANSI C12.18-2006 (R2015), Protocol Specification for ANSI Type 2 Optical Port
This Standard details the criteria required for communications between a C12.18 Device and a C12.18 Client via an optical port. The C12.18 Client may be a handheld reader, a portable computer, a master station system or some other electronic communications device. This Standard provides details for a complete implementation of an OSI 7-layer model. The protocol specified in this document was designed to transport data in Table format. The Table definitions are in ANSI C12.19 Utility Industry End Device Data Tables.

ANSI C12.19-2014, Standard for Utility Industry End Device Data Tables
Defines a table structure for utility application data to be passed between an end device and a computer. Does not define device design criteria nor specify the language or protocol used to transport that data. The purpose of the tables is to define structures for transporting data to and from end devices.

ANSI C12.20-2017, Standard for Electricity Meters - 0.1, 0.2 and 0.5 Accuracy Classes
This standard establishes the physical aspects and acceptable performance criteria for 0.1, 0.2, and 0.5 accuracy class electricity meters meeting Blondel's Theorem. Where differences exist between the requirements of this Standard and the most current version of C12.2 and C12.10, the requirements of this Standard shall prevail.

ANSI C12.21-2006 (R2015), Protocol Specification for Telephone Modem Communications
This Standard details the criteria required for communications between a C12.21 Device and a C12.21 Client via a modem connected to the switched telephone network. The C12.21 Client could be a laptop or portable computer, a master station system or some other electronic communications device. This Standard does not specify the implementation requirements of the telephone switched network to the modem, nor does it include definitions for the establishment of the communication channel. This document provides details for an implementation of the OSI 7-layer model. The protocol specified in this Standard was designed to transport data in Table format.

ANSI C12.22-2012, Protocol Specification for Interfacing to Data Communication Networks
Describes the process of transporting C12.19 table data over a variety of networks, with the intention of advancing interoperability among communications modules and meters.

ANSI C12.4-1984 (R2011), Registers, Mechanical Demand
Covers the voltage and frequency rating, full-scale values, scale classes, demand intervals, multiplying constants, timing mechanism and other general features of mechanical demand registers required for use on watthour meters.

ANSI C12.5-1978 (R2011), Meters, Thermal Demand
Establishes the physical aspects and acceptable performance criteria for 0.2 and 0.5 accuracy class electricity meters meeting Blondel's Theorem.

ANSI C12.6-1987 (R2016), Phase-Shifting Devices Used In Metering, Marking and Arrangement of Terminals
This specification applies to phase-shifting devices designed to provide the proper lagged voltages required for kvar and kVA measurement.

ANSI C12.7-2005 (R2014), Requirements for Watthour Meter Sockets
This standard covers the general requirements and pertinent dimensions applicable to watthour meter sockets rated up to and including 600 V and up to and including 320 A continuous duty per socket opening.

ANSI C12.8-1981 (R2011), Test Blocks and Cabinets for Installation of Self-Contained A-Base Watthour Meters
Covers the dimensions and functions of test blocks and cabinets used in self-contained A-base watthour meters.

ANSI C12.9-2014, Standard For Test Switches for Transformer-Rated Meters
Encompasses the dimensions and functions of meter test switches used with transformer-rated watthour meters in conjunction with instrument transformers.

NEMA (ASC C136) (National Electrical Manufacturers Association)

This is a guide for the proper selection of filament lamps for use in roadway and area lighting equipment covered by the following American National Standards: ANSI C136.4, ANSI C136.5, ANSI C136.6, and ANSI C136.11.

ANSI C136.10-2010, Locking-type Photocontrol Devices and Mating Receptacles - Physical and Electrical Interchangeability and Testing
This standard covers the following roadway and area lighting equipment, which may be physically and electrically interchanged to operate within established values: a) Locking-type photocontrol, herein referred to as 'photocontrol.' b) Locking-type mating receptacle, herein referred to as 'receptacle.' c) Shorting and non-shorting caps.

ANSI C136.11-2011 (R2016), Standard for Roadway and Area Lighting Equipment - Multiple Sockets
This standard covers medium and mogul multiple sockets as used in luminaires designed and intended for use in lighting roadways and other areas open to general use by the public.

This standard covers the selection of mercury vapor lamps recommended for use in roadway and area lighting equipment.

ANSI C136.13-2014, Roadway and Area Lighting Equipment - Metal Brackets for Wood Poles
This standard covers metal pipe, tubing, and structural brackets for wood poles designed to support luminaires of generally spherical, ellipsoidal, or rectangular shapes used in roadway and area lighting.

ANSI C136.14-2014, Roadway and Area Lighting Equipment - Elliptically Shaped, Enclosed Side-mounted Luminaires for Horizontal-burning High-intensity Discharge Lamps
This standard covers dimensional, maintenance and light distribution features that permit the interchange of enclosed side-mounted luminaires for horizontal-burning high-intensity discharge lamps used in roadway and area lighting equipment. Luminaires of similar size, shape, and weight meeting the requirements of this standard may be used interchangeably within a system with assurance that they will fit the bracket arm, pole strength requirements will not change, light distribution will be similar and similar maintenance procedures can be used.

ANSI C136.15-2015, For Roadway and Area Lighting Equipment - Luminaire Field Identification
The intent of this standard is to provide a simple, uniform method for identifying the type and wattage rating of a luminaire used for roadway and area lighting.
ANSI C136.16-2014, Standard for Roadway and Area Lighting: Enclosed, Post Top-Mounted Luminaires
This standard covers dimensional, maintenance, and light distribution features that permit the interchange of enclosed, post top-mounted high intensity discharge (HID), solid state (SSL) source (also referred to as LED (Light Emitting Diode), and magnetic induction luminaires whose center of mass is approximately over the mounting tenon. Luminaires of similar size, shape, and weight meeting the requirements of this standard may be used interchangeably within a system with assurance that: dECE They will fit the mounting tenon dECE Pole strength requirements will not change dECE Light distribution will be similar dECE Similar maintenance procedures can be used

This standard covers the dimensional features and the materials of refractors of the approximate shape shown in Figures 1 through 3, and as described in ANSI C136.14, American National Standard for Roadway and Area Lighting Equipment—Enclosed Side-mounted Luminaires for Horizontal-burning High-intensity Discharge Lamps.

ANSI C136.18-2006 (R2010), High-mast Side-mounted Luminaires for Horizontal- or Vertical-burning High-intensity Discharge Lamps
This standard is intended to cover physical, operational, maintenance, and light-distribution features that permit use of high-mast luminaires in roadway applications when specified. It is not intended that compliance with this standard will permit interchangeability with existing roadway equipment without thorough engineering review and evaluation.

ANSI C136.19-2017, High-Pressure Sodium and Retrofit High-Pressure Sodium Lamps for Mercury Ballasts - Guide for Selection
This standard covers the selection of high-pressure sodium lamps recommended for use in roadway and area lighting equipment.

ANSI C136.2-2015, Standard for Roadway and Area Lighting Equipment - Dielectric Withstand and Electrical Transient Immunity Requirements
This standard covers luminaires and control devices classified for 600 volt operation and intended for use in roadway and area lighting applications. This standard contains minimum performance requirements and test procedures for evaluating luminaire and control devices under test (DUTs) for the following: a) Dielectric withstand b) Electrical transient immunity

ANSI C136.20-2012 , Roadway and Area Lighting Equipment - Fiber Reinforced Composite (FRC) Lighting Poles
This standard applies to fiber-reinforced composite (FRC) lighting poles used for roadway and area lighting. This standard includes nomenclature, dimensional data, performance criteria, and some interchangeability features for standard poles as well as those that must meet breakaway requirements for poles as described in Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, AASHTO LTS.

ANSI C136.21-2014, Standard for Roadway and Area Lighting Equipment - Vertical Tenons
Used with Post Top-mounted Luminaires
This standard covers the attachment features of vertical tenons on pole tops or brackets used in roadway and area lighting that permit the interchangeability of post-top-mounted luminaires.

ANSI C136.22-2004 (R2014), For Roadway and Area Lighting Equipment - Internal Labeling of Luminaires
This standard covers internal luminaire identification labels for all styles of luminaires used for roadway lighting.

This standard is intended to cover physical, operating, maintenance, and light distribution features that permit use of architectural luminaires in roadway applications when so specified. The architectural luminaires covered by this standard include side-mounted, square, rectangular, cylindrical, spherical, and other types of decorative or nostalgic historical style luminaires that are considered to be any significant deviation from the luminaire style that has evolved in the industry as predominantly (commonly) known as the "cobra head" style covered in ANSI C136.14.

ANSI C136.24-2005 (R2010), Nonlocking (Button) Type Photocontrols
Covers the electrical and mechanical interchangeability of nonlocking type photocontrols for mounting within a roadway or off-roadway luminaire, herein called "controls." These controls are commonly called "button" photocontrols. Members in the "general interest" and "user" categories are actively being sought by this committee.

ANSI C136.25-2013, Roadway and Area Lighting Equipment - Ingress Protection (Resistance to Dust, Solid Objects and Moisture) for Luminaire Enclosures
This standard details the requirements for ingress protection of luminaires in roadway and area lighting equipment, installed for their intended use and specified by end user. While these requirements are suitable for most types of lighting equipment, it should not be assumed that all the listed degrees of protection are applicable to a particular type of equipment. The manufacturer of the equipment should be consulted to determine the degree of protection available. The adoption of this standard should promote uniform methods of describing the protection provided by the lighting equipment (luminaire) enclosure.

This troubleshooting guide is intended to help the service person quickly diagnose an HID luminaire with magnetic ballast and also ensure that the problem is fixed on the first attempt. This guide addresses the four commonly encountered problems in two manners: 1) Summary of possible actions for those needing only a checklist; and 2) A detailed report on possible actions for those needing additional information. The commonly encountered problems are: 1. Lamp on continually 2. Lamp cycles on and off 3. Lamp will not start 4. Lamp burns dimly

ANSI C136.27-2012, Roadway and Area Lighting Equipment - Tunnel and Underpass Lighting Luminaires
This standard covers luminaires used for illuminating roadway tunnels and underpasses. The requirements in this standard are limited to general attributes of tunnel luminaires due to the wide variety of designs possible.

ANSI C136.28-2006 (S2017), Standard for Roadway and Area Lighting Equipment Glass Lenses Used in Luminaires
This standard covers flat and molded glass of soda-lime and borosilicate materials used as lenses for roadway and area lighting luminaires. This standard includes definitions, criteria, and test methods for mechanical and impact strength, thermal shock resistance, and temper for both materials.

ANSI C136.29-2011, Roadway and Area Lighting Equipment - Metal Halide Lamps - Guide for Selection
Includes screw-base single-ended metal halide lamps that can be used in roadway and area lighting equipment.

ANSI C136.3-2014, Standard for Roadway and Area Lighting - Luminaire Attachments
This standard covers attachment features of luminaires used in roadway and area lighting equipment. The features covered apply to luminaires that are side, post-top or pendant-mounted.
ANSI C136.30-2015, Standards for Roadway and Area Lighting Equipment - Pole Vibration
This guide covers the minimum vibration withstand requirements and testing procedures for poles used in roadway and area lighting. The guide is intended for poles of 50 ft mounting height and under.

ANSI C136.31-2010, ANS for Roadway and Area Lighting Equipment - Luminaire Vibration
This standard covers the minimum vibration withstand capability and vibration test methods for roadway and area luminaires.

ANSI C136.32-2012, Standard for Roadway and Area Lighting - Enclosed Setback Luminaires and Directional Floodlights
This standard covers dimensional, maintenance, and electrical features that permit the interchange of similar style enclosed luminaires having the same light distribution classification or type used in roadway or area lighting equipment. Luminaires covered by this standard are generally yoke, trunnion, or tenon mounted. They are traditionally called floodlights or setback luminaires.

ANSI C136.34-2014, Roadway and Area Lighting Equipment - Vandal Shields for Roadway and Area Lighting Luminaires
This standard covers supplementary vandal shields used to protect luminaires and luminaire accessories used for roadway and area lighting.

ANSI C136.35-2009 (R2014), Roadway and Area Lighting Equipment - Luminaire Electrical Ancillary Devices (LEAD)
This standard covers the electrical and mechanical interchangeability of electrical devices mounted on or in luminaires, brackets, or remotely mounted on the support structure of the luminaire and that may draw power from the luminaire. These devices are used in conjunction with roadway and area lighting luminaires and may be mounted or plugged into the photocell receptacle. This standard does not cover such things as flag banners, flower containers, or decorative holiday/seasonal lights.

ANSI C136.37-2011, Roadway and Area Lighting Equipment - Solid State Light Sources Used in Roadway and Area Lighting
This standard defines interchangeability of and some minimum requirements for solid state light (SSL) source fixtures, also referred to as luminaires, and also called LED (light-emitting diode) fixtures, used in roadway and off-roadway luminaires that meet various ANSI C136 standards. This Standard does not address replacement or interchangeability of lamps/light sources.

ANSI C136.38-2015, Roadway and Area Lighting Equipment - Induction Lighting
This standard defines the electrical and mechanical requirements of induction-type light sources for use in roadway and area lighting luminaires.

ANSI C136.4-2003 (R2013), Roadway and Area Lighting Equipment - Series Sockets and Series Socket Receptacles
This standard covers the following equipment for roadway and area luminaires: a) Series sockets having medium impact strength and intended for service at high temperatures. b) Series sockets having high impact strength and intended for service at limited temperatures. c) Series-socket receptacles (here-in-after called the receptacles) in the 5000 V classification.

ANSI C136.40-2014, Roadway and Area Lighting - Solar Lighting Systems
This standard defines the electrical and mechanical requirements of standalone solar-type light systems for use in roadway and area lighting equipment.

ANSI C136.41-2013, Roadway and Area Lighting Equipment - Dimming Control between an External Locking Type Photocontrol and Ballast or Driver
This standard describes methods of light level control between an external locking type photocontrol (or similar device) and a dimmable ballast or driver for street and area lighting equipment. Mechanical, electrical, and marking requirements are established for dimming, locking type photocontrols and mating receptacles. All requirements of ANSI C136.10-2010, for photocontrols and receptacles, shall apply except where specifically superseded by this standard.

ANSI C136.45-2011 (R2016), Standard for Roadway and Area Lighting Equipment - Aluminum Lighting Poles
This standard applies to aluminum lighting poles and includes nomenclature, dimensional data, performance criteria, and some interchangeability features for standard poles as well as those that must meet breakaway requirements for poles as described in AASHTO LTS Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals.

ANSI C136.46-2013, Roadway and Area Lighting Equipment - Concrete Lighting Poles
This standard applies to concrete lighting poles used in roadway and area lighting equipment and includes nomenclature, performance criteria, marking and recordkeeping requirements, and certain minimal material needs. It does not cover concrete poles manufactured with any modified concrete mix incorporating the use of polymers or other modifiers.

ANSI C136.47-2010 (R2015), Standard for Roadway and Area Lighting Equipment - Steel Roadway and Area Lighting Poles
This standard applies to steel lighting poles. This standard includes nomenclature, dimensional data, performance criteria, and some interchangeability features for standard poles as well as those that must meet breakaway requirements for poles as described in Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, AASHTO LTS.
NEMA (ASC C18) (National Electrical Manufacturers Association)
ANSI C18.1M, Part 1-2015, Standard for Portable Primary Cells and Batteries with Aqueous Electrolyte - General and Specifications
This standard applies to portable primary cells and batteries with aqueous electrolyte and a zinc anode (non-lithium). This edition includes the following electrochemical systems: a) Carbon zinc (Leclanche and zinc chloride types); b) Alkaline manganese dioxide; c) Silver oxide; d) Zinc air; and e) Nickel oxyhydroxide. The purpose of this publication is to: a) Ensure the electrical and physical interchangeability of products from different manufacturers; b) Minimize proliferation of cell and battery types; c) Define a standard of performance and provide guidance for its assessment; and d) Provide guidance to consumers, manufacturers, and designers.

This American National Standard specifies tests and requirements for portable primary batteries with aqueous electrolyte and a zinc anode (non-lithium) to ensure their safe operation under normal use and reasonably foreseeable misuse. For reference, the chemical systems standardized in ANSI C18.1M, Part 1 are: Lithium carbon monofluoride; Lithium manganese dioxide; Lithium iron disulfide.

ANSI C18.3M, Part 2-2011, Portable Lithium Primary Cells and Batteries - Safety Standard
This standard applies to portable lithium primary cells and batteries. This edition includes the following electrochemical systems: a) Lithium/carbon monofluoride; b) Lithium/manganese dioxide; and c) Lithium/iron disulfide.

ANSI C18.4-2015, Standard for Portable Cells and Batteries - Environmental
- Raise awareness that provisions in battery standards can affect the environment in negative and positive ways; 
- Outline the relationship between battery standards and the environment; 
- Help avoid provisions in battery standards that may lead to adverse environmental effects; 
- Emphasize that addressing environmental aspects in battery standards is a complex process which requires a balance in competing priorities; 
- Recommend the use of recognized scientific methodologies when developing battery standards that incorporate environmental aspects.

ANSI C18.2M, Part 1-2013, Portable Rechargeable Cells and Batteries - General and Specifications
This publication applies to portable rechargeable, or secondary, cells and batteries based on the following electrochemical systems: a) Nickel-cadmium b) Nickel-metal hydride c) Lithium-ion including lithium ion polymer Section 1 of this standard contains general information and all standardized performance and mechanical tests upon which all the specifications in Section 2 are based. Section 2 specification sheets list those tests and requirements described herein that are required for each battery.

ANSI C18.2M, Part 2-2014, Portable Rechargeable Cells and Batteries - Safety Standard
This American National Standard specifies performance requirements for standardized portable lithium-ion, nickel cadmium, and nickel metal hydride rechargeable cells and batteries to ensure their safe operation under normal use and reasonably foreseeable misuse, and includes information relevant to hazard avoidance.

ANSI C18.3M, Part 1-2013, Portable Lithium Primary Cells and Batteries - General and Specifications
This standard applies to portable lithium primary cells and batteries. This edition includes the following electrochemical systems: a) Lithium/carbon monofluoride; b) Lithium/manganese dioxide; and c) Lithium/iron disulfide.

ANSI C18.2M, Part 1-2013, Portable Rechargeable Cells and Batteries - General and Specifications
This American National Standard specifies performance requirements for standardized portable lithium-ion, nickel cadmium, and nickel metal hydride rechargeable cells and batteries to ensure their safe operation under normal use and reasonably foreseeable misuse, and includes information relevant to hazard avoidance.

This standard comprises a manual of test methods to be followed in making tests to determine the characteristics of wet-process porcelain electrical power insulators.

ANSI C29.10-1989 (R2012), Standard for Wet Process Porcelain Insulators - Indoor Apparatus Type
Covers high-voltage indoor-apparatus insulators made of wet-process porcelain and used in the transmission and distribution of electrical energy.

ANSI C29.11-2012, Composite Suspension Insulators for Overhead Transmission Lines - Test
Comprises a manual of test methods to be followed in making tests to determine the characteristics of composite electrical power insulators.

ANSI C29.12-2013, Standard for Composite Insulators - Transmission Suspension Type
This standard covers composite suspension (tension) insulators with a minimum section length of 46 inches (1168.4 mm) made of a fiberglass-reinforced resin matrix core, polymer material weathersheds, and metal end fittings intended for use on overhead transmission lines for electric power systems.

ANSI C29.13-2012, Standards for Insulators - Composite Distribution Deadend Type
This standard covers composite distribution deadend insulators made of a fiberglass-reinforced resin matrix core, polymer material weathersheds, and metal end fittings intended for use on overhead lines for electric power systems, 69 kV and below.

ANSI C29.17-2013, Standard for Insulators-Composite-Line Post Type
This standard describes the qualification test procedures for composite line post insulators that are made of a fiberglass-reinforced resin matrix core, elastomeric weathersheds and metal end fittings. These insulators are intended for use on overhead lines in electric power systems, 70kV and above.

ANSI C29.18-2013, Standard for Composite Insulators -Distribution Line Post Type
This standard covers composite distribution line post insulators made of a fiberglass-reinforced resin rod core, polymer material weathersheds, and metal end fittings designed for use on overhead lines for electric power systems, 69 kV and below.

ANSI C29.2A-2013, Standard for Insulators - Wet-Process and Toughened Glass - Distribution Suspension Type
This standard covers distribution suspension-type insulators, 4-1/4 inches (108 millimeters) to 8 inches (203 millimeters) in diameter, made of wet-process porcelain or of toughened glass and used in the distribution of electrical energy.

ANSI C29.28-2013, Standard for Insulators - Wet Process Porcelain and Toughened Glass - Transmission Suspension Type
This standard covers transmission suspension-type insulators, 9 inches (228.6 millimeters) in diameter and larger, made of wet-process porcelain or of toughened glass and used in the transmission of electrical energy.

ANSI C29.8-1985 (R2012), Standard for Wet Process Porcelain Insulators - Apparatus, Cap, and Pin Type Type
Covers high-voltage indoor-apparatus insulators made of wet-process porcelain and used in the transmission and distribution of electrical energy.

ANSI C29.9-1983 (R2012), Standard for Wet-Process Porcelain Insulators—Apparatus, Post Type
Covers outdoor high-voltage post-type apparatus insulators made of wet-process porcelain and used in the transmission and distribution of electrical energy.

NEMA C29.3-2015, Standard for Wet Process Porcelain Insulators - Spool Type
This standard covers spool-type insulators made of wet-process porcelain and used in the transmission and distribution of electric energy.

NEMA C29.4-2015, Standard for Wet Process Porcelain Insulators-Strain Type
This standard covers strain-type insulators made of wet-process porcelain and used in the transmission and distribution of electric energy.

NEMA C29.5-2015, Standard for Wet Process Porcelain Insulators- Low and Medium Voltage Types
This standard covers low- and medium-voltage-type insulators made of wet-process porcelain and used in the transmission and distribution of electric energy.
NEMA C29.6-2015, Standard for Wet Process Porcelain Insulators-High Voltage Pin Type
This standard covers high-voltage pin-type insulators made of wet-process porcelain and used in the transmission and distribution of electrical energy

NEMA C29.7-2015, Standard for Wet Process Porcelain Insulators- High-Voltage Line Post Type
This standard covers high-voltage line post - type insulators made of wet-process porcelain and used in the transmission and distribution of electrical energy

NEMA (ASC C37) (National Electrical Manufacturers Association)

ANSI C37.50-2012, Low Voltage AC Power Circuit Breakers Used in Enclosures - Test Procedures
Covers the test procedures for enclosed low-voltage ac power circuit breakers as follows: 1) Stationary or drawout circuit breakers of two or three-pole construction, with one or more rated maximum voltages of 635 (600 for units incorporating fuses), 508, and 254 V for application on systems having nominal voltages of 600, 480, and 250 V. a) Unfused circuitbreakers b) Fused circuit breakers 3) Manually operated or power-operated circuit breakers with or without electromechanical or solid-state trip devices.

ANSI C37.51-2003 (R2010), Metal-Enclosed Low-Voltage AC Power Circuit Breaker Switchgear Assemblies - Conformance Test Procedures
Conformance testing standard optionally applicable to all metal-enclosed low-voltage ac power circuit breaker switchgear assemblies designed, tested, and manufactured in accordance with ANSI/IEEE C37.20.1-2002, Metal-Enclosed Low-Voltage AC Power Circuit Breaker Switchgear. Tests demonstrate conformance of the basic switchgear section (including the structure, circuit breaker compartments, instrument compartments, buses, and internal connections) with Sec 6, Tests, of ANSI/IEEE C37.20.1-2002.

This amendment has been developed to coordinate selected conformance tests and procedures with ANSI/IEEE C37.20.1-2002 Metal Enclosed Low-Voltage AC Power Circuit Breaker Switchgear, and particularly, to recognize the amendment C37.20.1a-2005.

ANSI C37.54-2003 (R2010), Indoor Alternating Current High-Voltage Circuit Breakers Applied as Removable Elements in Metal-Enclosed Switchgear - Conformance Test Procedures
Specifies tests to demonstrate that the circuit breaker being tested conforms with the ratings assigned by ANSI/IEEE C37.04. Preferred ratings are listed in ANSI C37.06.

ANSI C37.55-2003 (R2010), Medium-Voltage Metal-Clad Assemblies - Conformance Test Procedures
This Standard is a conformance testing standard optionally applicable to all medium voltage metal-clad switchgear assemblies designed, tested, and manufactured in accordance with ANSI/IEEE C37.20.2, Metal-Clad Switchgear. This standard covers selected tests to demonstrate conformance with Section 6, Tests, of ANSI/IEEE C37.20.2.

ANSI C37.57-2003 (R2010), Metal-Enclosed Interrupter Switchgear Assemblies – Conformance Testing
This standard is a conformance testing standard optionally applicable to all metal-enclosed interrupter switchgear assemblies designed, tested, and manufactured in accordance with ANSI/IEEE C37.20.3.

This standard applies to the conformance test procedure for ac medium-voltage switches rated above 1000 volts as designed, manufactured, and tested in accordance with ANSI/IEEE C37.20.4. It is intended for use in metal-clad switchgear, as described in ANSI/IEEE C37.20.2, and metal-enclosed interrupter switchgear, as described in ANSI/IEEE C37.20.3.

ANSI C37.85-2002 (R2010), Alternating-Current High-Voltage Power Vacuum Interrupters – Safety Requirements for X-Radiation Limits
This standard specifies the maximum permissible X-radiation emission from alternating-current high-voltage power vacuum interrupters that are intended to be operated at voltages above 1000 volts and up to 38,000 volts when tested in accordance with procedures described in this standard.

NEMA (ASC C50) (National Electrical Manufacturers Association)

ANSI C50.41-2012, Polyphase Induction Motors for Power Generating Stations
The requirements in this standard apply to Polyphase induction motors intended for use in power generating stations, including the following: a)Frame size larger than NEMA 440 series b)Squirrel-cage type c)Single speed or multispeed d)Horizontal or vertical construction e)Form wound

NEMA MG-1-2011, Motors and Generators
Assists users in the proper selection and application of motors and generators. Practical information concerning performance, safety, test, construction and manufacture of ac and dc motors and generators.

NEMA (ASC C78) (National Electrical Manufacturers Association)

ANSI ANSI C78.43-2013, Single-Ended Metal Halide Lamps
This standard sets forth the physical and electrical requirements for single-ended metal halide lamps operated on 60 Hz ballasts to ensure interchangeability and safety. The data … provides the basis for the electrical requirements for ballasts and igniters, as well …lamp-related requirements for luminaires. Includes lamps whose arc tubes are made of quartz or ceramic materials. Luminous flux and lamp color are not part of this standard.

This International Standard specifies the safety requirements for double-capped fluorescent lamps for general lighting purposes of all groups having Fa6, Fa8, G5, G13, 2G13, R17q and W4.3 8.5d caps. It also specifies the method a manufacturer should use to show compliance with the requirements of this standard on the basis of whole production appraisal in association with his test records on finished products. This method can also be applied for certification purposes. Details of a batch test procedure which can be used to make limited assessment of batches are also given in this standard.

ANSI C78.1199-2016, ANSI for Electric Lamps - Single-capped fluorescent lamps - Safety Specifications
This International Standard specifies the safety requirements for single-capped fluorescent lamps for general lighting purposes of all groups having 2G7, 2GX7, GR8, 2G10, G10q, GR10q, GX10q, GY10q, 2G11, G23, GX23, G24, GX24 and GX32 caps. It also specifies the method a manufacturer should use to show compliance with the requirements of this standard on the basis of whole production appraisal in association with his test records on finished products. This method can also be applied for certification purposes. Details of a batch test procedure which can be used to make limited assessment of batches are also given in this standard.

ANSI C78.1401-2004 (R2016), Dimensions for Projection Lamps - Double-Contact, Medium Ring (Special B), Base-up Type
This standard establishes the dimensions essential to the interchangeability of lamps of the double-contact, medium ring (Special B), base-up type. It is not intended to prescribe either operating characteristics or details of design, such as the shape of the ventilation ports or the method of attachment of the prefocus ring to the base.

ANSI C78.1402-2004 (R2011), Dimensions for Projection Lamps - G17q and GX17q Based Four-pin, Prefocus, for Base-down Operation. Establishes the dimensions essential to the interchangeability of four-pin, prefocus projection lamps for base-down operation of T10 and T12 bulb sizes.
ANSI C78.1403-1997 (R2011), Tungsten Halogen Lamps with 6.35, GX6.35 and GY6.35 Bases
Covers tungsten halogen lamps with 6.35, GX6.35 and GY6.35 bases.

ANSI C78.1404-2006 (R2015), Electric Lamps - P28 Single-Contact Medium Prefocus Based Projection Lamps for Base-Down Operation - Dimensions
This standard establishes the dimensions essential to interchangeability of single-contact medium prefocus based projection lamps of T-10 and T-12 bulb sizes. It is not the intent of this standard to prescribe operating characteristics or details of design.

ANSI C78.1407-2004 (R2015), Electric Lamps - Condenser-Reflector, Four-Pin Prefocus-Base Projection Lamps - Dimensions
This standard specifies the dimensions essential to the interchangeability of condenser-reflector lamps having four-pin prefocused bases, T12 or T14 bulbs, and used in 8mm motion-picture projectors. It is not the intent of this standard to prescribe operating characteristics or details of design.

ANSI C78.1408-2004 (R2015), Electric Lamps - CBA Projection Lamp
This standard provides information on the description, ratings, restrictions, physical characteristics, dimensions, life, illumination, seal temperature, and operating temperature of a lamp that has been Lamp Code Designated as a CBA projection lamp.

ANSI C78.1420-2001 (R2011), Microfilm Projection Lamps - Two Inch (51mm), Integral Reflector, Rim-Reference TH Lamps with GX5.3 Bases
Details microfilm projection lamps; specifically, integral reflector, rim-reference TH lamps with GX5.3 bases.

ANSI C78.1430-1997 (R2016), Slide Projector Lamps, Condensing, Dichroic, Two-inch (51 mm), Integral Reflector, Rim Reference Tungsten-Halogen Lamps with GX5.3 Bases
This standard consolidates the lamps commonly used for slide projectors into a single standard. The lamps contained in this standard are not to be considered as interchangeable. Physically they will all fit the common GX5.3 sockets. The photometry of each lamp is dependent upon the system for which it was designed and on the system in which it is used. A sample system and representative photometric values are found in the Annex.

ANSI C78.1431-1997 (R2016), Slide Projector Lamps, Condensing, Dichroic, Two-inch (51 mm), Integral Reflector, Rim Reference Tungsten-Halogen Lamps with GV 5.3 Bases
This standard consolidates the lamps commonly used for slide projectors into a single standard. The lamps contained in this standard are not to be considered as interchangeable. Physically they will all fit the common socket used for these lamps. The photometry of each lamp is dependent upon the system for which it was designed and on the system in which it is used. A sample system and representative photometric values are found in the Annex.

ANSI C78.1432-1997 (R2011), Tungsten-Halogen Lamps with GZ9.5 Two-Pin Prefocus Bases and 36.5mm Nominal LCL
Covers tungsten-halogen lamps with GZ9.5 two-pin prefocus bases and 36.5-mm nominal LCL.

ANSI C78.1433-2001 (R2011), Two-inch (51mm) Dichroic Coated Integral Reflector, Rim Reference, Tungsten Halogen Large Screen Projection Lamps with GX5.3 Bases
Covers two-inch (51-mm) dichroic coated integral reflector, rim reference, tungsten-halogen large-screen projection lamps with GX5.3 bases.

ANSI C78.1434-2001 (R2011), Condensing Dichroic Coated Integral Reflector Side Pin Tungsten Halogen Projection Lamps with GX7.9 Bases
Details condensing dichroic coated integral-reflector side-pin tungsten-halogen projection lamps with GX7.9 bases.

ANSI C78.1435-2002 (R2011), Projection-Lamps - Tungsten-Halogen Lamps with G5.3 Bases
Covers projection-lamps; specifically, tungsten-halogen lamps with G5.3 bases.

Details the method for life testing of incandescent projection lamps.

ANSI C78.1451-2002 (R2011), Use of Protective Shields with Tungsten-Halogen Lamps - Cautionary Notice
Covers the cautionary notice for use of protective shields with tungsten-halogen lamps.

ANSI C78.1452-2004 (R2015), Standard for Electric Lamps - Projection Lamps - Vocabulary
This standard provides definitions for a wide range of terms used in the design, manufacturing, and application of photographic lamps. It serves as a common reference for all ANSI lamp standards in the C78.1400 series, thus reducing the number of terms that need to be defined in individual standards. With strong input from the consumer or user side, this standard covers many terms in use by the laity.

ANSI C78.1460-2004 (R2015), Single-Ended Tungsten-Halogen Lamps G29.5 Base, T6 Bulb, 36.5 mm LCL, 76.2 mm MOL with Proximity Reflector
This standard defines the dimensional, physical, and other characteristics to assist in the proper application of tungsten-halogen lamps with G29.5 bases, T6 (T19) bulbs at 36.5 mm LCL and 76.2 mm maximum overall length with internal proximity reflectors. Lamps of various wattage and voltage designs are included. The grouping of lamps in this standard is based on general physical characteristics. It does not imply that the lamps listed are interchangeable with each other in a particular application. Lamps included in this standard are intended for photographic projection applications.

ANSI C78.1501-2016, Electric Lamps - Tungsten-Halogen Lamps with G22 Bases and 63.5 mm LCL
This scope defines the dimensional limits and other physical characteristics required to ensure interchangeability and assist in the proper application of a specific category of tungsten-halogen lamps with G22 bases and 63.5 mm nominal light center length.

ANSI C78.180-2003 (R2016), Standard for electric lamps: Specifications for Fluorescent Lamp Starters
This standard is intended to cover performance of glow switch starters used with preheat-type fluorescent and similar discharge lamps. It does not include starters that are an integral part of a lamp or manually operated switches that may be used for lamp starting.

This standard sets forth physical and electrical characteristics of the group of incandescent lamps that have A, G, PS, and similar bulb shapes with E26 single and double contact medium screw bases including the reduced wattage versions. Only clear, inside frost, frost-equivalent, and white bulb finishes are acknowledged. Excluded from this standard are tungsten-halogen and projection lamps.

ANSI C78.21-2011 (R2016), Incandescent lamps: PAR and R Shapes
This standard provides physical and electrical characteristics of the group of incandescent lamps that have PAR and R bulb shapes. Lamps with clear, frosted, and lens end bulbs, with clear and prescription lenses, and with various reflector coatings are covered. Lamps covered in this standard may contain either of two basic types of light sources; an incandescent filament or a tungsten halogen inner bulb. Sunlamps and heat lamps of the R type are included. Lamps with discharge arc tubes are not included.

ANSI C78.22-1995 (R2011), A, G, PS and Similar Shapes with E39 Mogul Screw Bases
Details A, G, PS, and similar shapes with E39 mogul screw bases.
ANSI C78.23-1995 (R2011), Incandescent Lamps - Miscellaneous Types
Details miscellaneous types of incandescent lamps.

ANSI C78.260-2002 (R2011), Tubular Tungsten-Halogen Lamps, Physical Characteristics
Covers the dimensional limits and other physical characteristics required to assure the interchangeability and proper application of tubular tungsten halogen lamps.

ANSI C78.261-1997 (R2011), Specification for Tubular Incandescent Infrared Lamps
Details the specification for tubular incandescent infrared lamps.

ANSI C78.30-1997 (R2011), Procedure for Use in Preparations of Lamp Space Drawings
Describes the procedure for use in preparations of lamp space drawings.

ANSI C78.370-1997 (R2011), Method of Designation for Electric Lamps - Photographic, Stage, and Studio
Details the method of designation for photographic, stage, and studio electric lamps.

ANSI C78.370/390 Icd-2002 (R2011), Method of Designation for Electric Lamps - Photographic, Stage, and Studio
Details amendments to the method of designation for electric lamps - photographic, stage, and studio.

ANSI C78.374-2015, ANS for electric lamps: Light Emitting Diode Specification Sheet for General Illumination Applications
The purpose of this standard is to specify the standardized white light emitting diode (LED) package specification sheet, or data reporting format, as the means of communication between LED package producers and users in general illumination applications.

This standard describes the procedures to be followed and the precautions to be observed in obtaining uniform and reproducible measurements of the electrical characteristics of fluorescent lamps under standard conditions when operated on alternating current (ac) circuits. These methods are applicable both to lamps having hot cathodes -- switch-start (preheat-start), rapid-start (continuously heated cathodes), or instant-start -- and to lamps of the cold-cathode variety. The electrical characteristics usually measured are lamp current, lamp voltage, and lamp power. In the case of rapid-start lamps, the power measurements may include both the arc watts and the cathode watts. Total lamp power is the sum of arc watts and cathode watts. The methods noted in this standard apply to fluorescent lamps operated at common power-line frequencies (50 and 60 Hz) or high frequency.

ANSI C78.376-2014, ANS for electric lamps: Specifications for the Chromaticity of Fluorescent Lamps
This standard covers the objectives and tolerances for the chromaticity of T8, T10, and T12 fluorescent lamps with a nominal loading of from 5 to 10 watts per foot at their normal 100 hour rating point.

The purpose of this standard is to specify the range of chromaticities recommended for general lighting with solid state lighting (SSL) products, as well as to ensure that the white light chromaticities of the products can be communicated to consumers. This standard applies to LED lamps, LED light engines and LED luminaires for general indoor lighting applications. This document does not apply to lighting fixtures sold without a light source. This standard does not apply to SSL products for outdoor applications. This standard also does not apply to SSL products for some indoor applications that intentionally produce tinted or colored light. This document does not include OLED products.

ANSI C78.379-2006 (R2015), Electric Lamps - Classification of the Beam Pattern of Reflector Lamps
This standard describes a system for classification of beam patterns and beam angles of reflector lamps. Also a method of describing light output is defined.

ANSI C78.379a-1997 (R2011), MR and PAR Beam Designation and Tolerance
Covers MR and PAR beam designation and tolerance.

ANSI C78.380-2016, ANS for electric lamps: High-Intensity Discharge Lamps, Method of Designation
This standard describes a system for the designation of high-intensity discharge lamps, including compact, enclosed-arc discharge light sources such as mercury, metal halide, high-pressure sodium, and similar types of lamps. For convenience, low-pressure sodium lamps, although technically not high-intensity discharge lamps, are included with the group.

ANSI C78.381-1961 (S2016), Standard for Electric Lamps: Method for the Designation of Glow Lamps
This standard describes a designation system for glow lamps.

ANSI C78.385-1961 (S2016), Standard for Electric Lamps: Methods of Measurement of Glow Lamps
This standard outlines the procedures to be followed and the precautions to be observed in testing glow lamps.

ANSI C78.389-1989 (R2009), High-Intensity Discharge Lamps-Methods of Measuring Characteristics
This standard describes the procedures to be followed and the precautions to be observed in measuring the electrical characteristics of high intensity discharge lamps as specified in the American National Standard Specifications for Mercury (Hg), High-pressure Sodium (HPS) and Metal Halide (MH) Lamps.

This standard describes a system for the designation of miniature and sealed-beam lamps. A form is provided for the use of lamp manufacturers to request a designation assignment, alternative, or change.

ANSI C78.391-2004 (R2016), Characteristics of Subminiature Lamps of T1 and T1-3/4 Shapes
This standard sets forth the physical and electrical characteristics of those groups of subminiature incandescent lamps with T1 and T1-3/4 bulb shapes. Lamps with various base or termination configurations are included.

ANSI C78.40-2016, Standard - Electric Lamps: Specifications for Mercury Lamps
This standard sets forth the physical and electrical requirements for single-ended metal halide lamps operated on 60 Hz ballasts to ensure interchangeability and safety. The data given also provides the basis for the electrical requirements for ballasts as well as the lamp-related requirements for luminaires. Luminous flux and lamp color are not part of this standard.

ANSI C78.41-2016, Electric lamps: Guidelines for Low Pressure Sodium Lamps
This standard describes the physical and electrical requirements of the principal types of single-ended low pressure sodium lamps. The electrical data provides the specific basis for ballast requirements.

ANSI C78.42-2016 (R2014), Electric Lamps - High-Pressure Sodium Lamps
This standard sets forth the physical and electrical requirements for HPS lamps, to ensure performance and interchangeability. The data given also provide the basis for the electrical requirements for ballasts and igniters, as well as the lamp-related requirements for luminaires. This standard covers only single-ended HPS lamps. Lamps with internal starting devices are not covered. This standard does include &quot;improved color&quot;; HPS lamps (those lamps that have a color rendering index 60 or 60 and that operate on the same ballasts as the conventional lamps that they are intended to replace). However, color is not a standardized parameter. Luminous flux is not a standardized parameter either. This standard covers only 60 Hz operation of HPS lamps, on ballasts designed for HPS lamps.
ANSI C78.44-2016, For Electric Lamps: Double-Ended Metal Halide Lamps
Standardize the M134 LCD and revise and update the standard.

ANSI C78.45-2016, Self-balled Mercury Lamps
This standard sets forth the physical and electrical requirements for self-balled mercury lamps operated on 60 Hz supply lines to ensure interchangeability and safety. The data given also provides the lamp-related requirements for luminaires. Luminous flux and lamp color are not part of this standard.

ANSI C78.5-2003 (R2015), Specifications for Performance of Self-balled Compact Fluorescent Lamps
This standard specifies the performance requirements together with the test methods and conditions required to show compliance of self-ballasted compact fluorescent lamps up to 60 watts which are intended for domestic and similar general lighting purposes. Globe and reflector types are excluded. Such lamps shall have a rated input voltage of 120 or 127 volts at 60 Hz and an Edison screw base.

ANSI C78.50-2016, Electric Lamps - Assigned LED Lamp Codes
This standard provides physical and electrical characteristics of the group of integrally ballasted Solid State Lighting (SSL) lamps that have standardized characteristics. Lamps with clear, frosted, opaque, and lens end windows and with various reflector and/or emitting coatings are covered. Lamps covered in this standard contain LED based light sources.

ANSI C78.51-2016, Electric Lamps: LED (Light Emitting Diode) Lamps - Method of Designation
This standard describes a system for the designation of integrally ballasted Solid State Lighting (SSL) lamps that have standardized characteristics. The lamps may be connected to the branch circuit or connected to another voltage suitable for lighting applications, such as 12 V AC or DC. This document is intended to allocate lamp codes for new lamps that are not direct replacements for lamps with existing ANSI Lamp Codes or Lamp Designations. OLED lamps are not included at this time.

This standard describes a system for the designation of LED lamps that are direct replacements for existing ANSI standardized non-LED lamps. Lamps covered in this standard contain LED-based light sources. Direct replacement is defined as LED lamps that shall not require modification of existing equipment.

ANSI C78.60360-2002 (S2016), Standard for Electric Lamps - Standard Method of Measurement of Lamp Cap Temperature Rise
This International Standard describes the standard method of measurement of lamp cap temperature rise which is to be used when testing incandescent or discharge lamps for compliance with the limits. Temperature-rise limits for particular lamp types are, for example, listed in ICE 60432. It covers the method of test and the specifications for test lampholders for lamps fitted with various sizes of Edison screw (ES) and Bayonet (BC) caps. This method has been used widely for incandescent lamps but its application is not limited to that kind of lamp.

Covers USA deviations to the safety specifications for incandescent lamps, specifically, tungsten filament lamps for domestic and similar general lighting purposes.

ANSI C78.60432.2-2004 (R2011), Incandescent Lamps - Safety Specifications - Part II: Tungsten Halogen Lamps for Domestic and Similar General Lighting Purposes
This part covers USA deviations to the safety specifications for incandescent lamps, specifically: tungsten halogen lamps for domestic and similar general lighting purposes.

ANSI C78.60432.3-2007 (R2011), Incandescent Lamps - Safety Specifications - Part III: Tungsten Halogen Lamps (non vehicle)
Covers USA deviations to the safety specifications for incandescent lamps, specifically: tungsten halogen lamps (non vehicle).

ANSI C78.62035-2016, ANSI for electric lamps - Discharge Lamps (Excluding fluorescent lamps) Safety Specifications
This standard specifies the safety requirements for discharge lamps (excluding fluorescent lamps) for general lighting purposes.

ANSI C78.682-1997 (R2016), Standard for electric lamps: Standard Method of Measuring the Pinch Temperature of Quartz Tungsten-Halogen Lamps
This standard specifies details of the type of thermocouple to be used to measure the pinch temperature of quartz-tungsten-halogen lamps, the methods of preparation of the lamp and thermocouple, and the measurement to be made.

ANSI C78.79-2014, Electric Lamps - Nomenclature for Envelope Shapes Intended for use with Electric Lamps
This standard describes a system of nomenclature that provides designations for envelope shapes used for all electric lamps. These envelope shapes are intended to be used with ANSI standardized base and holder systems. The included general shapes are not associated with specific base and holder systems, they may be used with one or more of these systems.

ANSI C78.81-2016, For Electric Lamps - Double-Capped Fluorescent Lamps-Dimensional and Electrical Characteristics
This standard sets forth the physical and electrical characteristics of the principal types of FL lamps intended for application on conventional line frequency circuits, and electronic high frequency circuits. Some datasheets may specify more than one circuit application. Specifications for both the lamp itself and the interactive features of the lamp and ballast are given. Only double-based lamps of the regular linear shape are included. Single-based lamps including compact, circular, square shaped and U-shaped are found in ANSI C78.901. Lamps for conventional systems relying on auxiliary support from external ballasts are described. These lamps are those designed for 60Hz and/or high frequency operation. Lamp color is not specified herein. Certain lamp types covered in this standard may be similar to those in ICE 60081. However, additional types are included that are used only in North America and are not specified in the IEC standard.

ANSI C78.901-2016, Electric Lamps - Single-Based Fluorescent Lamps-Dimensional and Electrical Characteristics
The scope of this project is to update the Programmed Start Requirements for 3 datasheets and slightly revise Section 6 to help clarify which lamps are included in the Methods of Measurement.

ANSI C78.LL1256-2003 (R2015), Procedures for Fluorescent Lamp Sample Preparation and the Toxicity Characteristic Leaching Procedure
Procedures for preparation of fluorescent lamps for Toxicity Characteristic Leaching Procedure (TCLP) are presented below. These guidelines are intended to supplement the TCLP by supplying specific instructions for size reduction of lamps including integral electronic compact, pin-based compact, linear and U-shaped fluorescent lamps. This standard specifically covers integral electronic compact, pin-based compact, linear and U-shaped fluorescent lamp types. Additional standards have been prepared and are in preparation for high intensity discharge lamps, and other lamp types that require specific sample preparation instructions because of their design or construction. It consolidates and supersedes the following 4 NEMA standards; NEMA LL 1 â€“ 1997, Procedures For Linear Fluorescent Lamp sample Preparation And The TCLP, NEMA LL 2 â€“ 1997, Procedures For Pin-Based Compact Fluorescent Lamp Sample Preparation and the TCLP, NEMA LL 5 â€“ 1999, Procedures For U-shaped Fluorescent Lamp Sample Preparation and the TCLP, and NEMA LL 6-1996, Procedures For Integral Electronic Compact Fluorescent Lamp Sample Preparation and the TCLP. The protocol that follows is grouped to include general requirements, safety considerations, lamp preparation, leaching, filtration, storage, and leaching vessel reuse.
ANSI C78.11-2003 (R2015), Procedures for High Intensity Discharge Lamp Sample Preparation and the Toxicity Characteristic Leaching Procedure

Procedures for preparation of high-intensity discharge (HID) lamps for the Toxicity Characteristic Leaching Procedure (TCLP) are presented below. These procedures are intended to supplement the TCLP by supplying specific instructions for size reduction and for other critical procedures specific to the testing of HID lamps. This standard specifically covers high-intensity discharge lamp types.

Additional standards are in preparation or have been prepared for fluorescent lamps and for other types that require specific sample preparation instructions because of their design or construction. The protocol that follows is grouped to include general requirements, lamp preparation, leaching, filtration, storage, and leaching vessel reuse.

ANSI C78.14-2003 (R2011), Procedures for Incandescent Lamp Sample Preparation and the TCLP

Details the procedures for preparation of incandescent lamps for Toxicity Characteristic Leaching Procedure (TCLP). These procedures are intended to supplement the TCLP by supplying specific instructions for size reduction and for other critical procedures specific to the testing of incandescent lamps.

NEMA (ASC C8) (National Electrical Manufacturers Association)

ANSI C78.1-101-699-2011, Category 3 Individually Unshielded Twisted Pair Indoor Cable for Use in General Purpose Non-LAN Telecommunications Wiring Systems Technical Requirements

The purpose of this Standard is to establish generic technical requirements that may be referenced by individual telecommunications cable specifications covering thermoplastic insulated and jacketed inside wiring products intended for normal indoor premises use in the wiring systems of communication users. The parameters covered provide material, construction, performance requirements, and test procedures.


This Standard covers mechanical and electrical requirements for insulated, copper conductor wires, intended primarily for use as telecommunications central office distribution frame wire.

ANSI C78.1-115-730-2012, Standard for Multi-Dwelling Unit (MDU) Optical Fiber Cable

Multi Dwelling Unit (MDU) cables covered by this standard include two classes of cables. The first class is described by a cable used for distribution and delivery of optical fiber from a demarcation point starting at a conventional optical fiber cable, optical fiber splitter or active optical device. The second class of cable, the Rugged Indoor Drop, is described as a cable that usually terminates at the customer electronics, or Optical Network Terminal (ONT). The second cable may be stapled, routed around corners under tension, and coiled in tight diameter.

ANSI C78.1-122-744-2017, STANDARD FOR OPTICAL FIBER OUTSIDE PLANT MICRODUST CABLES

This Standard covers performance requirements for microduct optical fiber outside plant cables intended for installation in microducts, typically by blowing in using commercially available equipment intended for this application. Products covered by this Standard are intended only for operation under conditions normally found in outside plant communication systems. Typically, these products are installed in protected ducts but may also be run for short distances in both exposed areas and in concealed areas (such as handholes), with or without external protection. Due to the thinner jacket usually associated with microduct cables, they typically do not have the jacket durability to be pulled into conduit for long distances even at or below the rated tensile strength. Additionally, the impact resistance, compression resistance and tensile strength requirements for cables covered by this Standard may be significantly lower than those for conventional outside plant cables covered by ICEA-640. Therefore, installation of cables covered by this Standard by techniques such as capstan pulling, aerial lashing, trenching and direct burial is not recommended.

ANSI ICEA S-76-474-2011, Standard for Neutral-Supported Power Cable Assemblies with Weather-Resistant Extruded Insulation Rated 600 Volts

Standard applies to materials, constructions, and testing of assemblies of current carrying conductors and bare or covered neutral conductors for overhead distribution of electrical energy.

ANSI ICEA S-84-608-2017, Standard for Telecommunications Cable Filled, Polyolefin Insulated, Copper Conductor Technical Requirements

This Standard covers mechanical and electrical requirements for filled, polyolefin insulated, copper conductor telecommunications cable. It provides alternative choices for type of insulation, type of filling compound, core lay-ups, color code, sheath design (shielding materials, single or double jackets, and jacket thicknesses), and screened or non-screened core.

ANSI ICEA S-89-648-2011, Standard for Aerial Service Wire

The purpose of this Standard is to establish generic technical requirements that may be referenced by individual telecommunications wire specifications covering products intended for normal outside plant use. The parameters covered provide material, construction, and performance requirements.


The purpose of this Standard is to establish generic technical requirements that may be referenced by individual telecommunications wire specifications covering products intended for the aerial outside plant use. The parameters covered provide material, construction, and performance requirements.

ANSI/I C78.113-684-2016, PERFORMANCE BASED STANDARD FOR ELECTRIC UTILITY EXTRUDED DIELECTRIC SHIELDED POWER CABLES RATED 5 THROUGH 46 KV

This standard provides the basis for designing non-traditional shielded power cables that will be rated 5 to 46 kV and be used for the transmission and distribution of electrical energy. These non-traditional cables will normally have overall diameters that are less than the diameters of what are considered shielded power cables. Manufacturers will design their cables based on what they have determined to be the maximum acceptable electrical stress levels that will not adversely affect their cable’s performance.

ANSI/I C86A-117-734-2016, Ampacities for Single-Conductor Solid Dielectric Power Cable 15 kV through 35 kV

This publication presents calculated ampacities for single-conductor solid-dielectric 15 through 35 kV power cables with multiple bonded shields, copper or aluminum conductors, single or three phase operation, spaced or trefoil configurations, single or double circuits, directly buried, or in buried ducts. Ampacities are given for three or four different shield resistances for each conductor size.

ANSI/I C86B-32-382-2006 (R2013), Short Circuit Characteristics of Insulated Conductors

This publication discusses factors for consideration in approximating the operability of insulated and/or covered wire and cable under the influence of uninterrupted short circuit currents encountered as a result of cable or other equipment faults. The duration of such a fault is considered to be up to approximately 2 seconds. Calculation for single short circuits of longer durations yield increasingly conservative results.

ANSI/I C86C-45-482-2013, Short-Circuit Performance of Metallic Shields and Sheaths on Insulated Cable

This publication discusses factors for consideration in approximating the operability of insulated and/or covered wire and cable under the influence of uninterrupted short circuit currents encountered as a result of cable or other equipment faults. The duration of such a fault is considered to be up to approximately 2 seconds. Calculation for single short circuits of longer durations yield increasingly conservative results.
ANSI/ICEA P-45-482-2017, Short Circuit Performance of Metallic Shields and Sheaths on Insulated Cable

Equations and parameters have been established for short circuit calculations for sheaths or shields made of aluminum, bronze, copper, lead, steel, zinc and cupronickel alloys. The types of sheaths or shields included are: \( \delta \)C Wires, applied either helically, as braid or serving; or longitudinally with corrugations. \( \delta \)C Helically applied flat tape, not overlapped. \( \delta \)C Helically applied, overlapped, flat tape. \( \delta \)C Corrugated tape, longitudinally applied. \( \delta \)C Tubular sheath. The types of cable materials in contact with the sheath or shield are: crosslinked (thermoset), thermoplastic, impregnated paper, and varnished cloth. The materials which determine the maximum allowable short circuit temperatures are: paper, varnished cloth and several thermoplastic and thermosetting materials presently appearing in ICEA standards. Temperature limits, considered safe, were established for the various coverings and insulation materials. The equations may be used to determine: \( \delta \)C The maximum short circuit current permitted for a specific sheath/shield and short circuit duration. \( \delta \)C The sheath/shield size necessary to carry a specific short circuit current for a given duration. \( \delta \)C The maximum duration a specific sheath/shield can carry a specific short circuit current.


This Standards Publication covers the ampacity ratings for 600-15,000 volt solid dielectric cables installed in cable trays. Ampacity ratings are tabulated for single conductor cables, triplexed assemblies of single conductor cables, and three-conductor cables incorporating an overall jacket. Ampacities have been tabulated for the cable constructions and the operating conditions normally encountered for tray applications. Correction factors to adjust the tabulated values to better reflect specific conditions are provided. These include adjustments to account for ambient and operating temperatures, cable construction, tray covers, and diversification of the cable loading. This standard is intended primarily for use by the utility industry. It is not intended for use where compliance with the National Electrical Code or other regulations is mandatory.

ANSI/ICEA P-79-561-2008 (R2013), Guide for Selecting Aerial Cable Messengers and Lashing Wires

This guide has been prepared to facilitate the selection of messengers and lashing wires for both field and factory-assembled self-supporting aerial cables. The cables used for attachment to the messenger shall be suitable for the service and shall be manufactured and tested in accordance with the applicable ICEA Standards and installed in accordance with the applicable provisions of the National Electrical Code (NFPA-70) and/or the National Electrical Safety Code/ANSI Standards Publication No. C2. This guide does not cover all possible messenger configurations. Reference should be made to other publications for service drop and neutral supported applications.

ANSI/ICEA S-100-685-2014, Standard for Thermoplastic Insulated and Jacketed Telecommunications Station Wire for Indoor/Outdoor Use

This Standard covers station wire intended primarily for application on the premises of communications users. The wire is intended for use in transition applications requiring a combination of fire and weather resistance, such as between the point of demarcation (the network interface device/protector) and the telephone termination device within single and multi-family dwellings. Materials, construction and performance requirements are included in the Standard, together with applicable test procedures.

ANSI/ICEA S-103-701-2004 (R2011), Standard for Riser Cables Technical Requirements

The purpose of this Standard is to establish generic technical requirements that may be referenced by individual telecommunications cable specifications covering products intended for normal indoor premises use in the wiring systems of communications users. The parameters covered provide material, construction, and performance requirements.

ANSI/ICEA S-104-696-2013, Standard for Indoor-Outdoor Optical Fiber Cable

Indoor-outdoor cables covered by this Standard are generally derived from outdoor cable designs having the thermal and mechanical robustness that makes them suitable for use in the Outside Plant. Material changes are made, as required, to allow the designs to meet their intended fire rating. These cables can be expected to comply with all specification requirements stipulated in this Standard.


This standard applies to the materials, constructions, and testing of single conductor cables and assemblies of completed single conductor thermostat insulated cables, with an insulated or bare copper or an insulated aluminum neutral, used for the distribution of electrical energy at phase-to-phase voltages not exceeding 600 volts, or phase-to-ground voltage not exceeding 480 volts, 60 Hz, and at conductor temperatures not exceeding 90 °C/176°F for use in direct burial and underground ducts.

ANSI/ICEA S-106-703-2012, ICEA Standard for Broadband Aerial Service Wire

This Standard covers materials, mechanical, and electrical requirements for Broad band Aerial Service Wire (BB-ASW) of less than or equal to 12 pair, intended for use principally in extending a circuit from a broadband distribution cable terminal to a subscriber's network interface device (NID).

ANSI/ICEA S-107-704-2012, ICEA Standard for Broadband Buried Service Wire

This standard covers materials, mechanical, and electrical requirements for Broad band Buried Service Wire (BB-FSW) or less than or equal to 6 pair, intended for use principally in extending a circuit from a broadband cable terminal to a subscriber's network interface device (NID).
ANSI/ICEA S-1-20-742-2016, Hybrid Optical Fiber and Power Cable for Use in Limited Power Circuits

This Standard covers performance requirements for limited power hybrid copper and fiber communications cables intended for use in the buildings, or for short distances external to the building of communications users. The optical fiber is intended for communications use while the copper conductors are intended for limited power applications in accordance with Articles 725 and 800 of the National Electric Code (NEC) ANSI/NFPA 70.

Typically, these cables utilize conductor sizes that range from 10 AWG to 20 AWG. Generally these cables are limited to a maximum of 100 VA. However, refer to NEC document for detailed requirements.

Materials, constructions and performance requirements are included in the Standard, together with applicable test procedures. Products covered by this standard are intended only for operation under conditions normally found in communication systems. Typically, these products are installed both in exposed areas (surface mounted to walls or building baseboards or in non-stationary configurations) and in concealed areas (within walls, attics, etc.), with or without external protection (such as conduit), depending upon product type and specific use. These products normally convey communications signals (voice, video, data, etc.) from place to place within a building. Products covered by this Standard may be factory terminated with connectors or splicing modules. This standard is intended to serve as a reference to the most recent appropriate standards.

ICEA S-83-596 for optical fiber communications cables intended for indoor use, ICEA S-104-696 for optical fiber communications cables intended for indoor-outdoor use and UL13 for Power Limited Circuit Conductors are also covered.

ANSI/ICEA S-121-733-2016, Tree Wire and Messenger Supported Spacer Cable

This standard applies to the materials, constructions, and testing of tree wire and messenger supported spacer cable. These conductors are intended primarily for the distribution of electrical energy under normal conditions of overhead (aerial) installations. This standard covers both thermoplastic and crosslinked polyethylene constructions, rated for 75°C or 90°C normal service temperature. They are considered as covered conductors therefore the cables carry no voltage rating. The conductors must be installed on insulators and/or spacers adequate for the service voltage. The user may want to give consideration to the dielectric compatibility of the covering, insulator, spacer and tie wire. Wire line constructions are covered in ANSI/ICEA S-70-547 BE Standard for Weather-Resistant Polyethylene Covered Conductors. Messenger wires are covered in ANSI/ICEA P-79-561 - Guide for Selecting Aerial Cable Messengers and Lashing Wires.


SCOPE This standard contains recommendations for conductor and circuit identification of control, instrumentation and thermocouple extension cables when such identification is used.

ANSI/ICEA S-70-547-2016, Standard for Weather-Resistant Polyethylene Covered Conductors

This standard applies to the materials, construction and testing of weather-resistant polyethylene covered conductors rated at 75°C and 90°C normal service temperatures. Conductors covered under this standard are intended for the distribution of electrical energy under normal overhead (aerial) conditions and installations.

ANSI/ICEA S-75-381-2008/NEMA WC 58-2008, Portable and Power Feeder Cables for Use In Mines and Similar Applications

These standards apply to materials, construction and testing of insulated cables used for the utilization of electrical energy in surface and underground mines and similar applications. Included are portable cables for use in mining machines, dredges, shovels and similar equipment, and mine power cables for use as connections between mine distribution systems.

ANSI/ICEA S-81-570-2012, Standard for 600 Volt Rated Cables of Ruggedized Design for Direct Burial Installation As Single Conductors or Assemblies of Single Conductors

This standard applies to the materials, constructions, and testing of single conductor cables and assemblies of completed single conductor cables used for the distribution of electrical energy at phase-to-phase voltages not exceeding 600 volts or phase to ground not exceeding 480V, and at temperatures not exceeding 75°C or 90°C, as applicable to the construction. It requires the use of ruggedized extruded insulations.

ANSI/ICEA S-83-596-2011, ANSI Standard for Indoor Optical Fiber Cable

The project is a revision to the standard for indoor optical fiber cables capable of being used as parat of an indoor communication cable system. This standard brings the language, terminology, and testing up to current industry practices and helps to harmonize, where particular, with other industry standards.

ANSI/ICEA S-84-608-2010, Telecommunications - Cable-Filled, Polyolefin-Insulated, Copper Conductor - Technical Requirements

This standard covers mechanical and electrical requirements for filled, polyolefin insulated, copper conductor telecommunication cables. It provides alternative choices for type of insulation, type of filling compound, core lay-ups, color code, sheath design (shielding materials, single or double jackets, and jacket thickness), and screened or non-screened core.

ANSI/ICEA S-85-625-2016, Telecommunications Cable Aircore, Polyolefin Insulated, Copper Conductor Technical Requirements

This Standard covers mechanical and electrical requirements for aircore, polyolefin insulated, copper conductor telecommunications cable. It provides alternative choices for type of insulation, core assembly, color code, sheath design (shielding materials, single or double jackets, and jacket thickness), and screened or non-screened core.

ANSI/ICEA S-86-634-2011 (R2017), Buried Distribution & Service Wire, Filled Polyolefin Insulated Copper Conductor

This Standard covers mechanical and electrical requirements for filled, polyolefin insulated, copper conductor, buried telecommunications wire. It provides alternative choices for type of insulation, type of filling compound, sheath design (shielding materials, single or double jackets, and jacket type and thickness) and armoirng. Buried wire is used to extend buried telephone plant from the distribution cable to the subscriber.

ANSI/ICEA S-87-640-2016, Standard for Optical Fiber Outside Plant Communications Cable

This Standard covers optical fiber communications cable intended for outdoor use and normally installed aerially, directly buried, or placed in underground ducts. Additional requirements are included in Annex D for aerial self-supporting cables and in Annex E for all-dielectric self-support cables, as appropriate. Materials, constructions, and performance requirements are included in the Standard, together with applicable test procedures.

ANSI/ICEA S-90-661-2012, Standard for Category 3, 5, and 5e Individually Unshielded Twisted Pair Indoor Cables (With or Without an Overall Shield) for Use in General Purpose and LAN Communication Wiring Systems

This standard establishes generic technical requirements that may be referenced by individual telecommunications cable specifications covering products intended for normal indoor premises use in the wiring systems of communications users. The parameters covered provide material, construction, and performance requirements.

ANSI/ICEA S-94-649-2013, Standard for Concentric Neutral Cables Rated 5 Through 46 kV

These standards apply to materials, constructions, and testing of crosslinked polyethylene, tree retardant crosslinked polyethylene and ethylene propylene rubber insulated single conductor or multiplexed concentric neutral cables rated 5 to 46 kV which are used for the transmission and distribution of electrical energy.

ANSI/ICEA S-97-682-2013, Standard for Utility Shielded Power Cables Rated 5 Through 46 kV

These standards apply to materials, constructions, and testing of crosslinked polyethylene, tree retardant crosslinked polyethylene and ethylene propylene rubber insulated single conductor or multiplexed concentric neutral cables rated 5 to 46 kV which are used for the transmission and distribution of electrical energy.

ANSI/ICEA S-98-688-2012, ICEA Standard for Broadband TP Aircore, PE, CU

This standard covers mechanical and electrical requirements for aircore broadband twisted pair telecommunications cable with polyolefin insulated copper conductors.
This publication describes procedures for long term testing of extruded wire and cable insulations for service in wet (submerged) locations. It is intended to apply to insulations rated for service up to 2000 volts inclusive. Tests may be conducted on single or multiple wall insulations, using either ac or dc volatage, as applicable.

ANSI/ICEA T-24-380-2013, Standard for Partial Discharge Test Procedure
This Factory Test Procedure applies to the detection and measurement of partial discharges occurring in the following solid dielectric cables; single conductor shielded cables and assemblies and multiple conductor cables with individually shielded conductors within an outer covering.

ANSI/ICEA T-26-465/NEMA WC 54-2013, Guide For Frequency of Sampling Extruded Dielectric Power, Control, Instrumentation, and Portable Cables for Test
This guide provides a combination of plans for the frequencies at which cable samples may be obtained for tests to determine conformance to the appropriate requirements of ICEA Standards Publications. Valid statistical sampling frequencies other than those listed herein are acceptable if evidence of statistical control can be demonstrated. This guide applies only to extruded dielectric power, control, instrumentation, and portable cables.

This Standard applies to the testing of extruded dielectric insulated power, control, instrumentation, and portable cables.

This standard provides a procedure, which is suited for determining the relative degree of crosslinking of polymeric electric cable insulation.

This test method provides for qualification and production test procedures for determining the effectiveness of water blocking components incorporated into the interstices of the stranded and insulated conductor as an impediment to longitudinal water penetration into the conductor.

This test method provides for qualification and production test procedures for determining the effectiveness of non-metallic water barriers incorporated in a cable construction which are designed as an impediment to longitudinal water penetration along the cable interstices.

This test method provides procedures for establishing volume resistivity compatibility of water blocking components with extruded semiconducting shields utilized in MV, HV or EHV power cables. The compatibility test is designed to verify that the electrical properties of a semiconducting material used as a conductor or insulation shield are not adversely affected when exposed to a water blocking component. These water blocking components can be incorporated in a conductor, over a conductor, over an insulation shield, or around a metallic shield or concentric neutral. It describes a test method of demonstrating that the volume resistivity and volume resistivity stability remain within their specified limits when a semiconducting material is exposed to a water blocking component at the emergency operating temperature of the cable.

NEMA HP 3-2011, Electrical & Electronic PTFE (Polytetrafluoroethylene) Insulated High Temperature Hook-Up Wire; Types ET, (250 Volts), E (600 Volts) and EE (1000 Volts)
Covers specific requirements for PTFE (polytetrafluoroethylene) -insulated solid and stranded wire, designed for the internal wiring of high reliability electrical and electronic equipment. This Standards Publication addresses 250-volt (Type ET), 600-volt (Type E), and 1000-volt (Type EE) wire and permits continuous conductor temperature ratings of -65°C to +200°C with silver-coated conductors and -65°C to +260°C with nickel-coated conductors.

NEMA HP 4-2012, Electrical and Electronic FEP (Fluorinated Ethylene Propylene) Insulated High Temperature Hook-Up Wire, Types KT (250 Volt) and KK (1000 Volt)
This Standards Publication covers specific requirements for FEP (fluorinated ethylene propylene) insulated solid and stranded wire, designed for the internal wiring of high reliability electrical and electronic equipment. This Standards Publication addresses 250 volt (Type KT), 600 volt (Type K), and 1000 volt (Type KK) wire and permits continuous conductor temperature ratings of -65°C to +200°C with silver-coated or nickel-coated conductors and -65°C to +150°C with tin-coated conductors.

NEMA HP 5-2013, Electrical and Electronic Crosslinked, Modified Polyethylene (XLPE) Insulated, 125 C Hook-Up Wire, Types L (600 V), LL (1000 V), and LX (3000 V)
This Standards Publication covers specific requirements for crosslinked, modified polyethylene insulated solid and stranded wire, designed to the internal wiring of high reliability electrical and electronic equipment. This Standards Publication addresses 250 volt (Type S, ZHS) and 1000 volt (Type SS, ZHSS and SSB) wire and permits continuous conductor temperature ratings of -55°C to +150°C with tin-coated copper or -55°C to +200°C with silver-coated copper.

NEMA HP 8-2013, Electrical and Electronic Crosslinked, Modified Low Smoke Polyolefin (XLPO) Insulated Hook-Up Wire, Types LS (105°C & 176°C-600 V), ZHDM (90°C & 176°C-600 V), ZHDH (90°C & 176°C-600 V), ZH (125°C & 176°C-600 V), and ZHX (125°C & 176°C-1000 V)
This Standards Publication covers specific requirements for crosslinked, modified polyolefin insulated solid and stranded wire, designed to the internal wiring of high reliability electrical and electronic equipment. This Standards Publication addresses 600 volt (Type LS, ZHDM, ZHDH, ZH), and 1000 volt (Type ZH) wire and permits continuous conductor temperature ratings of -40°C to +90°C, or 105°C & 180°C, or 125°C & 180°C with either tin- or silver-coated conductors.

NEMA HP 9-2014, Electrical and Electronic Ethylene-Propylene Diene Elastomer (EPDM) Insulated Hook-Up Wire, Types EP (rated 125 C; 600 V), and EPD (rated 125 C; 5000 V)
This Standards Publication covers specific requirements for Ethylene Propylene Diene Elastomer insulated solid and stranded wire, designed to the internal wiring of high reliability electrical and electronic equipment. This Standards Publication addresses 600 volt (Type EP), and 5000 volt (Type EPD) wire and permits continuous conductor temperature ratings of -25°C to +125°C with tin-coated conductors.

NEMA IEC 5-93-639/WC 74-2012, 5-46 kV Shielded Power Cable for Use in the Transmission and Distribution of Electricity
This standard applies to materials, constructions, and testing of 5 kV to 46 kV shielded XLPE and EPR insulated wires and cables which are used for the transmission and distribution of electrical energy for normal conditions of installation and service, either indoors, outdoors, aerial, underground, or submarine.
NEMA WC 27500-2015, Standard for Aerospace and Industrial Electrical Cable
This standard contains requirements for finished cables. Component wires are covered by other referenced standards. These cables are intended for signal and low-voltage power applications with defined environment or temperature conditions found in commercial aircraft, military aircraft, and high performance vehicles.

NEMA WC 55021-2013, Standard for Military Internal Electrical Cable
This Standards Publication covers specific requirements for finished cables. The cables are intended for internal wiring of electrical equipment for use in the hook-up of various electronic assemblies. The component wires are covered by other reference standards. Cables constructed with PVC insulated wires or jackets are not to be used for aerospace applications.

NEMA WC 57/ICEA S-73-532-2014, Standard for Control, Thermocouple, Extension And Instrumentation Cable
This standard applies to materials, construction, and testing of multi-conductor cables that convey electrical signals used for monitoring or controlling electrical power systems and their associated processes.

NEMA WC 61-1992 (R2015), Transfer Impedance Testing
This standard is intended to provide a reliable surface transfer impedance test method for coaxial cables and shielded multi-conductor cables over the frequency range from DC to 100 MHz.

NEMA WC 66/ICEA S-116-732-2013, Standard for Category 6 and 6A, 100 Ohm Individually Unshielded Twisted Pairs, Indoor Cables (With or Without an Overall Shield) for Use in LAN Communication Wiring Systems
This standards publication covers the minimum performance requirements for cables up to four pairs, with transmission characteristics specified up to 250 MHz for Category 6 cables and up to 500 MHz for Category 6A cables. These Category cables are intended for voice, text, data, video and image transmission and low voltage power supply (POE & POE+). The cables are categorized by electrical transmission characteristics based on existing system requirements and projected application needs determined by IEEE 802.3.

NEMA WC 67-2015, Standard for Uninsulated Conductors Used in Electrical and Electronic Applications
This standard covers the following uninsulated conductors: Δ C Single end (solid) and stranded; Δ C coated and uncoated copper; Δ C coated copper alloy; Δ C coated copper-clad steel; Δ C aluminum conductors; and, Δ C thermocouple extension conductors. These conductors are used primarily in insulated wires for aerospace, electrical, electronic and other high performance applications.

This standard applies to materials, constructions and testing of 2001 through 5000 volt nonshielded power cables having insulations of crosslinked polyethylene (both XLPE and TR-XLPE) or crosslinked rubber (EPR) of the types shown in Section 4 of the standard. They are intended for use for the distribution of electrical energy in normal conditions of service in indoors, outdoors, aerial, underground or subsea installations.

NEMA WC 75-2015, Standard for Controlled Impedance in Internal Electrical Cable
This Standards Publication was developed to cover specific requirements for finished cables with controlled impedance twisted pair(s). This standard uniquely enables a user to specify various numbers of pairs (1 - 61) with a required impedance requirement, and tailor the materials to meet a specific end application. The cables are intended for wiring of electrical equipment.

NEMA (ASC C80) (National Electrical Manufacturers Association)

ANSI C80.1-2015, Standard for Electrically Rigid Steel Conduit
This standard covers the requirements for electrical rigid steel conduit for use as a raceway for wires or cables of an electrical system. Finished conduit is produced in nominal 10 ft (3.05 m) lengths, threaded on each end with one coupling attached. It is protected on the exterior surface with a metallic zinc coating or alternate corrosion protection coating (as specified in the 13th edition of UL 6 in Clauses 5.3.3, 6.2.4, 7.8 and 7.9) and on the interior surface with a zinc or organic coating. This standard also covers conduit couplings, elbows, nipples and conduit lengths other than 10 ft (3.05 m).

ANSI C80.3-2015, Electrical Metallic Tubing Steel (EMT-S)
This standard covers the requirements for steel metallic tubing, for use as a raceway for wires or cables of an electrical system. Finished tubing is typically furnished in nominal 10ft (3.05 m) lengths. It is protected on the exterior surface with a metallic zinc coating or alternate corrosion protection coating (see UL 797 Eighth Edition Clauses 5.3, 6.2.4, 7.5 and 7.6) and on the interior surface with a zinc or organic coating. This standard also covers electrical metallic tubing elbows.

ANSI C80.5-2015, Electrical Rigid Metal Conduit - Aluminum (ERMC - A)
This standard covers the requirements for porthole-extruded aluminum-alloy conduit for use as a raceway for the wires or cables of an electrical system. The finished conduit is produced in nominal 10 ft. (3.05 m) lengths, threaded on each end with one coupling attached. This standard also covers aluminum conduit couplings, elbows, nipples and conduit lengths other than 10 ft (3.05 m).

NEMA (ASC C81) (National Electrical Manufacturers Association)

ANSI C81.61-2017, Standard for Electrical Lamp Bases (Caps) - Specifications for Bases (Caps) for Electric Lamps
This standard sets forth the specifications for bases (caps) used on electric lamps.

ANSI C81.62-2017, Electric Lampholders
This standard sets forth the specifications for lampholders for electric lamps.

ANSI C81.63-2007 (R2014), ANSI for Gauges for Electric Lamp Bases and Lampholders
This standard sets forth the specifications for gauges for bases (caps) and lampholders for electric lamps.

ANSI C81.64-2005 (R2014), ANSI for Guidelines and General Information for Electric Lamp Bases, Lampholders and Gauges
This standard gives guidance and information to designers and testing personnel on the use of ANSI_IEC C81.61, ANSI_IEC C81.62 and ANSI_IEC C81.63 and their supplements. It includes the designation system and general information regarding bases (caps), lampholders and gauges. Many parts of this standard reference the adopted parts of IEC 60061-4 Lamp Caps and Holders Together with Gauges for Control of Interchangeability and Safety-Part 4: Guidelines and General Information. This standard is intended for use by standards engineers. In those cases where new proposals have to be prepared, so as to achieve uniformity in base/ lampholder/gauge standards and testing procedures. It contains information from ANSI and the IEC in regard to bases (caps) and holders in general use today, together with their relevant gauges. The gauges illustrated, although generally accepted in principle, are not necessarily the only form in which they can be made. This standard is applicable to bases, lampholders and gauges with the object of securing international interchangeability and safety.

NEMA (ASC C82) (National Electrical Manufacturers Association)

ANSI C82.1-2004 (R2015), Lamp Ballast - Line Frequency Fluorescent Lamp Ballast
This standard is intended to cover ballasts which have rated open circuit voltages of 2000 volts or less and are intended to operate lamps at a frequency of 50 Hz or 60 Hz. This comprises ballasts for hot cathode fluorescent lamps, either switch start (preheat start), rapid start (continuously heated cathodes), modified rapid start (cathode cutout), or instant start, and also ballasts for cold cathode fluorescent lamps, used primarily for lighting purposes, which come within this voltage range. The ballast and lamp combinations covered by this specification normally are intended for use in room ambient temperatures of 10°C to 40°C. At ambient temperatures outside this range, certain special operating characteristics may be required.
ANSI C82.11-2017, Lamp Ballasts - High Frequency Fluorescent Lamp Ballasts
This standard is intended to cover high frequency ballasts which have rated open-circuit voltages of 2000 volts or less, operate the lamp at frequencies between 10 kHz and 500 kHz, and are intended to operate at a supply frequency of 50 Hz or 60 Hz. This comprises ballasts for hot-cathode fluorescent lamps, either switch-start (preheat-start), rapid-start (continuously heated cathodes), modified rapid start, programmed start, or instant start used primarily for lighting purposes. The ballast and lamp combinations covered by this specification are normally intended for use in room ambient temperatures of 10°C to 40°C. At ambient temperatures outside this range, certain special operating characteristics may be required.

ANSI C82.13-2002 (R2010), Definitions for Fluorescent Lamps and Ballasts
Provides definitions of terms used in ANSI C78 and C82 series standards for fluorescent lamps and ballasts.

ANSI C82.14-2016, Lamp ballasts: Low-Frequency Square Wave Electronic Ballasts - for Metal Halide Lamps
This standard provides specifications for and operating characteristics of low frequency square wave electronic ballasts for metal halide lamps. Electronic ballasts are devices that use semiconductors to control lamp starting and operation. The ballasts operate from multiple supply sources of 600V maximum at a frequency of 60 hertz. The output frequency of electronic ballasts may be of some frequency other than 60 hertz. This standard only covers lamp operating current frequencies of greater than 60 hertz up to 400 hertz (some exclusionary frequency ranges may apply). An electronic square wave ballast is defined as an electronic ballast whose operating lamp current waveform is essentially a square wave with defined rise/fall times stated in the C78.43 lamp standards.

ANSI C82.16-2015, For Lighting Equipment - Light Emitting Diode Drivers - Methods of Measurement
This is a new standard to set forth and describe procedures to be followed and precautions to be taken in measuring performance of LED Drivers.

ANSI C82.17-2017, Lighting Equipment: High Frequency (HF) Electronic Ballasts for Metal Halide Lamps
This standard provides specifications for, and operating characteristics of, high frequency electronic ballasts for metal halide lamps. Electronic ballasts are devices that use semiconductors to control lamp starting and operation. The ballasts operate from multiple supply sources up to 600V maximum at a frequency of 60 hertz. This standard covers electronic ballasts with sinusoidal lamp operating current frequencies above 40 kHz.

ANSI C82.2-2002 (R2016), Standard For Lamp Ballasts - Method of Measurement of Fluorescent Lamp Ballasts
This standard outlines the procedures to be followed and the precautions to be observed in measuring and testing line frequency fluorescent lamp ballasts as specified in C82.1 with either hot-cathode or cold-cathode fluorescent lamps.

ANSI C82.3-2016, Lamp Ballasts - Reference Ballasts for Fluorescent Lamps
This standard describes the essential design features and operating characteristics of reference ballasts for fluorescent lamps. The items specified are those that have been found necessary to ensure accurate and reproducible results when either lamps or ballasts are being tested. It includes requirements for both line frequency and high frequency circuits. The specific values of rated input voltage and impedance for each size of lamp are listed in the applicable ANSI C78 lamp standard.

ANSI C82.4-2017, Standard for Lamp Ballasts - Ballasts for High-Intensity-Discharge and Low-Pressure Sodium Lamps (Multiple-Supply Type)
This standard provides specifications for and operating characteristics of ballasts for mercury, metal-halide, high-pressure sodium (HPS), and low-pressure sodium (LPS) lamps. The ballasts operate from multiple-supply sources of 600V maximum at a frequency of 60 hertz. They may be designed for operation under either indoor or outdoor conditions. The following types of ballasts are excluded from this standard: (1) Ballasts consisting of resistance only (2) Transformers for constant current (series) operation of mercury lamps (see American National Standard for Mercury Lamp Transformers - Constant Current (Series) Supply Type, ANSI C82.7-1983 (R1988) (3) All ballasts that use semiconductors to control the lamp power.

ANSI C82.5-2016, Reference Ballasts - High-Intensity-Discharge and Low-Pressure Sodium Lamps
This standard describes the essential features and operating characteristics of reference ballasts for high-intensity discharge and low-pressure sodium lamps to operate on 60-Hz sinusoidal ballast systems. The items specified are those that have been found necessary to ensure accurate and reproducible results when either lamps or ballasts are being tested. The specific values of rated input voltage and impedance needed for each size of lamp are listed in the appropriate American National Standards for high-intensity-discharge and low pressure sodium lamps, ANSI C78.1300 series (ANSI C78.40-1992, Specifications for Mercury Lamps, ANSI C78.41-2006, Guidelines for Low-Pressure Sodium Lamps, ANSI C78.42-2007, High-Pressure Sodium Lamps, ANSI C78.43-2007, Single-Ended Metal Halide Lamps, and ANSI C78.44-2006, Double-Ended Metal Halide Lamps).

ANSI C82.6-2015, Lamp Ballasts - Ballasts for High-Intensity Discharge Lamps - Methods of Measurement
Revise current ballast standard to include Methods of Measurement for low frequency square wave electronic ballasts operating metal halide lamps

ANSI C82.77-2014, ANSI for Ballasts: Harmonic Emission Limits-Related Power Quality Requirements
Supersedes the requirements for power factor (PF) and total harmonic distortion (THD) of ANSI C82.11 and ANSI C82.14. This standard specifies harmonic limits and methods of measurement for all types of lighting equipment used for general illumination (typically found in residential, commercial, and industrial applications). This standard covers lighting equipment regardless of wattage (operating input power level) or operating input current. Emission limits are only specified over a range of power or current deemed warranted at this time.

ANSI C82.77-2015, Lighting Equipment-Voltage Surge Requirements
This standard specifies voltage surge limits and testing requirements for lighting equipment. The lighting equipment covered in this standard is used for general illumination typically found in residential, commercial, and industrial applications.

ANSI C82.9-2016, ANSI for lamp ballasts: High-Intensity Discharge and Low-Pressure Sodium Lamps &™ Definitions
This standard provides definitions related to specific terms contained in HID and LPS lamps and ballast standards.

NEMA (ASC C84) (National Electrical Manufacturers Association)

ANSI C84.1-2016, Standard for Electric Power Systems and Equipment - Voltage Ratings (60 Hertz)
This standard establishes nominal voltage ratings and operating tolerances for 60-hertz electric power systems above 100 volts. It also makes recommendations to other standardizing groups with respect to voltage ratings for equipment used on power systems and for utilization devices connected to such systems. This standard includes preferred voltage ratings up to and including 1200 kV maximum system voltage, as defined in the standard. In defining minimum system voltage, voltage transients and temporary overvoltages caused by abnormal system conditions such as faults, load rejection, and the like are excluded. However, voltage transients and temporary overvoltages may affect equipment operating performance and are considered in equipment application.

NEMA (ASC W1) (National Electrical Manufacturers Association)

Safety and performance requirements for power sources applicable in welding, cutting and allied processes, and designed for industrial and professional use.
Safety and performance requirements for electrode holders applicable for welding, cutting and allied processes, and designed for industrial and professional use

ANSI/IEC 60974-12-2009, Arc Welding Equipment - Part 12: coupling devices
Safety and performance requirements for coupling devices applicable for welding, cutting and allied processes, and designed for industrial and professional use

Safety and performance requirements for cooling systems applicable for welding, cutting and allied processes, and designed for industrial and professional use

Safety and performance requirements for arc striking/stabilizing devices applicable for welding, cutting and allied processes, and designed for industrial and professional use

Safety and performance requirements for wire feeders applicable for welding, cutting and allied processes, and designed for industrial and professional use

ANSI/IEC 60974-7-2009, Arc Welding Equipment - Part 7: torches
Safety and performance requirements for torches applicable for welding, cutting and allied processes, and designed for industrial and professional use

ANSI/IEC 60974-8-2009, Arc Welding Equipment - Part 8: Gas Consoles
Safety and performance requirements for gas consoles intended to be used with combustible gases or oxygen. These gas consoles are designed to supply gases for use in arc welding, plasma cutting, gouging and allied processes in non-explosive atmospheres. The gas console can be external or internal to the power source enclosure. In the latter case, this standard also applies to the power source.

NEMA (ASC Z535) (National Electrical Manufacturers Association)
This standard sets forth the technical definitions, color standards, and color tolerances for safety colors.

ANSI Z535.2-2011, Standard for Environmental and Facility Safety Signs
Establishes requirements for a uniform visual system of identification related to potential hazards in the environment. Provides for the design, application and use of signs and placards employing this visual alerting system.

ANSI Z535.3-2011, Criteria for Safety Symbols
Provides general criteria for the design, evaluation and use of safety symbols to identify and warn against specific hazards and to provide information to avoid personal injury.

ANSI Z535.4-2011, Standard for Product Safety Signs and Labels
Sets forth performance requirements for the design, application, use and placement of safety signs and labels intended to identify potential hazards for persons using, operating, servicing or in proximity to a variety of products.

ANSI Z535.5-2011, Safety Tags and Barricade Tapes (for Temporary Hazards)
Sets forth requirements for safety tags and barricade tapes to be used to identify temporary hazards.

ANSI Z535.6-2011, Product Safety Information in Product Manuals, Instructions, and Other Collateral Materials
Sets forth requirements for the design and location of product safety messages in collateral materials for a variety of products.

NEMA (Canvas) (National Electrical Manufacturers Association)
ANSI/ICEA S-83-596-2016, Standard for Indoor Optical Fiber Cable
This standard defines optical fiber cables intended for use in the buildings of communications users. Materials, constructions and performance requirements are included in the Standard, together with applicable test procedures. Products covered by this standard are intended only for operation under conditions normally found in communication systems. Typically, these products are installed both in exposed areas (surface mounted to walls or building baseboards or in non-stationary configurations) and in concealed areas (within walls, attics, etc.), with or without external protection (such as conduit), depending upon product type and specific use. These products normally convey communications signals (voice, video, data, etc.) from place to place within a building. Products covered by this Standard may be factory terminated with connectors or splicing modules.

ANSI/ICEA S-83-596-2016, Standard for Nonmetallic Sheathed Cable, and Service Entrance Cable
This standard covers nonmetallic sheathed cable (NM) and service entrance cable applicable for residential, farm, and light industrial buildings and for Class 2 and Class III cord and Conduit Bodies for Conduit, Electrical Metallic Tubing, and fittings for use with flexible conduit and cable raceways—Rigid and Intermediate Metal Tubing, and including 1000 V 50/60 Hz AC or AC/DC.

NEMA Z535.7-2014, Standards for Cord and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Fittings
This standard covers fittings for use with non-flexible tabular raceways—Rigid and Intermediate Metal Conduit, Electrical Metallic Tubing, and fittings for use with flexible conduit and cable raceways—Rigid and Intermediate Metal Tubing, and including Flexible Metal Conduit and liquidtight flexible conduits, Armored Cable, Metal Clay Cable, Tray Cable, Mineral Insulated Cable, Flexible Cord, Nonmetallic Sheathed Cable, and Service Entrance Cable

NEMA 2011, Standard for Environmental Colors
This standard sets forth the technical definitions, color standards, and color tolerances for safety colors.

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NEMA GR 1-2007, Ground Rods and Ground Rod Couplings
This Standards Publication applies to ground rod electrodes and ground rod electrode couplings that function in accordance with the National Electrical Code? (NFPA 70-2005) and/or the National Electrical Safety Code (ANSI C2-2002). Included are materials, construction, and performance of copper bonded ground rod electrodes, zinc-coated ground rod electrodes, and stainless steel clad ground rod electrodes. This standards publication also includes information for electrode products that have been successfully used for many years but are not defined within the National Electrical Code or the National Electrical Safety Code. The items described in this Standards Publication are defined in Section 1.

NEMA KS 3-2012, Guidelines for Inspection and Preventive Maintenance of Switches Used in Commercial and Industrial Applications
Sets forth, for use by qualified personnel, a number of basic procedures that may be used for the inspection and preventive maintenance of switches used in industrial and commercial applications rated up to and including 600 V 50/60 Hz ac or ac/dc.

NEMA KS2-2013, Distribution Equipment Switch Guide, A User’s Reference
This publication covers application information for distribution equipment switches that are: a) Rated at not more than 600V and 6000A with or without a horse-power rating b) With or without provision for fuses c) With current-carrying parts and mechanisms enclosed in metallic or non-metallic cases, or that are enclosed when mounted in an enclosed switchboard, panelboard, or the like d) Manually operable by means of external handles

NEMA MW 1000-2016, Magnet Wire
MW 1000 presents in concise and convenient form all existing NEMA standards for round, rectangular, and square film-insulated and/or fibrous-covered copper and aluminum magnet wire for use in electrical apparatus. Included are the definitions, type designations, dimensions, constructions, performance, and test methods for magnet wire generally used in the winding of coils for electrical apparatus.

NEMA OS 1-2014, Sheet-Steel Outlet Boxes, Device Boxes, Covers, and Box Supports
Covers general-purpose metallic outlet and device boxes, covers and supports widely used by the consumer and designed to facilitate wire pulling, mounting of devices and connecting of conduit, cable and tubing systems.

NEMA OS 2-2014, Nonmetallic Outlet Boxes, Device Boxes, Covers, and Box Supports
Covers general-purpose nonmetallic outlet and device boxes, covers and supports widely used by the consumer and designed to facilitate wire pulling, mounting of devices and connecting of conduit, cable and tubing systems.

NEMA PB 1.1-2013, General Instructions for Proper Handling, Installation, Operation, and Maintenance of Panelboards Rated 600 Volts or less
This publication covers single panelboards or groups of panel units suitable for assembly in the form of single panelboards, including buses, and with or without switches or automatic overload protective devices (fuses or circuit breakers), or both. These units are used in the distribution of electricity at 600 volts and less with: 1600 - amperes mains or less 1200 - ampere branch circuits or less Specifically excluded are live-front panelboards, panelboards employing cast enclosures for special service conditions, and panelboards designed primarily for residential and light commercial service equipment.

NEMA PB 2.1-2013, General Instructions for Proper Handling, Installation, Operation, and Maintenance of Deadfront Distribution Switchboards Rated 600 Volts or less
This publication covers floor-mounted deadfront switchboards which consist of an enclosure, molded case and low-voltage power circuit breakers, fusible or non-fusible switches, instrument, and metering, monitoring, or control equipment, with associated interconnections and supporting structures. These units are used in the distribution of electricity at: a) 600 volts and less b. 6000 amperes or less

NEMA SB 40-2014, Communications Systems for Life Safety in Schools
This Standard covers the application, installation, location, performance, and maintenance of school emergency communications systems and their components.

The Interoperability Process Reference Manual (IPRM) defines a process by which industry stakeholders may procure, test, and assert interoperability between disparate vendors of Smart Grid products to identified standards. This is accomplished by defining the relationships between Smart Grid stakeholders invested in this goal. This Standard defines requirements and recommendations for general test policies, test suite specifications, test profiles, interoperability testing and certification authority technical programs, governance, laboratory qualifications, and (process) improvements. Finally, this Standard describes an implementation approach.

NEMA SGIC-1-2013, Smart Grid Interoperable & Conformant (SG-IC) Testing and Certification Scheme Operator Guidelines
This standard will be an implementation of the governance aspects of smart grid interoperability testing as developed in the SGIP Interoperability Process Reference Manual. The objective is to identify a single scheme to manage interoperability testing in the U.S. that will work across multiple standards (regardless of source) and electric grid domains including generation, transmission, distribution, and consumer product interoperability.

These specifications describe the systematic process of documenting, and placing into service newly installed, or retrofitted electrical power equipment and systems. This document shall be used in conjunction with the most recent edition of the ANSI/NETA ATS Standard for Acceptance Testing Specifications for Electrical Power Equipment and Systems. The individual electrical components shall be subjected to factory and field tests, as required, to validate the individual components. It is not the intent of these specifications to provide comprehensive details on the commissioning of mechanical equipment, mechanical instrumentation systems, and related components.

ANSI/NETA ETT-2015, ANSI/NETA Standard for Certification of Electrical Testing Technicians

This standard establishes minimum requirements for qualification and certification of the electrical testing technician (ETT). This standard details the minimum training and experience requirements for electrical testing technicians and provides criteria for documenting qualifications and certification. This standard details the minimum qualifications for an independent and impartial certifying body to certify electrical testing technicians.


These specifications cover the suggested field tests and inspections that are available to assess the suitability for continued service and reliability of electrical power equipment and systems. The purpose of these specifications is to assure that tested electrical equipment and systems are operational, are within applicable standards and manufacturer’s tolerances, and are suitable for continued service.

NFPA (National Fire Protection Association)

ANSI/NFPA 1-2011, Fire Code

1.1 Scope. 1.1.1 The scope includes, but is not limited to, the following: (1) Inspection of permanent and temporary buildings, processes, equipment, systems, and other fire and related life safety situations (2) Investigation of fires, explosions, hazardous materials incidents, and other related emergency incidents (3) Review of construction plans, drawings, and specifications for life safety systems, fire protection systems, access, water supplies, processes, hazardous materials, and other fire and life safety issues (4) Fire and life safety education of fire brigades, employees, responsible parties, and the general public (5) Existing occupancies and conditions, the design and construction of new buildings, remodeling of existing buildings, and additions to existing buildings (6) Design, alteration, modification, construction, maintenance, and testing of fire protection systems and equipment (7) Access requirements for fire department operations (8) Hazards from outside fires in vegetation, trash, building debris, and other materials (9) Regulation and control of special events including, but not limited to, assemblage of people, exhibits, trade shows, amusement parks, haunted houses, outdoor events, and other similar special temporary and permanent occupancies (10) Interior finish, decorations, furnishings, and other combustibles that contribute to fire spread, fire load, and smoke production (11) Storage, use, processing, handling, and on-site transportation of flammable and combustible gases, liquids, and solids (12) Storage, use, processing, handling, and on-site transportation of hazardous materials (13) Control of emergency operations and scenes (14) Conditions affecting fire fighter safety (15) Arrangement, placement, and control of on-site and supporting resources (16) Assessment of the adequacy of fire service (17) Planning, coordination, training, and exercises for fire suppression operations (18) Operational procedures (19) Planning, coordination, training, and exercises for emergency medical services operations (20) The requirements given herein are minimum. The requirements do not apply to permanently installed systems for fire extinguishment, even where portions of such systems are portable (such as hose and nozzles attached to a fixed supply of extinguishing agent)

ANSI/NFPA 10-2012, Standard for Portable Fire Extinguishers

The provisions of this standard apply to the selection, installation, inspection, maintenance, and testing of portable extinguishing equipment. Portable fire extinguishers are intended as a first line of defense to cope with fires of limited size. The selection and installation of extinguishers is independent of whether the building is equipped with automatic sprinklers, standpipe and hose, or other fixed protection equipment. (See 5.5.5, 6., 6.2.1.1, and 6.2.1.5.) The requirements given herein are minimum. The requirements do not apply to permanently installed systems for fire extinguishment, even where portions of such systems are portable (such as hose and nozzles attached to a fixed supply of extinguishing agent)

ANSI/NFPA 1000-2011, Standard for Fire Service Professional Qualifications Accreditation and Certification Systems

This standard establishes the minimum criteria for accrediting bodies; and for the assessment and validation of the process used to certify fire and related emergency response personnel to professional qualifications standards; and of nonengineering, fire-related, academic, degree-granting programs offered by institutions of higher education.

1.1* Scope. 1.1.1 Title. NFPA 101, Life Safety Code, shall be known as the Life Safety Code®, is cited as such, and shall be referred to herein as “this Code” or “the Code.” 1.1.2 Danger to Life from Fire. The Code addresses those construction, protection, and occupancy features necessary to minimize danger to life from the effects of fire, including smoke, heat, and toxic gases created during a fire. 1.1.3 Egress Facilities. The Code establishes minimum criteria for the design of egress facilities so as to allow prompt escape of occupants from buildings or, where desirable, into safe areas within buildings. 1.1.4 Other Fire-Related Considerations. The Code addresses other considerations that are essential to life safety in recognition of the fact that life safety is more than a matter of egress. The Code also addresses protective features and systems, building services, operating features, maintenance activities, and other provisions in recognition of the fact that achieving an acceptable degree of life safety depends on additional safeguards to provide adequate egress time or protection for people exposed to fire. 1.1.5* Considerations Not Related to Fire. The Code also addresses other considerations that, while important in fire conditions, provide an ongoing benefit in other conditions of use, including non-fire emergencies. 1.1.6 Areas Not Addressed. The Code does not address the following: (1)*General fire prevention or building construction features that are normally a function of fire prevention codes and building codes


This guide consists of a number of alternative approaches to life safety. Each chapter is a different system independent of the others and is to be used in conjunction with the NFPA 101, Life Safety Code.

ANSI/NFPA 102-2011, Standard for Grandstands, Folding and Telescopic Seating, Tents, and Membrane Structures

1.1 Scope. This standard addresses the following: (1) The construction, location, protection, and maintenance of grandstands and bleachers, folding and telescopic seating, tents, and membrane structures (2) Seating facilities located in the open air or within enclosed or semi-enclosed structures such as tents, membrane structures, and stadium complexes.

ANSI/NFPA 1021-2013, Standard for Fire Officer Professional Qualifications

This test shall apply to upholstered furniture mock-ups. Mock-up testing is used in assessing the relative resistance to continuing combustion of individual materials used in furniture, such as cover fabrics, filling materials, and welt tape, in realistic combinations and in an ideal geometric arrangement of the seat cushions, back, and arms of furniture items

ANSI/NFPA 1026-2013, Standard for Incident Management Personnel Professional Qualifications

This shall be a fire-test-response standard. This test method shall provide a means of measuring smoke obscuration resulting from subjecting essentially flat materials, products, or assemblies (including surface finishes) not exceeding 25 mm in thickness, to specified levels of thermal irradiance from a conical heater, in a single closed chamber, in the absence or presence of a pilot flame, and when placed in a horizontal orientation. The principal fire-test-response characteristic obtained from this test method shall be the specific optical density of smoke from the specimens tested, which is obtained as a function of time, for a period of 10 minutes. Other fire-test-response characteristics shall also be permitted to be determined. An optional fire-test-response characteristic measurable with this test method shall be the mass optical density, which is the specific optical density of smoke divided by the mass lost by the specimens during the test. This test method shall be based on ISO 5659-2, Determination of Specific Optical Density by a Single-Chamber Test, and shall provide equivalent results to ISO 5659-2. The fire-test-response characteristics obtained from this test shall be specific to the specimen tested, in the form and thickness tested, and shall not be inherent properties of the material, product, or assembly. This test method shall not provide information on the fire performance of the test specimens under fire conditions other than those conditions specified in this test method. This standard shall measure and describe the response of materials, products, or assemblies to heat and flame under controlled conditions, but shall not by itself incorporate all factors required for fire hazard or fire safety.

ANSI/NFPA 1031-2013, Standard for Professional Qualifications for Fire Inspector and Plan Examiner

This standard describes a method for determining the heat release and the smoke generation of pipe insulation assemblies mounted on steel pipes in a full-scale pipe chase.

ANSI/NFPA 1033-2013, Standard for Professional Qualifications for Fire Investigator

This standard describes a fire test method for determining the fire test response characteristics of individual fuel packages when exposed to various ignition sources. This fire test method is applicable to individual fuel packages. This fire test method is not intended to evaluate fire resistance. This standard contains detailed descriptions of three types of individual fuel packages to be investigated, as follows: (1) Single decorative object This test method shall not apply to seating furniture, mattresses, stacking chairs, interior finish, textile wall coverings, or mattress sets.

ANSI/NFPA 1035-2014, Standard for Professional Qualifications for Fire and Life Safety Educator, Public Information Officer, and Juvenile Firesetter Intervention Specialist

This standard identifies the levels of professional performance required for fire and life safety educators, public information officers (PIOs), and juvenile firesetter intervention specialists. 1.1.2 This standard specifically identifies the job performance requirements (JPRs) for a fire and life safety educator, a PIO, and a JFIS.

ANSI/NFPA 1037-2015, Standard for Professional Qualifications for Fire Marshal

This standard identifies the professional level of performance required for Fire Marshal, specifically identifying the minimum job performance requirements (JPRs) necessary to perform as a Fire Marshal.

ANSI/NFPA 1041-2011, Standard for Fire Service Instructor Professional Qualifications

1.1 Scope. This standard identifies minimum job performance requirements (JPRs) for fire service instructors

ANSI/NFPA 105-2015, Standard for the Installation of Smoke Door Assemblies and Other Opening Protective

This standard shall prescribe minimum requirements for smoke door assemblies for use in providing safety to life and protection of property from smoke.

ANSI/NFPA 1051-2015, Standard for Wildland Fire Fighter Professional Qualifications

This standard shall identify the minimum job performance requirements (JPRs) for wildland fire duties and responsibilities. A.1.1 This standard does not address prescribed fire requirements. Authorities having jurisdiction can choose to use any or all of these requirements as they deem appropriate.

ANSI/NFPA 1061-2013, Standard for Professional Qualifications for Public Safety Telecommunicator

1.1 Scope. This standard identifies the minimum job performance requirements for public safety telecommunicators.


This standard shall identify and define the minimum job performance requirements (JPRs) for a person to be considered qualified as an emergency vehicle technician (EVT) and shall apply to personnel who are engaged in the inspection, diagnosis, maintenance, repair, and testing of emergency response vehicles.

ANSI/NFPA 1081-2011, Standard for Industrial Fire Brigade Member Professional Qualifications

1.1* Scope. This standard identifies the minimum job performance requirements (JPRs) necessary to perform the duties as a member of an organized industrial fire brigade providing services at a specific facility or site.
ANSI/NFPA 1091-2014, Standard for Traffic Control Incident Management Professional Qualifications
This Committee shall have primary responsibility for documents on professional qualifications required for emergency responders in relation to their operations on roadways.

ANSI/NFPA 11-2015, Standard for Low-, Medium-, and High-Expansion Foam
This standard covers the design, installation, operation, testing, and maintenance of low-, medium-, and high-expansion foam systems for fire protection. Criteria apply to fixed, semi-fixed, or portable systems for interior and exterior hazards.

This standard covers performance requirements for emergency and standby power systems providing an alternate source of electrical power to loads in buildings and facilities in the event that the primary power source fails. Power systems covered in this standard include power sources, transfer equipment, controls, supervisory equipment, and all related electrical and mechanical auxiliary and accessory equipment needed to supply electrical power to the load terminals of the transfer equipment.

This standard shall cover performance requirements for stored electrical energy systems providing an alternate source of electrical power in buildings and facilities in the event that the normal electrical power source fails. Systems covered in this standard shall include power sources, transfer equipment, controls, supervisory equipment, and accessory equipment, including integral accessory equipment, needed to supply electrical power to the selected circuits.

ANSI/NFPA 1122-2012, Code for Model Rocketry
1.1 Scope. 1.1.1 This code shall apply to the design, construction, limitation of model rocket motors and model rocket motor reloading kits and their components, produced commercially for sale to or for use by the public for purposes of education, recreation, and sporting competition. 1.1.2 This code also shall apply to the design and construction of model rockets propelled by model rocket motors specified in 1.1.1. 1.1.3 This code also shall apply to the conduct of launch operations of model rockets specified in 1.1.2. 1.1.4 This code shall not apply to the design, construction, production, manufacture, fabrication, maintenance, launch, flight, test, operation, use, or other activity that is connected with a rocket or rocket motor where carried out or engaged in by any of the following: (1) National, state, or local government (2) Individual, firm, partnership, joint venture, corporation, or other business entity engaged as a licensed business in the research, development, production, testing, maintenance, or supply of rockets, rocket motors, rocket propellant chemicals, or rocket components or parts (3) Colleges or universities 1.1.5 This code shall not apply to the design, construction, fabrication, maintenance, production, manufacture, launch, flight, test, operation, or use of rocket-propelled model aircraft that sustain their mass against the force of gravity by aerodynamic lifting surfaces that support the aircraft during the entire duration of its flight in the air, but shall apply to the model rocket motors and their components that provide the propulsion for such model aircraft. 1.1.6 This code shall not apply to model or toy rockets propelled by compressed air, propellants, or gas. 1.1.7 This code shall apply to stored electrical energy systems.

ANSI/NFPA 1123-2013, Code for Fireworks Display
This code shall apply to the manufacture, transportation, storage, sale, and use of explosive materials. This code shall not apply to the transportation of explosive materials where under the jurisdiction of the U.S. Department of Transportation (DOT). It shall apply, however, to state and municipal supervision of compliance with “Hazardous Materials Regulations,” U.S. Department of Transportation, Title 49, Code of Federal Regulations, Parts 100-199. This code shall not apply to the transportation and use of military explosives by federal or state military agencies, nor shall it apply to the transportation and use of explosive materials by federal, state, or municipal agencies while engaged in normal or emergency performance of duties. This code shall not apply to the manufacture of explosive materials under the jurisdiction of the U.S. Department of Defense. This code also shall not apply to the distribution of explosive materials to or storage of explosive materials by military agencies of the United States, nor shall it apply to arsenals, navy yards, depots, or other establishments owned by or operated by or on behalf of the United States. This code shall not apply to pyrotechnics such as flares, fuses, and railway torpedoes. It also shall not apply to fireworks and pyrotechnic special effects as defined in NFPA 1123, Code for Fireworks Display; NFPA 1124, Code for the Manufacture, Transportation, and Storage of Fireworks and Pyrotechnic Articles; and NFPA 1126, Standard for the Use of Pyrotechnics before a Proximate Audience. This code shall not apply to model and high power rocketry as defined in NFPA 1122, Code for Model Rocketry. NFPA 1125, Code for the Manufacture of Model Rocket and High Power Rocket Motors and NFPA 1127 Code for High Power Rocket Motors

ANSI/NFPA 1125-2011, Code for the Manufacture of Model Rocket and High Power Rocket Motors
1.1 Scope. 1.1.1* This code shall apply to the manufacture of model and high power rocket motors designed, sold, and used for the purpose of propelling recoverable aero models. 1.1.2 This code shall apply to the design, construction, and reliability of model and high power rocket motors and model rocket and high power motor-reloading kits and their components, and to the limitation of propellant mass and power. 1.1.3 This code shall not apply to the sale and use of the following: (1) Model rocket motors (covered by NFPA 1122, Code for Model Rocketry) (2) High power rocket motors (covered by NFPA 1127, Code for High Power Rocketry) 1.1.4* This code shall not apply to the manufacture, transportation, and storage of fireworks. 1.1.5 This code shall not apply to the manufacture, transportation, and storage of rocket motors by the United States military or other agencies or political subdivisions of the United States. 1.1.6 This code shall not apply to the assembly of reloadable model or high power rocket motors by the user. 1.1.7 This code shall not apply to the fabrication of model rocket motors or high power rocket motors by individuals for their personal use.
ANSI/NFPA 1126-2015, Standard for the Use of Pyrotechnics Before a Proximate Audience
This standard shall provide requirements for the protection of property, operators, performers, support personnel, and the viewing audiences where pyrotechnic effects are used indoors or outdoors with a proximate audience.

ANSI/NFPA 1127-2013, Code for High Power Rocketry
Applies to the design, construction, limitation of propellant mass and power, and reliability of all high power rocket motors produced commercially for sale to and/or use by the certified user for education, recreation, and sporting competition.

ANSI/NFPA 1141-2011, Fire Protection Infrastructure for Land Development in Wildland, Rural, and Suburban Areas
1.1* Scope. This standard covers the requirements for the fire protection infrastructure in suburban and rural areas where there is an intended change of use or intended land development. A.1.1 Land use changes in suburban and rural areas often occur in areas where there might be an inadequate water supply, inadequate fire department resources, extended fire department response time, limited access, hazardous vegetation, unusual terrain, or unusual characteristics. Without the involvement of the fire department from the outset, the resulting changes could create a situation where the fire department cannot properly access structures or have the resources necessary to deal with emergencies at the property and where the occupants might not be able to escape the incident. This standard addresses the design of subdivisions and development in areas where threats of natural disasters or human-caused hazards in suburban/rural areas not addressed by other planning and development documents. Moreover, in many areas of the United States, building and fire codes may not have been adopted, in which case this standard is meant to apply.

ANSI/NFPA 1142-2011, Standard on Water Supplies for Suburban and Rural Fire Fighting
1.1 Scope. 1.1.1 This standard identifies a method for determining the minimum requirements for alternative water supplies for structural fire-fighting purposes in areas where the authority having jurisdiction determines that adequate and reliable water supply systems for fire-fighting purposes do not otherwise exist. 1.1.2 An adequate and reliable municipal-type water supply is one that is sufficient every day of the year to control and extinguish anticipated fires in the municipality, particular building, or building group served by the water supply.

ANSI/NFPA 1143-2013, Standard for Wildland Fire Management
This standard applies to purging and pressurizing for the following: (1) Electrical equipment located in areas classified as hazardous by Article 500 or Article 505 of NFPA 70 (2) Electrical equipment containing sources of flammable vapors or gases and located in either classified or unclassified areas (3) Control rooms or buildings located in areas classified as hazardous by Article 500 or Article 505 of NFPA 70 (4) Analyzer rooms containing sources of flammable vapors or gases and located in areas classified as hazardous by Article 500 or Article 505 of NFPA 70. This standard does not apply to electrical equipment located in: (1) Areas classified as Class I, Zone 0 (2) Areas classified as Class III (3) Areas where flammable liquids may be splashed or spilled on the electrical equipment.

ANSI/NFPA 1144-2013, Standard for Reducing Structure Ignition Hazards from Wildland Fire
1.1* Scope. This standard provides a methodology for assessing wildland fire ignition hazards around existing structures, residential developments, and subdivisions and improved property or planned property improvement that will be located in a wildland/urban interface area, and provides minimum requirements for new construction to reduce the potential of structure ignition from wildland fires. A.1.1 Residential developments and subdivisions are intended to include clubhouses, community meeting and activity centers, municipal buildings, offices, farm and ranch structures, and other structures within development boundaries.

ANSI/NFPA 1145-2011, Guide for the Use of Class A Foams in Manual Structural Fire Fighting
1.1.1 This document presents fundamental information for agencies planning to use Class A foam for structural fire-fighting and protection. It presents necessary and useful information on foam properties and characteristics, proportioning and discharge hardware, application techniques, and safety considerations. 1.1.2 This document describes the use and application of Class A foams that meet the requirements of NFPA 1150, Standard on Foam Chemicals for Fires in Class A Fuels. 1.1.3 This document does not apply to the use of Class A Foam in sprinkler systems or on fires involving Class B flammable or combustible liquids. 1.1.4 This document is not written for applications of Class A foam in the wildland fire environment. However, much of the material in this guide can be helpful to those who use Class A foam in wildland fire applications. See Annex B for publications that address use of Class A foam in wildland applications. 1.1.5 This document is not intended to discourage the use of future technologies and practices provided that the recommended level of safety is not lessened.

1.1 Scope. 1.1.1 This document shall provide minimum fire protection requirements for the design, manufacture, installation, and use of lasers and associated equipment. 1.1.2 Criteria for training for and responding to fire emergencies involving lasers shall be included.

ANSI/NFPA 1150-2010, Standard on Foam Chemicals for Fires in Class A Fuels
This standard specifies requirements for foam and the chemicals used to produce foam that is used to control, suppress, or prevent fires in Class A fuels.

ANSI/NFPA 1192-2011, Standard on Recreational Vehicles
1.1* Scope. This standard shall cover fire and life safety criteria for recreational vehicles.

ANSI/NFPA 1194-2013, Standard for Recreational Vehicle Parks and Campgrounds
This standard shall provide minimum construction requirements for safety and health for occupants using facilities supplied by recreational vehicle parks and campgrounds offering temporary living sites for use by recreational vehicles, recreational park trailers, and other camping units. * This standard shall not cover the design of recreational vehicles, recreational park trailers, or other forms of camping units. This standard shall not cover operational and maintenance practices for recreational vehicle parks and campgrounds.

ANSI/NFPA 12-2014, Standard on Carbon Dioxide Extinguishing Systems
1.1* Scope A.1.1 Portable carbon dioxide equipment is covered in NFPA 10. The use of carbon dioxide for inerting is covered in NFPA 69.1.1.1 This standard contains minimum requirements for carbon dioxide fire-extinguishing systems. A.1.2 This standard includes only the necessary essentials to make it workable in the hands of those skilled in this field.

This standard shall cover minimum requirements for reducing loss of life and property from fire and explosion in the following: (1) Underground bituminous coal mines (2) Coal preparation plants designed to prepare coal for shipment (3) Surface building and facilities associated with coal mining and preparation (4) Surface coal and lignite mines.

ANSI/NFPA 1201-2014, Standard for Providing Fire and Emergency Services to the Public
This standard contains requirements on the structure and operations of fire emergency service organizations (FESOs). A.1.1 Fire and emergency service organizations provide a myriad of services to the community. Public fire protection services can include, but are not limited to, fire suppression, fire prevention, public life safety education, emergency management, rescue, emergency medical service, hazardous materials response, response to other emergencies, and law enforcement (e.g., incident investigation, code application enforcement).

Because of the uniqueness and often remoteness of metal and nonmetal mines and ore processing facilities, provisions in this standard could differ from commonly accepted fire protection standards and guides devised for other types of occupancies. The provisions of this document are considered necessary to provide a reasonable level of protection from loss of life and property from fire and explosions. They reflect situations and the state of the art at the time the standard was issued.

ANSI/NFPA 1221-2015, Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems

This standard shall cover the installation, operation, and maintenance of public emergency services communications systems and facilities. This standard shall not be used as a design specification manual or an instruction manual.

ANSI/NFPA 1250-2014, Recommended Practice in Fire and Emergency Service Organization Risk Management

This recommended practice establishes minimum criteria to develop, implement, or evaluate a fire and emergency service organization (FESO) risk management program for effective risk identification, control, and financing.

ANSI/NFPA 12A-2014, Standard on Halon 1301 Fire Extinguishing Systems

This standard contains minimum requirements for total flooding Halon 1301 fire extinguishing systems. It includes only the essentials to make the standard workable in the hands of those skilled in this field. Only those skilled in this work are competent to design, install, maintain, decommission, and remove this equipment. It might be necessary for many of those charged with purchasing, inspecting, testing, approving, operating, and maintaining this equipment to consult with an experienced and competent fire protection engineer to effectively discharge their respective duties.

ANSI/NFPA 13-2015, Standard for the Installation of Sprinkler Systems

This standard provides a range of sprinkler system approaches, design development alternatives, and component options that are all acceptable. Building owners are advised to carefully evaluate proposed selections for appropriateness and preference. It shall provide requirements for the design and installation of automatic fire sprinkler systems and exposure protection sprinkler systems covered within this standard.

ANSI/NFPA 130-2013, Standard for Fixed Guideway Transit and Passenger Rail Systems

This guide applies to the design, installation, and operation of piping systems containing flammable gases, where there is a potential for ignition.

ANSI/NFPA 13D-2015, Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes

This standard shall cover the design, installation, and maintenance of automatic sprinkler systems for protection against the fire hazards in one- and two-family dwellings and manufactured homes. This standard assumes that the sprinkler system is designed to protect against a fire originating from a single ignition location.

ANSI/NFPA 13E-2014, Recommended Practice for Fire Department Operations in Properties Protected by Sprinkler and Standpipe Systems

1.1 Scope. This recommended practice provides basic procedures and information for use in fire department operations concerning properties equipped with certain fixed fire protection systems. The fixed systems covered in this recommended practice are interior automatic sprinkler systems, exterior sprinkler systems, and standpipe systems.


This standard shall cover the design and installation of automatic sprinkler systems for protection against fire hazards in residential occupancies up to and including four stories in height. This standard assumes that the sprinkler system shall be designed to protect against a fire originating from a single ignition location.

ANSI/NFPA 14-2015, Standard for the Installation of Standpipe and Hose Systems

This standard covers the minimum requirements for the installation of standpipes and hose systems.

ANSI/NFPA 140-2012, Standard on Motion Picture and Television Production Studio Soundstages, Approved Production Facilities, and Production Locations

This standard shall cover the fire protection, property protection, and life safety in motion picture and television industry soundstages, approved production facilities, and production locations. Practices, processes, materials, and facilities that are addressed by other NFPA standards shall be governed by those standards unless modified herein.

ANSI/NFPA 1401-2011, Recommended Practice for Fire Service Training Reports and Records

1.1 Scope. It is the intent of this document that fire service organizations be considered an all-inclusive term used to describe those local, municipal, state, federal, military, industrial, and private organizations with fire protection responsibilities and institutions that provide training for such organizations. 1.1.2 Fire service organizations utilizing this document for the establishment, upgrade, or evaluation of their training records and report systems should be able to document clearly the performance and ability of individual and group activities related to the following: (1) Compliance with applicable standards (2) Documentation of both internally and externally obtained career development training and education (3) Documentation for the purposes of certification and recertification (4) Cooperation with other agencies with which the organization executes joint specialty operations (e.g., emergency medical services) (5) Training required by regulatory and/or other agencies [e.g., Occupational Safety and Health Administration (OSHA), International Standards Organization (ISO)] (6) Training required to provide emergency medical care (e.g., first responder, emergency medical technician, first aid, cardiopulmonary resuscitation, automatic external defibrillations)

ANSI/NFPA 1402-2011, Guide to Building Fire Service Training Centers

1.1 Scope. This guide addresses the design and construction of facilities for fire service training. It covers the aspects that should be considered when planning a fire service training center. It should be understood that it is impractical to list every item that might be included in a training center or every type of specialty training facility that might be constructed. Therefore, the main components of a training center necessary to accomplish general fire fighter training effectively, efficiently, and safely are presented here.

ANSI/NFPA 1403-2011, Standard on Live Fire Training Evolutions

1.1 Scope. 1.1.1 This standard shall contain the minimum requirements for training all fire suppression personnel engaged in firefighting operations under live fire conditions. 1.1.2 The minimum requirements for training shall comprise a basic system that can be adapted to local conditions to serve as a standard mechanism for live fire training.


This standard shall contain minimum requirements for the training component of the Respiratory Protection Program found in NFPA 1500, Standard on Fire Department Occupational Safety and Health Program.
ANSI/NFPA 1405-2011, Guide for Land-Based Fire Departments that Respond to Marine Vessel Fires

1.1 Scope. 1.1.1 This guide identifies the elements of a comprehensive marine fire-fighting response program including, but not limited to, vessel familiarization, training considerations, pre-fire planning, and special hazards that enable land-based fire fighters to extinguish vessel fires safely and efficiently. In general, the practices recommended in this publication apply to vessels that call at United States ports or that are signatory to the Safety of Life at Sea (SOLAS) agreement. 1.1.2 This document does not consider offshore terminals or vessels on the high sea.

ANSI/NFPA 1407-2014, Standard for Training Fire Service Rapid Intervention Crews

This standard specifies the basic training procedures for fire service personnel to conduct fire fighter rapid intervention operations as specified in NFPA1710, Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments, and NFPA 1720, Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Volunteer Fire Departments. This standard specifies basic evolutions that can be adapted to local conditions and serves as a standard mechanism for the evaluation of minimum acceptable performance during training for rapid intervention activities.

ANSI/NFPA 1408-2014, Standard on Thermal Imaging Training

This standard shall contain minimum requirements for training fire service personnel to utilize fire service thermal imagers (TI).

ANSI/NFPA 1410-2014, Standard on Training for Initial Emergency Scene Operations

This standard contains the minimum requirements for evaluating training for initial fire suppression and rescue procedures used by fire department personnel engaged in emergency scene operations. A.1.1.1 It is recognized that most successful emergency scene operations efforts involve a coordinated engine, ladder, and rescue company operation. When performing the evolutions included in this standard for the purpose of training, departments should use the number of personnel normally assigned to perform the initial operations at the scene of an emergency incident. 1.1.2 This standard specifies basic evolutions that can be adapted to local conditions and serves as a standard mechanism for the evaluation of minimum acceptable performance during training for initial fire suppression and rescue activities.

ANSI/NFPA 1451-2012, Standard for Fire and Emergency Services Vehicle Operations Training Program

This standard shall contain the minimum requirements for a fire service vehicle operations training program. This standard shall outline the development of a written fire service vehicle training program, which includes the organizational procedures for training personnel, maintaining vehicles, and identifying equipment deficiencies; design; financing; and other areas. The knowledge and skills required of safety, training, maintenance, and administrative officers charged with developing and implementing the fire service vehicle operations training program shall also be outlined within this standard.


The intent of this document is to provide fire department training officers or other fire service personnel with a guide for the establishment of a community fire safety program for dwellings.


1.1 Scope. 1.1.1 This standard provides the minimum requirements for the design, installation, and system acceptance testing of water spray fixed systems for fire protection service and the minimum requirements for the periodic testing and maintenance of high-speed water spray fixed systems. 1.1.2* Water spray fixed systems shall be specifically designed to provide for effective fire control, extinguishment, prevention, or exposure protection. 1.1.3* This standard shall not apply to water spray protection from portable nozzles, sprinkler systems, monitor nozzles, water mist suppression systems, explosion suppression, or other means of application covered by other standards of NFPA.


This standard establishes life and safety requirements for both humans and animals in all types of animal housing facilities where animals are kept for any purpose, including barns, stables, kennels, animal shelters, veterinary facilities, zoos, laboratories, and racetracks. Provisions encompass design, construction, operation, and maintenance of animal housing facilities and cover performance-based design, subclassification of facilities and categorization of animals, construction and separation requirements, means of egress, and protection from fire and special hazards. Specific chapters for Class 1, 2, and 3 facilities are provided.

ANSI/NFPA 1500-2013, Standard on Fire Department Occupational Safety and Health Program

1.1 Scope. This standard shall contain minimum requirements for a fire service–related occupational safety and health program

ANSI/NFPA 1521-2007, Standard for Fire Department Safety Officer

1.1.1 This standard contains minimum requirements for the assignment, duties, and responsibilities of a health and safety officer and an incident safety officer for a fire department or other fire service organization. 1.1.2 These requirements shall be applicable to organizations providing rescue, fire suppression, emergency medical services, hazardous materials mitigation, special operations, and other emergency services, including public, military, private, and industrial fire departments. 1.1.3 This standard does not apply to industrial fire brigades that also can be known as emergency brigades, emergency response teams, fire teams, plant emergency organizations, or mine emergency response teams.

ANSI/NFPA 1561-2013, Standard on Emergency Services Incident Management System

This standard contains the minimum requirements for an incident management system to be used by emergency services to manage all emergency incidents.

ANSI/NFPA 1581-2014, Standard on Fire Department Infection Control Program

This standard contains minimum requirements for a fire department infection control program.

ANSI/NFPA 1582-2013, Standard on Comprehensive Occupational Medical Program for Fire Departments

1.1 Scope. This standard contains descriptive requirements for a comprehensive occupational medical program for fire departments. 1.1.1* The medical requirements in this standard are applicable to fire department candidates and members whose job descriptions as defined by the authority having jurisdiction (AHJ) are outlined in NFPA1001, Standard for Fire Fighter Professional Qualifications; NFPA 1002, Standard for Fire Apparatus Driver/Operator Professional Qualifications; NFPA 1003, Standard for Airport Fire Fighter Professional Qualifications; NFPA 1006, Standard for Rescue Technician Professional Qualifications; NFPA 1021, Standard for Fire Officer Professional Qualifications; and NFPA 1051, Standard for Wildland Fire Fighter Professional Qualifications. 1.1.2 This standard provides information for physicians and other health care providers responsible for fire department occupational medical programs. 1.1.3 These requirements are applicable to public, governmental, military, private, and industrial fire department organizations providing rescue, fire suppression, emergency medical services, hazardous materials mitigation, special operations, and other emergency services. 1.1.4 This standard shall not apply to industrial fire brigades that also can be known as emergency brigades, emergency response teams, fire teams, plant emergency organizations, or mine emergency response teams.
ANSI/NFPA 1583-2014, Standard on Health-Related Fitness Programs for Fire Department Members
This standard establishes the minimum requirements for the development, implementation, and management of a health-related fitness program (HRFP) for members of the fire department involved in emergency operations. A.1.1 Although this standard is intended primarily for members involved in emergency operations, fire departments are encouraged to apply the components of the health-related fitness program to all employees.

This standard establishes the minimum criteria for developing and implementing a rehabilitation process for fire department members at incident scene operations and training exercises.

This standard contains minimum requirements for the design, installation, and maintenance of foam-water sprinkler and spray systems. These systems shall be designed with the required density for either foam or water application as the controlling factor, depending on the design purpose of the system.

ANSI/NFPA 160-2015, Standard for the Use of Flame Effects Before an Audience
This standard shall provide requirements for the protection of the audience, support personnel, performers, the operator, assistants, and property where flame effects are used.

ANSI/NFPA 1600-2015, Standard on Disaster/Emergency Management and Business Continuity Programs
This standard shall establish a common set of criteria for all hazards disaster/emergency management and business continuity programs, hereinafter referred to as “the program.”

ANSI/NFPA 1620-2014, Standard for Pre-Incident Planning
This document provides criteria for developing pre-incident plans for use by personnel responding to emergencies. Not every portion of this standard is applicable to the development of all pre-incident plans. Annex A, Explanatory Material; Annex B, Case Histories; Annex C, Special or Unique Characteristics of Occupancy Classifications; and Annex D, Sample Pre-Incident Plan Field Collection Card and Facility Data Record forms provide information to the users of this document.

ANSI/NFPA 1670-2013, Standard on Operations and Training for Technical Search and Rescue Incidents
This standard shall identify and establish levels of functional capability for conducting operations at technical search and rescue incidents while minimizing threats to rescuers. This standard was developed to define levels of preparation and operational capability that should be achieved by any authority having jurisdiction (AHJ) that has responsibility for technical rescue operations. These defined levels provide an outline of a system used to manage an incident efficiently and effectively, to maximize personnel safety, and to bring about the successful rescue of victims and the eventual termination of the event. The system should be followed to increase the capabilities of the AHJ to deal successfully with even the most complex incident. The system progresses from the simple basic awareness level to the operations level, and, finally, to the technician level. It should be understood that, as the system expands, the requirements for training, operational skills, management ability, and types and amounts of equipment also expand. * The requirements of this standard shall apply to organizations that provide response to technical search and rescue incidents, including those not regulated by governmental mandates. A. Organizations providing such rescue, fire suppression, and emergency services can include fire departments, law enforcement, emergency medical services, and utility, public works, and rescue organizations. * It is not the intent of this document to be applied to individuals and their associated skills and/or qualifications. A. While organizations can meet the requirements of this standard, individuals and their skills and qualifications are outside of the scope of this standard.

ANSI/NFPA 17-2012, Standard for Dry Chemical Extinguishing Systems
This standard includes minimum requirements for dry chemical fire-extinguishing systems that discharge dry chemical from fixed nozzles or hand hose lines by means of expellant gas.

ANSI/NFPA 170-2014, Standard for Fire Safety and Emergency Symbols
This standard presents symbols used for fire safety, emergency, and associated hazards.

This standard contains minimum requirements relating to the organization and deployment of fire suppression operations, emergency medical operations, and special operations to the public by substantially all career fire departments. The requirements address functions and objectives of fire department emergency service delivery, response capabilities, and resources.

This standard contains minimum requirements relating to the organization and deployment of fire suppression operations, emergency medical operations, and special operations to the public by volunteer and combination fire departments. The requirements address functions and outcomes of fire department emergency service delivery, response capabilities, and resources. This standard also contains minimum requirements for managing resources and systems, such as health and safety, incident management, training, communications, and pre-incident planning. This standard addresses the strategic and system issues involving the organization, operation, and deployment of a fire department and does not address tactical operations at a specific emergency incident. This standard does not address fire prevention, community education, fire investigations, support services, personnel management, and budgeting.

ANSI/NFPA 1730-2015, Standard on the Use of Extinguishing Systems
The provisions of this standard apply to the design, installation, operation, testing, and maintenance of pre-engineered wet chemical fire extinguishing systems that discharge wet chemical from fixed nozzles and piping by means of expellant gas. It contains only the essential requirements and recommendations needed to make the standard workable in the hands of those skilled in this field.

ANSI/NFPA 18-2011, Standard on Wetting Agents
1.1.1 Scope. This standard is limited to qualification tests, methods of evaluation, general rules for application, and limitations for use of wetting agents as related to fire control and extinguishment. 1.1.1.1 The method whereby the wetting agent is added to water is not herein specifically set forth. The solution can be premixed in tanks or can result from bringing the wetting agent into contact with water by any suitable proportioning device, providing, however, said device shall be approved in accordance with applicable standards.
ANSI/NFPA 1801-2012, Standard on Thermal Imagers for the Fire Service

1.1 Scope. 1.1.1 This standard shall specify the design, performance, testing, and certification requirements for thermal imagers used by fire service personnel during emergency incident operations.

1.1.2 This standard shall specify requirements for new thermal imagers used by fire service personnel. 1.1.3 This standard shall not specify requirements for thermal imagers manufactured prior to the effective date of this standard. 1.1.4 This standard shall not specify requirements for thermal imagers manufactured to any other standards or other requirements. 1.1.5 This standard shall not specify requirements for any accessories and enhancements that could be attached to the certified product but that are not necessary for the certified product to meet the requirements of this standard. 1.1.6 This standard shall not be construed as addressing all of the safety concerns associated with the use of compliant thermal imagers. It shall be the responsibility of the persons and organizations that use compliant thermal imagers to establish safety and health practices and to determine the applicability of regulatory limitations prior to use.

1.1.7 This standard shall not be construed as addressing all of the safety concerns, if any, associated with the use of this standard by testing facilities. It shall be the responsibility of the persons and organizations that use this standard to establish safety and health practices and to determine the applicability of regulatory limitations prior to use of this standard for designing, manufacturing, and testing. 1.1.8 Nothing herein shall restrict any jurisdiction or manufacturer from exceeding these minimum requirements.

ANSI/NFPA 1801-2013, Standard on Selection, Care, and Maintenance of Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting

This standard specifies the minimum selection, care, and maintenance requirements for structural fire fighting protective ensembles and the individual ensemble elements that include garments, helmets, gloves, footwear, and interface components that are compliant with NFPA 1971, Standard on Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting. This standard also shall specify the minimum selection, care, and maintenance requirements for proximity fire fighting protective ensembles and the individual ensemble elements that include garments, helmets, gloves, footwear, and interface components that are compliant with NFPA 1971, Standard on Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting. This standard also shall specify requirements for both structural fire fighting and proximity fire fighting protective ensembles, ensemble elements, clothing, and equipment certified as compliant with previous editions of NFPA 1971, Standard on Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting; NFPA 1972, Standard on Helmets for Structural Fire Fighting; NFPA 1973, Standard on Gloves for Structural Fire Fighting; NFPA 1974, Standard on Protective Footwear for Structural Fire Fighting; or NFPA 1976, Standard on Protective Ensembles for Proximity Fire Fighting. This standard also shall specify the minimum selection, care, and maintenance requirements for structural fire fighting protective ensembles with optional CBRN protection and for proximity fire fighting protective ensembles with optional CBRN protection. This standard shall not specify requirements for other organizational programs such as appropriate use of structural fire apparatus and SCBA/supplied air respirator (SAR) that are used for respiratory protection during emergency operations in environments where the atmosphere is Immediately Dangerous to Life and Health (IDLH), or could become oxygen deficient or IDLH. This standard shall specify the requirements for SCBA models as detailed in Section 1.3 of this chapter. For fire departments, this standard shall specify the requirements for the SCBA selection, care, and maintenance component of the respiratory protection program required in Section 7.9 of NFPA 1500, Standard on Fire Department Occupational Safety and Health Program. This standard shall not specify requirements for any closed-circuit SCBA. This standard shall not specify requirements for other respiratory protection program components of the organization such as SCBA training, appropriate use of SCBA for operations, and breathing air quality as these program components are under the jurisdiction of other NFPA standards. This standard shall not specify requirements for accessories attached to the SCBA unless specifically addressed herein. Nothing herein shall restrict any jurisdiction from exceeding these minimum requirements.

ANSI/NFPA 1852-2012, Standard on Selection, Care, and Maintenance of Open-Circuit Self-Contained Breathing Apparatus (SCBA)

This standard specifies minimum requirements for the selection, care, and maintenance of open-circuit self-contained breathing apparatus (SCBA) and combination SCBA/supplied air respirator (SAR) that are used for respiratory protection during emergency operations in environments where the atmosphere is Immediately Dangerous to Life and Health (IDLH), or could become oxygen deficient or IDLH. This standard shall specify the requirements for SCBA models as detailed in Section 1.3 of this chapter. For fire departments, this standard shall specify the requirements for the SCBA selection, care, and maintenance component of the respiratory protection program required in Section 7.9 of NFPA 1500, Standard on Fire Department Occupational Safety and Health Program. This standard shall not specify requirements for any closed-circuit SCBA. This standard shall not specify requirements for other respiratory protection program components of the organization such as SCBA training, appropriate use of SCBA for operations, and breathing air quality as these program components are under the jurisdiction of other NFPA standards. This standard shall not specify requirements for accessories attached to the SCBA unless specifically addressed herein. Nothing herein shall restrict any jurisdiction from exceeding these minimum requirements.

ANSI/NFPA 1851-2012, Standard for Selection, Care, and Maintenance of Protective Ensembles for Technical Rescue Incidents

This standard specifies the minimum selection, care, and maintenance requirements for utility technical rescue protective, rescue and recovery technical rescue, and chemicals, biological agents, and radiological particulate [also known as chemical, biological, radiological, and nuclear (CBRN) technical rescue] ensembles and the individual ensemble elements that include garments, helmets, gloves, footwear, and interface components that are compliant with NFPA 1951, Standard on Protective Ensembles for Technical Rescue Incidents. This standard shall also specify requirements for USAR operation protective ensembles, ensemble elements, clothing, and equipment certified as compliant with the previous edition of NFPA 1951, Standard on Protective Ensemble for USAR Operations.

ANSI/NFPA 1852A-2011, Standard on Water Additives for Fire Control and Vapor Mitigation

1.1 Scope. This standard provides the minimum requirements for water additives used for the control and/or suppression of fire and mitigation of flammable vapors.

ANSI/NFPA 1901-2015, Standard for Automotive Fire Apparatus

This standard defines the requirements for new automotive fire apparatus and trailers designed to be used under emergency conditions to transport personnel and equipment and to support the suppression of fires and mitigation of other hazardous situations.

ANSI/NFPA 1906-2015, Standard for Wildland Fire Apparatus

This standard defines the minimum requirements for the design, performance, and testing of new automotive fire apparatus that are designed primarily to support wildland fire suppression operations. This standard is designed to cover new automotive fire apparatus primarily used to fight wildland fires at both on-road and off-road locations. To a limited degree, these apparatus can be used to protect exposures or fight structure fires from the exterior.

ANSI/NFPA 1911-2011, Standard for the Inspection, Maintenance, Testing, and Retirement of In-Service Automotive Fire Apparatus

1.1 Scope. 1.1.1 This standard defines the minimum requirements for establishing an inspection, maintenance, and testing program for in-service fire apparatus. 1.1.2 This standard includes guidelines for fire apparatus refurbishment and retirement. 1.1.3 This standard identifies the systems and items on a fire apparatus that are to be inspected and maintained, the frequency of such inspections and maintenance, and the requirements and procedures for conducting performance tests on components. 1.1.4 This standard provides sample forms for collecting inspection and test data.
ANSI/NFPA 1912-2015, Standard for Fire Apparatus Refurbishing
This standard specifies the minimum requirements for the refurbishing of automatic fire apparatus utilized for fire fighting and rescue operations, whether the refurbishing is done at the fire department or municipal maintenance facilities, or at the facilities of private contractors or apparatus manufacturers.

ANSI/NFPA 1917-2015, Standard for Automotive Ambulances
This standard defines the requirements for new automotive ambulances designed to be used under emergency conditions to provide medical treatment and transportation of sick or injured people to appropriate medical facilities.

ANSI/NFPA 1925-2012, Standard on Marine Fire-Fighting Vessels
This standard shall provide minimum requirements for marine fire-fighting vessels. This standard shall also provide minimum maintenance and testing requirements.

ANSI/NFPA 1931-2010, Standard for Manufacturer’s Design of Fire Department Ground Ladders
1.1.1 This standard specifies the requirements for the design of fire department ground ladders and for the design verification tests that are to be conducted by the ground ladder manufacturer. 1.1.2 The tests specified herein are the responsibility of the ladder manufacturer only and are not to be performed by fire departments.

ANSI/NFPA 1932-2010, Standard on Use, Maintenance, and Service Testing of In-Service Fire Department Ground Ladders
This standard specifies requirements for the use, maintenance, inspection, and service testing of fire department ground ladders.

ANSI/NFPA 1936-2014, Standard on Powered Rescue Tools
This standard shall specify the minimum requirements for the design, performance, testing, and product conformance verification of powered rescue tools and components. This standard shall specify the requirements for spreader, ram, cutter, and combination powered rescue tools. This standard shall also specify the requirements for cable assemblies, hose assemblies, and power unit components for powered rescue tools.

1.1 Scope. 1.1.1 This standard shall specify the minimum design, performance, testing, and certification requirements for utility technical rescue, rescue and recovery technical rescue, and chemicals, biological agents, and radiological particulate [also known as chemical, biological, radiological, and nuclear (CBRN) technical rescue] protective ensembles for use by emergency services personnel during technical rescue incidents. 1.1.2 This standard shall also specify the minimum requirements for the various elements of the utility technical rescue ensembles and the rescue and recovery technical rescue protective ensembles, including garments, helmets, gloves, footwear, interface, and eye and face protection devices. 1.1.3* This standard shall also specify the minimum requirements for the respiratory protection for the CBRN technical rescue protective ensembles. 1.1.4 This standard shall not specify requirements for respiratory protection equipment for technical rescue utility and technical rescue and recovery protective ensembles; those requirements are specified by NIOSH in 42 CFR 84, and by OSHA in 29 CFR 1910.134. 1.1.5 This standard shall establish criteria for water or wilderness operations. 1.1.6* This standard shall not specify requirements for any visibility markings. 1.1.7 This standard shall establish criteria for protection from ionizing radiation. 1.1.8 This standard shall not establish criteria for protection for any fire-fighting or hazardous materials emergencies. 1.1.9* This standard shall not specify requirements for accessories that could be attached to any ensemble or ensemble element but are not required for the ensemble or element to meet the performance of this standard. 1.1.10 Certification of Ensembles for Technical Rescue Incidents

Some performance criteria in this standard were based on the U.S. Fire Administration Study, “Protective Clothing and Equipment Needs of Emergency Responders for Urban Search and Rescue Missions.” This report documents the protective clothing and equipment needs for emergency responders engaged in surface water activities. Input was obtained from an emergency responder user requirements committee and resulted in proposed criteria based on a needs and risk analysis. The report contains survey results and test data for a number of materials.

ANSI/NFPA 1953-2015, Standard on Protective Ensembles for Contaminated Water Diving
This standard shall specify the minimum design, performance, testing, and certification requirements for protective clothing and equipment items, including dry suit, dry suit gloves and dry suit footwear designed to provide limited protection from physical, environmental and certain chemical and biological hazards that are listed herein for emergency services personnel during contaminated water dive operations.

ANSI/NFPA 1961-2012, Standard on Fire Hose
1.1 Scope. This standard shall define the design and construction requirements for new fire hose, the testing required to verify the design and construction, and the inspection and testing required of all new fire hose.

This standard shall apply to the inspection, care, and use of fire hose, fire hose couplings, and fire-fighting nozzles; the service testing of fire hose; and the associated record-keeping.

This standard shall apply to the inspection, care, and use of fire hose, fire hose couplings, and fire-fighting nozzles; the service testing of fire hose; and the associated record-keeping.

ANSI/NFPA 1963-2013, Standard for Fire Hose Connections
This standard gives the performance requirements for new fire hose couplings and adapters with nominal sizes from 3/4 in. (19 mm) through 8 in. (200 mm) and the specifications for the mating surfaces. A.1.1 Some fire-fighting organizations use small hose less than 3/4 in. (19 mm) nominal diameter fitted with garden hose couplings. Such couplings should have 0.75-11.5 NH (garden hose thread) threads conforming to ANSI/ASME B1.20.7, Standard on Hose Coupling Screw Threads.

This standard covers the requirements for new adjustable-pattern spray nozzles intended for general fire-fighting use, for marine and offshore platform fire-fighting use, or for use with fire hoses affixed to standpipe systems.

This standard shall cover the requirements for fire hose appliances up to and including 150 mm (6 in.) nominal dimension designed for connection to fire hose, fire apparatus, and fire hydrants and intended for general fire service use in controlling or conveying water.
ANSI/NFPA 1971-2013, Standard on Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting

1.1 Scope. 1.1.1 This standard shall specify the minimum design, performance, testing, and certification requirements for structural fire fighting protective ensembles and ensemble elements that include coats, trousers, coveralls, helmets, gloves, footwear, and interface components. 1.1.2 This standard shall specify the minimum design, performance, testing, and certification requirements for proximity fire fighting protective ensembles and ensemble elements that include coats, trousers, coveralls, helmets, gloves, footwear, and interface components. 1.1.3* This standard shall also specify additional optional requirements for structural fire fighting protective ensembles and proximity fire fighting protective ensembles that will provide limited protection from specified chemicals, biological agents, and radiological particulates (CBRN) terrorism agents. 1.1.3.1* This standard shall establish requirements for a single exposure wearing of protective ensembles for limited protection from specified CBRN terrorism agents. 1.1.4 This standard shall specify requirements for new structural fire fighting protective ensembles, new proximity fire fighting protective ensembles, or new elements for both ensembles. 1.1.5* This standard shall not specify requirements for any accessories that could be attached to the certified product, but are not necessary for the certification of the product to meet the requirements of this standard. 1.1.6 Other than for the certification of structural or proximity protective ensembles to the optional CBRN requirements, this standard shall not specify the respiratory protection that is necessary for proper protection with both protective ensembles. 1.1.7 Certification of compliant equipment.

ANSI/NFPA 1975-2013, Standard on Station/Work Uniforms for Emergency Services

This standard shall specify requirements for the design, performance, testing, and certification of nonprimary protective station/work uniforms and the individual garments comprising station/work uniforms. This standard shall also specify requirements for the thermal stability of textiles used in the construction of station/work uniforms. This standard shall also specify optional requirements for flame resistant textiles where such textiles are specified or claimed to be used in construction of station/work uniforms. This standard shall not specify requirements for clothing that is intended to provide primary protection from given hazard exposures.

ANSI/NFPA 1981-2012, Standard on Open-Circuit Self-Contained Breathing Apparatus (SCBA) for Emergency Services

This standard shall specify the minimum requirements for the design, performance, testing, and certification of new compressed breathing air open-circuit self-contained breathing apparatus (SCBA) and compressed breathing air combination open-circuit self-contained breathing apparatus and supplied air respirators (SCBA/SARs) for the replacement parts, components, and accessories for these respirators. This standard shall also specify the minimum requirements for the design, performance, testing, and certification of replacement parts, components, and add-on accessories for SCBA and combination SCBA/SAR certified as compliant to specific earlier editions of this standard. This standard shall not specify requirements for other types of SCBA. * This standard shall not specify requirements for any accessories that could be attached to the certified product that are not certified by the National Institute for Occupational Safety and Health (NIOSH). This standard shall not establish criteria for SCBA for water or underwater operations. This standard shall not establish criteria for protection from ionizing radiation. This standard shall not be construed as addressing all of the safety concerns associated with the use of compliant SCBA and combination SCBA/SARs. It shall be the responsibility of the persons and organizations that use compliant SCBA and combination SCBA/SARs to establish safety and health practices and to determine the applicability of regulatory limitations prior to use. This standard shall not be construed as addressing all of the safety concerns, if any, associated with the use of this standard by testing facilities. It shall be the responsibility of the persons and organizations that use compliant SCBA and combination SCBA/SARs to establish safety and health practices and to determine the applicability of regulatory limitations prior to use. 1.1.8 This standard shall not be construed as addressing all of the safety concerns, if any, associated with the use of this standard by testing facilities. It shall be the responsibility of the persons and organizations that use compliant SCBA and combination SCBA/SARs to establish safety and health practices and to determine the applicability of regulatory limitations prior to use.


This standard shall specify minimum requirements for the design, performance, testing, and certification for all Personal Alert Safety Systems (PASS) for emergency services personnel. This standard shall specify the requirements for all new PASS, including but not limited to stand-alone PASS and integrated PASS. This standard shall not specify requirements for any PASS manufactured to previous editions of this standard. * This standard shall not specify requirements for any accessories that could be attached to the certified product but that are not necessary for the certified product to meet the requirements of this standard. This standard shall not be construed as addressing all the safety concerns associated with the use of compliant PASS. It shall be the responsibility of the persons and organizations that use compliant PASS to establish safety and health practices and to determine the applicability of regulatory limitations prior to use. This standard shall not be construed as addressing all the safety concerns, if any, associated with the use of this standard by testing facilities. It shall be the responsibility of the persons and organizations that use this standard to conduct testing of PASS to establish safety and health practices and to determine the applicability of regulatory limitations prior to using this standard for any designing, manufacturing, and testing. Nothing herein is intended to restrict any jurisdiction or manufacturer from exceeding these minimum requirements.


1.1 Scope. 1.1.1 This standard shall specify minimum design, performance, testing, and certifications requirements for life safety rope, escape rope, water rescue throwlines, life safety harnesses, belts, and auxiliary equipment for emergency services personnel. 1.1.2 This standard shall specify requirements for new life safety rope, escape rope, water rescue throwlines, life safety harnesses, belts, and auxiliary equipment. 1.1.3 This standard shall not specify requirements for any accessories that could be attached to the certified product, but are not necessary for the certified product to meet the requirements of this standard. 1.1.4 This standard shall not specify requirements for any utility rope. 1.1.5 This standard shall not specify requirements for any rope or associated equipment designed for mountain rescue, cave rescue, lead climbing operations, or where expected hazards and situations dictate other performance requirements. 1.1.6* This standard shall not specify requirements for any rope or equipment for fall protection pertaining to employees of general industry or the construction and demolition industry. 1.1.7 This standard shall not be construed as addressing all of the safety concerns associated with the use of compliant life safety rope or associated equipment. It shall be the responsibility of the persons and organizations that use compliant life safety rope or associated equipment to establish safety and health practices and determine the applicability of regulatory limitations prior to use. 1.1.8 This standard shall not be construed as addressing all of the safety concerns, if any, associated with the use of this standard by testing facilities. It shall be the responsibility of the persons and organizations that use compliant life safety rope or associated equipment to establish safety and health practices and determine the applicability of regulatory limitations prior to use.


1.1 This standard shall specify the minimum design, performance, testing, and certification requirements for respirators to provide protection from inhalation hazards for personnel conducting wildland fire fighting operations. 1.1.2 This standard shall specify respirator requirements only for use in non-IDLH (Immediate Dangerous to Life and Health) wildland environments during wildland fire fighting operations.

This standard shall specify the minimum requirements for breathing air quality for fire and emergency services organizations that use atmosphere-supplying respirators. This standard shall specify the requirements for the breathing air quality component of the respiratory protection program required by NFPA 1500, Standard on Fire Department Occupational Safety and Health Program. This standard shall not specify requirements for air quality for any other applications. This standard shall not specify requirements for medical-grade oxygen. This standard shall not be construed as addressing all of the safety concerns, if any, associated with its use. It shall be the responsibility of the persons and organizations that use this standard to establish safety and health practices and determine the applicability of regulatory limitations prior to use of this standard. Nothing herein shall restrict any jurisdiction or breathing air provider from exceeding these minimum requirements.


This standard shall specify minimum design, performance, certification, and documentation requirements; and test methods for vapor‐protective ensembles and individual elements for chemical vapor protection; and additional optional criteria for chemical flash fire escape protection and liquefied gas protection.


1.1.1* This standard shall specify minimum design, performance, certification, and documentation requirements; test methods for liquid splash‐protective ensembles and liquid splash‐protective clothing; and additional optional criteria for chemical flash fire protection. 1.1.2 This standard shall apply to the design, manufacturing, and certification of new liquid splash‐protective ensembles or new liquid splash‐protective clothing items. This edition of this standard shall not apply to liquid splash‐protective ensembles or liquid splash‐protective clothing items manufactured to previous editions of NFPA 1992, Standard on Liquid Splash‐Protective Suits for Hazardous Chemical Emergencies (former title). 1.1.3 This standard shall not apply to protection from chemical or biological warfare agents or from chemical or biological terrorism incidents. Such protection shall be provided by vapor‐protective ensembles that are also compliant with the additional optional criteria for chemical and biological terrorism vapor‐protective ensembles as specified in NFPA 1991, Standard on Vapor‐Protective Ensembles for Hazardous Materials Emergencies. 1.1.4* This standard shall not apply to protective ensembles or clothing for hazardous materials emergencies involving known or suspected carcinogens, hazardous materials with known skin toxicity, or hazardous material vapor atmospheres. 1.1.5 This standard shall not apply to protective ensembles or clothing for any fire‐fighting applications and shall not provide criteria for protection from radiological, biological, liquefied gas, or cryogenic liquid hazards, or against explosive vapor atmospheres. 1.1.6 This standard shall not apply to the respiratory protection that is specified by NFPA 1991, Standard on Breathing Air Quality for Emergency Services Respiratory Protection.

ANSI/NFPA 1994-2011, Standard on Protective Ensembles for First Responders to CBRN Terrorism Incidents

1.1 Scope. 1.1.1 This standard shall establish the minimum requirements for the design, performance, testing, documentation, and certification of protective ensembles and ensemble elements for protection from chemicals, biological agents, and radiological particulates (CBRN) terrorism agents. 1.1.2* This standard shall establish requirements for protective ensembles and ensemble elements that are worn for a single exposure at incidents involving CBRN terrorism agents. 1.1.3 This standard shall establish requirements for new CBRN protective ensembles and ensemble elements. 1.1.4* This standard shall not establish requirements for respiratory protection for incidents involving CBRN terrorism agents. Appropriate respiratory protection for the incidents involving specific CBRN terrorism agent exposure is a critical part of overall protection and shall be specified and provided by the authority having jurisdiction. 1.1.5 This standard shall not establish requirements for any fire‐fighting applications. 1.1.6* This standard shall not establish requirements for protection at incidents involving ionizing radiation, liquefied gas, cryogenic liquid hazards, explosives, or explosive atmospheres. 1.1.7* CBRN protective ensembles and ensemble elements that are certified as compliant with NFPA1994 shall be permitted also to be certified to NFPA1991, Standard on Vapor‐Protective Ensembles for Hazardous Materials Emergencies, NFPA1992, Standard on Liquid Splash‐Protective Ensembles and Clothing for Hazardous Materials Emergencies, and the single‐use requirements of NFPA 1999, Standard on Protective Clothing for Emergency Medical Operations. 1.1.8 This standard shall not apply to ionizing radiation.
This standard shall specify the minimum documentation, design, performance, testing, and certification requirements for new single-use and new multiple-use emergency medical protective clothing, including garments, gloves, footwear, and face protection devices, used by fire and emergency services personnel during emergency medical operations. * This standard shall not be interpreted as providing criteria for protection from radiological agents, from hazardous chemicals, from flammable or explosive atmospheres, or from thermal hazards associated with fire fighting. * This standard shall not be interpreted as providing criteria for protection from blood and body fluid-borne pathogens that are airborne. This standard shall not be interpreted as providing criteria for respiratory protection. This standard shall not be interpreted as providing criteria for protection from chemical and biological terrorism agents. Certification of emergency medical garments, emergency medical examination gloves, emergency medical work gloves, emergency medical footwear, emergency medical footwear covers, or emergency medical face protection devices, or cleaning gloves to the requirements of this standard shall not preclude certification to additional appropriate standards where the garments, gloves, footwear, or face protection devices meet all applicable requirements of each standard. This standard shall not be construed as addressing all of the safety concerns, if any, associated with its use. It shall be the responsibility of the persons and organizations that use this standard to establish safety and health practices and determine the applicability of regulatory limitations prior to use of this standard. * Alcoholic beverages shall not be consumed.

ANSI/NFPA 2-2015, Hydrogen Technologies Code
The purpose of this code shall be to provide fundamental safeguards for the generation, installation, storage, piping, use, and handling of hydrogen in compressed gas (GH2) form or cryogenic liquid (LH2) form. This code shall apply to the production, storage, transfer, and use of hydrogen in all occupancies.

This standard deals with the selection and installation of pumps supplying liquid for private fire protection. This document shall include liquid supplies; suction, discharge, and auxiliary equipment; power supplies, including power supply arrangements; electric drive and control; diesel engine drive and control; steam turbine drive and control; and acceptance tests and operation.

ANSI/NFPA 2001-2014, Standard on Clean Agent Fire Extinguishing Systems
This standard contains minimum requirements for total flooding and local application clean agent fire extinguishing systems. It does not cover fire extinguishing systems that use carbon dioxide or water as the primary extinguishing media, which are addressed by other NFPA documents.

This standard contains the requirements for the design, installation, operation, testing, and maintenance of condensed and dispersed aerosol fire-extinguishing systems for total flooding applications. * This standard also covers performance requirements and methods of testing for condensed aerosol systems, dispersed aerosol systems, and associated components.

ANSI/NFPA 204-2014, Standard for Smoke and Heat Venting
This standard shall apply to the design of venting systems for the emergency venting of products of combustion from fires in buildings. The provisions of Chapters 4 through 10 shall apply to the design of venting systems for the emergency venting of products of combustion from fires in nonsprinklered, single-story buildings using both hand calculations and computer-based solution methods as provided in Chapter 9. Chapter 11 shall apply to venting in sprinkered buildings.

This standard applies to the design, installation, maintenance, and inspection of all chimneys, fireplaces, venting systems, and solid fuel-burning appliances.

ANSI/NFPA 2112-2012, Standard on Flame-Resistant Garments for Protection of Industrial Personnel Against Flash Fire
1.1 Scope. The standard shall specify the minimum performance requirements and test methods for flame-resistant fabrics and components and the design and certification requirements for garments for use in areas at risk from flash fires.

ANSI/NFPA 2113-2011, Standard on Selection, Care, Use, and Maintenance of Flame-Resistant Garments for Protection of Industrial Personnel Against Flash Fire
1.1 Scope. * This standard shall specify the minimum selection, care, use, and maintenance requirements for flame-resistant garments for use in areas at risk from flash fires by industrial personnel that are compliant with NFPA 2112, Standard on Flame-Resistant Garments for Protection of Industrial Personnel Against Flash Fire. * This standard shall not apply to protective clothing for wildland fire fighting, technical rescue, structural fire fighting, proximity fire fighting, or any other fire-fighting operations, or hazardous materials emergencies.

ANSI/NFPA 2114-2015, Standard on Water-Cooling Towers
This standard applies to fire protection for field erected and factory-assembled water-cooling towers of combustible construction or those in which the fill is of combustible material.

ANSI/NFPA 22-2012, Standard for Water Tanks for Private Fire Protection
This standard provides the minimum requirements for the design, construction, installation, and maintenance of tanks and accessory equipment that supply water for private fire protection, including the following: (1) Gravity tanks, suction tanks, pressure tanks, and embankment-supported coated fabric suction tanks (2) Towers (3) Foundations (4) Pipe connections and fittings (5) Valve enclosures (6) Tank filling (7) Protection against freezing

ANSI/NFPA 220-2011, Standard on Types of Building Construction
1.1 Scope. This standard defines types of building construction based on the combustibility and the fire resistance rating of a building's structural elements. Fire walls, nonbearing exterior walls, nonbearing interior partitions, fire barrier walls, shaft enclosures, and openings in walls, partitions, floors, and roofs are not related to the types of building construction and are regulated by other standards and codes, where appropriate.

ANSI/NFPA 221-2011, Standard for High Challenge Fire Walls, Fire Walls, and Fire Barrier Walls
1.1 Scope. This standard specifies requirements for the design and construction of high challenge fire walls, fire walls, and fire barrier walls including protection of openings and penetrations.

ANSI/NFPA 225-2012, Model Manufactured Home Installation Standard
This model standard shall cover the installation of manufactured homes wherever sited in the United States and its territories. The manufacturer's installation instructions shall apply under either of the following conditions: (1) To items not covered by this standard (2) Where the manufacturer's approved installation instructions provide a specific method of performing a specific operation or assembly A.1.1 Utilization of this standard by the homeowner and installation crew and use of a registered professional engineer in those unusual circumstances as required by this standard will help ensure the homeowner of a well-built, safe, and affordable home. This standard contains instructions, including specifications and procedures, for installation of utility connections of a manufactured home. It has been written in an objective manner so that it can be understood by those who are trained in the installation of manufactured homes and who are properly licensed. It discusses the installation of the home from preparation of the site through final inspection. It includes many tables and figures giving important data for proper installation.
ANSI/NFPA 232-2012, Standard for the Protection of Records

1.1 Scope. 1.1.1 This standard provides requirements for records protection equipment and facilities and records-handling techniques that provide protection of records in a variety of media forms from the hazards of fire. 1.1.2 This standard does not consider forcible entry. 1.1.3 This standard covers the following categories of records storage environments in ascending order of risk tolerance: (1) Vaults (2) Archives (3) File rooms (4) Compartmented records centers (5) Records centers

ANSI/NFPA 25-2013, Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems

This document establishes the minimum requirements for the periodic inspection, testing, and maintenance of water-based fire protection systems, including land-based and marine applications.

ANSI/NFPA 252-2011, Standard Methods of Fire Tests of Door Assemblies

1.1 Scope. This standard prescribes standardized fire and hose stream test procedures that apply to fire door assemblies intended to be used to retard the spread of fire through door openings in fire-resistant walls.

1.1 Scope. 1.1.1 This test method is intended to provide a means for assessing the lethal toxic potency of combustion products produced from a material or product ignited when exposed to a radiant flux. 1.1.2 This test method has been designed to generate toxic potency data on materials and products (including composites) for use in fire hazard analysis. It is also permitted to be used to assist in the research and development of materials and products. 1.1.3 Lethal toxic potency values associated with 30-minute exposures are predicted using calculations that employ combustion atmospheric analytical data for carbon monoxide, carbon dioxide, oxygen (vitiation), and, if present, hydrogen cyanide, hydrogen chloride, carbon monoxide, carbon dioxide, oxygen (vitiation), and hydrogen bromide. The calculation method is therefore limited to those materials and products whose smoke toxicity can be attributed to those toxicants. 1.1.4 Specimens are exposed to a radiant heating flux with an electric spark ignition. 1.1.5 Specimens tested are representative of finished products, including composite and combination systems. 1.1.6 This standard is not intended to address all safety issues associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and to determine the applicability of regulatory limitations (especially with regard to the institutional care and use of experimental test animals) prior to use. (For specific hazard requirements, see Section 6.1.)


This shall be a fire-test-response standard. This test method shall provide a means of measuring smoke obscuration resulting from subjecting essentially flat materials, products, or assemblies (including surface finishes) not exceeding 25 mm in thickness, to specified levels of thermal irradiance from a conical heater, in a single closed chamber, in the absence or presence of a pilot flame, and when placed in a horizontal orientation. The principal fire-test-response characteristic obtained from this test method shall be the specific optical density of smoke from the specimens tested, which is obtained as a function of time, for a period of 10 minutes. Other fire-test-response characteristics shall also be permitted to be determined. An optional fire-test-response characteristic measurable with this test method shall be the mass optical density, which is the specific optical density of smoke divided by the mass lost by the specimens during the test. This test method shall be based on ISO 5659-2, Determination of Specific Optical Density by a Single-Chamber Test, and shall provide equivalent results to ISO 5659-2. The fire-test-response characteristics obtained from this test shall be specific to the specimen tested, in the form and thickness tested, and shall not be inherent properties of the material, product, or assembly. * This test method shall not provide information on the fire performance of the test specimens under fire conditions other than those conditions specified in this test method. This standard shall measure and describe the response of materials, products, or assemblies to heat and flame under controlled conditions, but shall not by itself incorporate all factors required for fire hazard or fire performance.


1.1.1* This test method measures the response of materials exposed to controlled levels of radiant heating, with or without an external igniter. 1.1.2 This test method determines the ignitibility, heat release rate, mass loss rates, effective heat of combustion, and visible smoke development of materials and products. 1.1.3* This test method tests the specimen in the horizontal orientation.


This standard describes a method for determining the heat release and the smoke generation of pipe insulation assemblies mounted on steel pipes in a full-scale pipe chase.


1.1 Scope. 1.1.1* This method of fire tests for a thermal barrier for foam plastic insulation (herein referred to as thermal barrier) is applicable to building construction materials, products, or assemblies intended to be used to protect foam plastic insulation from direct fire exposure. 1.1.2 The performance of the thermal barrier is evaluated by its ability to limit the temperature rise on its unexposed surface and by the ability of the thermal barrier to remain intact in order to provide protection from ignition of the foam plastic insulation during a standard fire exposure.

ANSI/NFPA 276-2014, Standard Method of Fire Tests for Determining the Heat Release Rate of Roofing Assemblies with Combustible Above-Deck Roofing Components

This standard describes a method for determining the heat release rate from below the deck of roofing assemblies that have combustible above-deck roofing components when the assemblies are exposed to a fire from below the roof deck. 1.1.2 The performance of the above-deck roofing assembly is evaluated by determining the heat release rate below the deck of the roof test specimen.


This test provides a method of determining the flammability characteristics of exterior, non-load-bearing wall assemblies/panels. The test method described is intended to evaluate the inclusion of combustible components within wall assemblies/panels of buildings that are required to be of non-combustible construction. It is intended to simulate the tested wall assemblies’ fire performance.


This standard describes a method for determining the contribution of interior finish materials to room fire growth during specified fire exposure conditions.
ANSI/NFPA 306-2013, Standard for the Control of Gas Hazards on Vessels

This standard applies to the design, location, installation, maintenance, and use of devices and systems that vent the combustion gases and pressures resulting from a deflagration within an enclosure so that structural and mechanical damage is minimized.


This standard shall provide general principles for the construction and fire protection of marine terminals, piers, and wharves. Nothing in this standard shall supersede any of the regulations of governmental or other regulatory authority. The provisions of this standard shall reflect situations and state-of-the-art techniques at the time the standard was issued.


This code is recommended for use as the basis for legal regulations. Its provisions are intended to reduce the hazards of motor fuels to a degree consistent with reasonable public safety, without undue interference with public convenience and necessity. This code shall apply to motor fuel dispensing facilities; marine/motor fuel dispensing facilities; and motor fuel dispensing facilities located inside buildings, at fleet vehicle motor fuel facilities, and at farms and isolated construction sites.

ANSI/NFPA 30B-2014, Code for the Manufacture and Storage of Aerosol Products

This code shall apply to the manufacture, storage, and display of aerosol products. This code shall not apply to post-consumer processing of aerosol containers. This code shall not apply to containers that do not meet the definition of Aerosol Container. Metal containers that contain a product that meets the definitions in 3.3.1 and 3.3.3, but are larger than 1000 ml (33.8 fl oz) shall not be classified as aerosol products, and this code shall not apply to the manufacture, storage, and display of such containers.

ANSI/NFPA 31-2015, Standard for the Installation of Oil-Burning Equipment

This standard shall apply to the installation of stationary liquid fuel–burning appliances, including but not limited to industrial-, commercial-, and residential-type steam, hot water, or warm air heating appliances; domestic-type range burners; space heaters; and portable liquid fuel–burning equipment


This standard shall apply to vessels during the course of construction, conversion, repairs, or while laid up. It shall not apply to situations where it is in conflict with or superseded by requirements of any government regulatory agency.

ANSI/NFPA 318-2011, Standard for the Protection of Semiconductor Fabrication Facilities

1.1 Scope. This standard applies to semiconductor fabrication facilities and comparable fabrication processes, including research and development areas in which hazardous chemicals are used, stored, and handled and containing what is herein defined as a cleanroom or clean zone, or both.

ANSI/NFPA 32-2015, Standard for Drycleaning Plants

This standard shall apply to establishments hereinafter defined as drycleaning plants.

ANSI/NFPA 326-2014, Standard for the Safeguarding of Tanks and Containers for Entry, Cleaning, or Repair

This standard shall apply to the safeguarding of tanks or containers operating at nominal atmospheric pressure that contain or have contained flammable or combustible liquids or other hazardous substances and related vapors or residues.

ANSI/NFPA 329-2014, Recommended Practice for Handling Releases of Flammable and Combustible Liquids and Gases

This recommended practice provides methods for responding to fire and explosion hazards resulting from the release of a flammable or combustible liquid, gas, or vapor that can migrate to a subsurface structure. 1.1.2 Although this recommended practice is intended to address only fire and explosion hazards, other authorities should be consulted regarding the environmental and health impacts and other hazardous conditions of such releases.

ANSI/NFPA 33-2015, Standard for Spray Application Using Flammable or Combustible Materials

This standard shall apply to the spray application of flammable or combustible materials either continuously or intermittently by any of the following methods: Compressed air atomization; Airless or hydraulic atomization, Electrostatic application methods, Other means of atomized application. This standard shall also apply to the application of flammable or combustible materials either continuously or intermittently by any of the following methods: Fluidized bed application methods, Electrostatic fluidized bed application methods Other means of fluidized application

ANSI/NFPA 34-2014, Standard for Dipping, Coating, and Printing Processes Using Flammable or Combustible Liquids

This standard shall apply to dipping, roll coating, flow coating, curtain coating, printing, cleaning, and similar processes, hereinafter referred to as coating processes or processes, in which articles or materials are passed through tanks, vats, or containers, or passed over rollers, drums, or other process equipment that contain flammable or combustible liquids.

ANSI/NFPA 35-2015, Standard on Halon 1301 Fire Extinguishing Systems

This standard shall apply to facilities that use flammable and combustible liquids, as herein defined, to manufacture organic coatings for automotive, industrial, institutional, household, marine, printing, transportation, and other applications.


This guide is intended to protect workers who enter into confined spaces for inspection or testing or to perform associated work from death and from life-threatening and other injuries or illnesses and to protect facilities, equipment, non–confined space personnel, and the public from injuries associated with confined space incidents.

ANSI/NFPA 36-2012, Standard for Solvent Extraction Plants

This standard shall apply to the commercial scale extraction processing of animal and vegetable oils and fats by the use of Class I flammable hydrocarbon liquids, hereinafter referred to as “solvents.” A. Extraction processes that use flammable liquids but are not within the scope of NFPA 36 might be within the scope of NFPA 30, Flammable and Combustible Liquids Code, and the user is referred to that document for guidance. (See Chapter 3 for definitions of terms, including “extraction process” and “solvent.”) This standard shall also apply to any equipment and buildings that are located within 30 m (100 ft) of the extraction process. This standard shall also apply to the unloading, storage, and handling of solvents, regardless of distance from the extraction process. This standard shall also apply to the means by which material to be extracted is conveyed from the preparation process to the extraction process. This standard shall also apply to preparation and meal finishing processes that are connected by conveyor to the extraction process, regardless of intervening distance. * This standard shall not apply to the storage of raw materials or finished products. A. See NFPA 61, Standard for the Prevention of Fires and Dust Explosions in Agricultural and Food Processing Facilities. This standard shall not apply to extraction processes that use liquids that are miscible with water. This standard shall not apply to extraction processes that use flammable gases, liquefied petroleum gases, or nonflammable gases. 0 This standard shall prohibit the use of processes that would produce flammable or nonflammable gases, or liquids, that would be flammable when in intimate mixture with air. This standard shall prohibit the use of processes that would produce flammable or nonflammable gases, or liquids, that would be flammable when in intimate mixture with air.

ANSI/NFPA 37-2014, Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines

This standard establishes criteria for minimizing the hazards of fire during the installation and operation of stationary combustion engines and gas turbines.
ANSI/NFPA 385-2011, Standard for Tank Vehicles for Flammable and Combustible Liquids

1.1 Scope. 1.1.1* This standard shall apply to tank vehicles used for the transportation of asphalt or normally stable flammable and combustible liquids with flash points below 200°F (93°C). 1.1.2 This standard shall also provide minimum requirements for the design and construction of cargo tanks and their appurtenances and shall set forth certain matters pertaining to tank vehicles. 1.1.3 The provisions of this standard shall not preclude the use of additional safeguards for tank vehicles used for the transportation of flammable and combustible liquids having characteristics that introduce additional factors such as high rates of expansion, instability, corrosiveness, and toxicity. 1.1.4 The provisions of this standard shall also apply to cutback asphalts that have flash points below 100°F (37.8°C) and to liquids transported at temperatures elevated above their flash points. 1.1.5 The requirements for aircraft fuel servicing tank vehicles shall be in accordance with NFPA 407, Standard for Aircraft Fuel Servicing. 1.1.6 A tank vehicle transporting a flammable or combustible liquid in interstate service shall be considered to be in compliance with this standard while it is in interstate service if it meets the requirements of the U.S. Department of Transportation 49 CFR 171–179, “Hazardous Materials Regulations.”

ANSI/NFPA 40-2015, Standard for the Storage and Handling of Cellulose Nitrate Film

This standard shall apply to all facilities that are involved with the storage and handling of cellulose nitrate based film. 1.1.2 This standard shall not apply to the storage and handling of film having a base other than cellulose nitrate.


The Code’s fire and life safety requirements are applicable to a wide range of substances including but not limited to ammonium nitrate solids and liquids, corrosive solids and liquids, flammable solids, organic peroxide formulations, oxidizers, pyrophoric solids and liquids, toxic and highly toxic solids and liquids, unstable (reactive) solids and liquids, water-reactive solids and liquids. Compressed gases and cryogenic fluids are included within the context of NFPA 5.
1.1 The special fire protection required when handling explosive materials (See NFPA 495, Explosive Materials Code.) shall not cover the following: (1) The special fire protection required when handling explosive materials, including scrap, that exhibit combustion characteristics of aluminum, alkali metals, magnesium, tantalum, titanium, or zirconium shall be subject to the requirements of the metal whose combustion characteristics they most closely match.

1.1.2 Operations where metal or metal alloys are subjected to processing or finishing operations that produce combustible powder or dust. 1.1.2.2 Operations where metal or metal alloys are subjected to processing or finishing operations that produce combustible powder or dust shall include, but shall not be limited to, machining, sawing, grinding, buffing, and polishing.

1.1.3 Metals, metal alloy parts, and those materials, including scrap, that exhibit combustion characteristics of alkali metals, aluminum, magnesium, niobium, tantalum, titanium, or zirconium are subject to the requirements of the metal whose combustion characteristics most closely match. 1.1.4 Metals and metal alloy parts and those materials, including scrap, that do not exhibit combustion characteristics of alkali metals, aluminum, magnesium, niobium, tantalum, titanium, or zirconium are subject to the requirements of Chapter 10.

1.1.5 This standard shall not apply to the transportation of metals in any form on public highways and waterways or by air or rail. 1.1.6 This standard shall not apply to the primary production of aluminum, magnesium, and lithium. 1.1.7 This standard shall apply to laboratories that handle, use, or store more than 1/2 lb of alkali metals or 2 lb aggregate of other combustible metals, excluding alkali metals.

1.1.8 This standard does not apply to engines and engine accessories or to engine test facilities where fuels other than hydrocarbon fuels are used.


1.1 Scope. This guide describes the elements of an airport/community emergency plan that require consideration before, during, and after an emergency has occurred. The scope of the airport/community emergency plan should include command, communication, and coordination functions for executing the Plan. Throughout this document, the airport/community emergency plan will be referred to as the “Plan.”

1.1.1 This standard shall apply to laboratory buildings, laboratory units, and laboratory work areas whether located above or below grade in which chemicals, as defined, are handled or stored. This standard contains requirements, but not all-inclusive requirements, for handling and storage of chemicals where laboratory-scale operations are conducted and shall not cover the following: (1) The special fire protection required when handling explosive materials (See NFPA 495, Explosive Materials Code.) (2) The special fire protection required when handling radioactive materials.

ANSI/NFPA 450-2012, Guide for Emergency Medical Services and Systems

1.1 Scope. This document is designed to assist individuals, agencies, organizations, or systems as well as those interested or involved in emergency medical services (EMS) system design.


1.1 Scope. 1.1.1 This standard shall identify the minimum levels of competence required by responders to emergencies involving hazardous materials/weapons of mass destruction (WMD).

1.1.2 This standard shall apply to any individual or member of any organization who responds to hazardous materials/WMD incidents. 1.1.3 This standard shall cover the competencies for awareness level personnel, operations level responders, hazardous materials technicians, incident commanders, hazardous materials officers, hazardous materials safety officers, and other specialist employees. A.1.1.1 Outside the United States, hazardous materials might be called dangerous goods (see Annex H). Weapons of mass destruction (WMD) are known by many different abbreviations and acronyms, including CBRNE (chemical, biological, radiological, nuclear, explosive), B-NICE (biological, nuclear, incendiary, chemical, explosive), COBRA (chemical, ordinance, biological, radiological agents), and NBC (nuclear, biological, chemical).


1.1 Scope. This standard identifies the levels of competence required of emergency medical services (EMS) personnel who respond to incidents involving hazardous materials or weapons of mass destruction (WMD). It specifically covers the requirements for basic life support and advanced life support personnel in the pre-hospital setting. 1.1.1 This standard is based on the premise that all EMS responders are trained to meet at least the core competencies of the operations level responders as defined in Chapter 5 of NFPA 472. Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents.
This code shall apply to the manufacture, transportation, storage, sale, and use of explosive materials. This code shall not apply to the transportation of explosive materials where under the jurisdiction of the U.S. Department of Transportation (DOT). It shall apply, however, to state and municipal supervision of compliance with “Hazardous Materials Regulations,” U.S. Department of Transportation, Title 49, Code of Federal Regulations, Parts 100-199. This code shall not apply to the transportation and use of military explosives by federal or state military agencies, nor shall it apply to the transportation and use of explosive materials by federal, state, or municipal agencies while engaged in normal or emergency performance of duties. This code shall not apply to the manufacture of explosive materials under the jurisdiction of the U.S. Department of Defense. This code also shall not apply to the distribution of explosive materials to or storage of explosive materials by military agencies of the United States, nor shall it apply to arsenals, navy yards, depots, or other establishments owned by or operated by or on behalf of the United States. This code shall not apply to pyrotechnics such as flares, fuses, and railway torpedoes. It also shall not apply to fireworks and pyrotechnic special effects as defined in NFPA 1123, Code for Fireworks Display; NFPA 1124, Code for the Manufacture, Transportation, and Storage of Fireworks and Pyrotechnic Articles; and NFPA 1126, Standard for the Use of Pyrotechnics before a Proximate Audience. This code shall not apply to model and high power rocketry as defined in NFPA 1122, Code for Model Rocketry; NFPA 1125, Code for the Manufacture of Model Rocket and High Speed Model Solid-propellant Rocket Motor Cases; and NFPA 1137, Standard for the Use of Pyrotechnics before a Proximate Audience.

ANSI/NFPA 496-2012, Standard for Purged and Pressurized Enclosures for Electrical Equipment
This standard applies to purging and pressurizing for the following: (1) Electrical equipment located in areas classified as hazardous by Article 500 or Article 505 of NFPA 70; (2) Electrical equipment containing sources of flammable vapors or gases and located in either classified or unclassified areas; (3) Control rooms or buildings located in areas classified as hazardous by Article 500 or Article 505 of NFPA 70; (4) Analyzer rooms containing sources of flammable vapors or gases and located in areas classified as hazardous by Article 500 or Article 505 of NFPA 70.

ANSI/NFPA 497-2011, Recommended Practice for the Classification of Flammable Liquids, Gases, or Vapors and of Hazardous (Classified) Locations for Electrical Installations in Chemical Process Areas
1.1 Scope. 1.1.1 This recommended practice applies to those locations where flammable gases or vapors, flammable liquids, or combustible liquids are processed or handled, and where their release into the atmosphere could result in their ignition by electrical systems or equipment. 1.1.2 This recommended practice provides information on specific flammable gases and vapors, flammable liquids, and combustible liquids whose relevant combustion properties have been sufficiently identified to allow their classification into the groups established by NFPA 70, National Electrical Code (NEC), for proper selection of electrical equipment in hazardous (classified) locations. The tables of selected combustible materials contained in this document are not intended to be all-inclusive. 1.1.3 This recommended practice applies to chemical process areas. As used in this document, a chemical process area could be a large, integrated chemical process plant or it could be a part of such a plant. It could be a part of a manufacturing facility where flammable gases or vapors, flammable liquids, or combustible liquids are produced or used in chemical reactions, or are handled or used in certain unit operations such as mixing, filtration, coating, spraying, and distillation. 1.1.4 This recommended practice does not address situations that could involve catastrophic failure of or catastrophic discharge from process vessels, pipelines, tanks, or systems. 1.1.5 This recommended practice does not address the unique hazards associated with explosives, pyrotechnics, blasting agents, pyrophoric materials, or oxygen-enriched atmospheres that might be present.

ANSI/NFPA 498-2012, Standard for Safe Havens and Interchange Lots for Vehicles Transporting Explosives
This standard shall apply to safe havens that are used for the parking of vehicles transporting explosives and to explosives interchange lots that are safe areas where less-than-truckloads of explosives shall be permitted to be held for transfer from one vehicle to another for continuance in transportation. All vehicles covered by this standard shall be required to be engaged in the transportation of explosives and shall carry shipping papers to show that the explosives being transported are properly described, classified, identified, packaged, and labeled in accordance with regulations of the U.S. Department of Transportation. Additionally, all vehicles shall be required to be marked and placarded in accordance with regulations of the U.S. Department of Transportation. This standard shall apply to the design and operating features of explosives motor vehicle facilities related to the prevention of fire, theft, and explosion. * This standard shall not apply to motor freight terminals for vehicles handling general freight. The requirements of NFPA 513, Standard for Motor Freight Terminals, shall apply to explosives motor vehicle facilities where they are applicable and are not covered by this standard.

ANSI/NFPA 499-2013, Recommended Practice for the Classification of Combustible Dusts and of Hazardous (Classified) Locations for Electrical Installations in Chemical Process Areas
1.1 Scope. 1.1.1 This recommended practice applies to those locations where combustible dusts are produced, processed, or handled, and where dust released into the atmosphere or accumulated on surfaces could be ignited by electrical systems or equipment. 1.1.2 This recommended practice provides information on specific combustible dusts whose relevant combustion properties have been sufficiently identified to allow their classification into the groups established by NFPA 70, National Electrical Code (NEC), for proper selection of electrical equipment in hazardous (classified) locations. The tables of selected combustible materials contained in this document are not intended to be all-inclusive. 1.1.3 This recommended practice also applies to chemical process areas. As used in this document, a chemical process area could be a chemical process plant, or it could be a part of such a plant. A chemical process area could be a part of a manufacturing facility where combustible dusts are produced or used in chemical reactions, or are handled or used in operations such as mixing, coating, extrusion, conveying, drying, and/or grinding. 1.1.4 This recommended practice does not apply to agricultural grain-handling facilities except where powdered grain is used in a chemical reaction or mixture. 1.1.5 This recommended practice does not apply to situations that could involve catastrophic failure of, or catastrophic discharge from, silos, process vessels, pipelines, tanks, hoppers, or conveying or elevating systems. 1.1.6 This recommended practice does not address the unique hazards associated with explosives, pyrotechnics, blasting agents, pyrophoric materials, or oxygen-enriched atmospheres that might be present.

1.1 General. The Code addresses those construction, protection, and occupancy features necessary to minimize danger to life and property. 1.1.2 Code Title. The provisions of this document shall constitute and be known as NFPA 500, Building Construction and Safety Code, hereinafter referred to as “this Code” or “the Code.”

ANSI/NFPA 501-2012, Standard on Manufactured Housing
This standard shall cover all the equipment and installations used in the design, construction, transportation, fire safety, plumbing, heat-producing, and electrical systems of manufactured homes that are designed to be used as dwelling units. This standard shall, to the maximum extent possible, establish performance requirements. In certain instances, however, the use of specific requirements is necessary.

This standard shall cover fire safety requirements for the installation of manufactured homes and manufactured home sites, including accessory buildings, structures, and communities.
ANSI/NFPA 502-2013, Standard for Road Tunnels, Bridges, and Other Limited Access Highways

This edition of NFPA 211 contains provisions for chimneys, fireplaces, venting systems, and solid fuel–burning appliances, including their installation. The standard applies to residential as well as commercial and industrial installations.

ANSI/NFPA 505-2012, Fire Safety Standard for Powered Industrial Trucks Including Type Designations, Areas of Use, Conversions, Maintenance, and Operations

This standard shall apply to fork trucks, tractors, platform lift trucks, motorized hand trucks, and other specialized industrial trucks powered by electric motors or internal combustion engines. This standard shall not apply to compressed air-operated or nonflammable compressed gas-operated industrial trucks, farm vehicles, or automotive vehicles for highway use.


1.1 Scope. 1.1.1 This standard applies to the following: (1) Design and installation of oxygen-fuel gas welding and cutting systems and allied processes (see 3.3.2), except for systems meeting the criteria in 1.1.5. (2) Utilization of gaseous fuels generated from flammable liquids under pressure where such fuels are used with oxygen(3) Storage on the site of a welding and cutting system installation of the following: (a) Gases to be used with such systems where more than one cylinder each of oxygen and fuel gas are stored in any single storage area (includes storage of more than one cylinder in any single storage area even though all such stored cylinders may be intended for use in systems of the kind described in 1.1.5(1)) (b) Calcium carbide 1.1.2 Unless specifically indicated otherwise, the term welding and cutting systems shall be considered to include allied processes in this standard. 1.1.3 Where only a portion of a fuel gas system is to be used for welding, cutting, or allied processes, only that portion of the system need comply with this standard. 1.1.4 Where only a portion of an oxygen system is to be used with fuel gas for welding, cutting, or allied processes, only that portion of the system need comply with this standard. 1.1.5 This standard shall not apply to the following: (1)*Systems consisting of a single cylinder not exceeding 3.4 m3(120 ft3) of oxygen and a single cylinder not exceeding 3.4 m3 (120 ft3) of fuel gas used for welding and cutting (2) Systems in which fuel gases are not to be used with oxygen, as described in NFPA 54, National Fuel Gas Code, and NFPA 58, Liquefied Petroleum Gas Code (3) The manufacture of gases and the filling of cylinders (4) Storage of empty cylinders (5) Compressed air–fueled systems.

ANSI/NFPA 51A-2012, Standard for Acetylene Cylinder Charging Plants

1.1 Scope. This standard shall apply to plants that are engaged in the generation and compression of acetylene and in the charging of acetylene cylinders, either as their sole operation or in conjunction with facilities for charging other compressed gas cylinders.

ANSI/NFPA 51B-2013, Standard for Fire Prevention During Welding, Cutting, and Other Hot Work

This standard shall cover provisions to prevent loss of life and property from fire or explosion as a result of hot work. Installation and operation of arc cutting and welding equipment and operation of gas cutting and welding equipment shall be in accordance with ANSI Z49. 1, Safety in Welding, Cutting, and Allied Processes.

ANSI/NFPA 52-2012, Vehicular Gaseous Fuel Systems Code

This code shall apply to the design, installation, operation, and maintenance of compressed natural gas (CNG) and liquefied natural gas (LNG) engine fuel systems on vehicles of all types and for fueling vehicles (dispensing) systems and associated storage, including the following: (1) Original equipment manufacturers (OEMs) (2) Final-stage vehicle integrator/manufacturer (FSVIM) (3) Vehicle fueling (dispensing) systems This code shall apply to the design, installation, operation, and maintenance of liquefied natural gas (LNG) engine fuel systems on vehicles of all types, to their associated fueling (dispensing) facilities, and to LNG to CNG facilities with LNG storage in ASME containers of 70,000 gal (265 m3) or less. Vehicles and fuel supply containers complying with federal motor vehicle safety standards (FMVSSs) covering the installation of CNG fuel systems on vehicles and certified by the respective manufacturer as meeting these standards shall not be required to comply with Sections 4.4, 4.8, 4.9, and 4.10 and Chapter 6 (except Sections 6.9, 6.11, 6.12, 6.13, and 6.14). This code shall apply to the design, installation, operation, and maintenance of compressed hydrogen (GH2) and liquefied compressed hydrogen (LH2). This code shall include marine, highway, rail, off-road, and industrial vehicles. Vehicles that are required to comply with applicable federal motor vehicle safety standards covering the installation of LNG fuel systems on vehicles and that are certified by the manufacturer as meeting these standards shall not be required to comply with Chapter 11, except 11.12.8. This code shall apply to testing, service, and maintenance of GH2 engine fuel systems. Vehicles that meet FMVSS no hazardous dangers shall be exempt.

ANSI/NFPA 520-2015, Standard on Subterranean Spaces

This standard’s primary focus is to safeguard life and property against fire and related hazards. Other safety concerns such as structural adequacy, plumbing, and mechanical system design, including environmental conditions, are beyond the scope of this standard. These issues are considered important, and additional requirements are expected to be enforced by the authority having jurisdiction. Where no authority having jurisdiction exists, the owner or operator should include due consideration of these items.


NFPA 53 establishes recommended criteria for the safe use of oxygen (liquid/gaseous) and the design of systems for use in oxygen and oxygen-enriched atmospheres (OEA).

ANSI/NFPA 55-2015, Compressed Gases and Cryogenic Fluids Code

NFPA 55 facilitates protection from physiological, over-pressurization, explosive, and flammability hazards associated with compressed gases and cryogenic fluids. Criteria provide fundamental safeguards for the installation, storage, use, and handling of compressed gases and cryogenic fluids in portable and stationary cylinders, containers, and tanks in all occupancy types.


1.1 Scope. This guide describes the structure, application, and limitations of the Fire Safety Concepts Tree.


This guide is intended to provide assistance, primarily to authorities having jurisdiction (AHJs), in evaluating the appropriateness and execution of a fire risk assessment (FRA) for a given fire safety problem. While this guide primarily addresses regulatory officials, it also is intended for others who review FRAs, such as insurance company representatives and building owners.


1.1 Scope. 1.1.1 This guide addresses methods for evaluating the potential for room flashover from fire involving the contents, furnishings, and interior finish of a room. The methods addressed by this guide include prevention of ignition; installation of automatic fire suppression systems; control of ventilation factors; and limitation of the heat release rate of individual and grouped room contents, furnishings, and interior finish. 1.1.2 The accuracy, precision, and relevance of this guide are a function of the accuracy, precision, and relevance of the data from the test methods and calculations used. The principles and concepts presented are among the most reliable available. The use of these techniques can help to minimize the probability of flashover or delay its occurrence, but might not prevent it.


This guide addresses issues associated with the development of hazardous conditions from fire involving passenger road vehicles and the time available for safe egress or rescue. This document provides guidance toward a systematic approach of the determination of the relationship between the properties of passenger road vehicles, including the materials, components and systems, and the development of hazardous conditions in the vehicle.


The scope of this standard is the determination of the fire load and fire load density to be used as the basis for the evaluation and design of the structural fire performance of a building. The determination of a design-basis fire is outside the scope of this standard.
ANSI/NFPA 560-2006, Storage, Handling, and Use of Ethylene Oxide for Sterilization and Fumigation

1.1.1 This standard shall not apply to the following:

(1) Nonflammable mixtures of ethylene oxide with other chemicals
(2) Ethylene oxide manufacturing facilities, and container filling, repacking, or transferring facilities
(3) * The off-site transportation of portable containers of ethylene oxide
(4) Facilities using ethylene oxide as a chemical feedstock
(5) Ethylene oxide in chambers 0.283 m^3 (10 ft^3) or less in volume, or for containers holding 200 g (7.05 oz) of ethylene oxide or less.

ANSI/NFPA 56PS-2013, Standard for Fire and Explosion Prevention During Cleaning and Purging of Flammable Gas Piping Systems

This standard shall apply to fire and explosion prevention during cleaning and purging activities for new and existing flammable gas piping found in electric generating plants and in industrial, institutional, and commercial applications.

1 Coverage of piping systems shall extend from the point of delivery to the gas-consuming equipment isolation valve. 1.1 For other than undiluted liquefied petroleum gas (LP-Gas) systems, the point of delivery is the outlet of the customer meter or at the connection to a customer's piping, whichever is farther downstream, or if there is no meter at the connection to customer piping. 1.2 For undiluted LP-Gas, the point of delivery is the outlet of the final pressure regulator, exclusive of line gas regulators, in the system. 1.3 For facilities that produce flammable gas for consumption on site, the point of delivery is the discharge isolation valve for the gas-consuming equipment.

Nonapplication of Standard. This standard shall not apply to the following items:

(1) Piping systems covered by NFPA 2(2)Piping systems covered by NFPA 54(3)Piping systems covered by NFPA 58(4)LP-Gas systems covered by NFPA 58(5)Refrigerated utility gas systems covered by NFPA 59(6) Nonrefrigerated utility gas systems covered by NFPA 59(7) Nonrefrigerated utility gas systems covered by NFPA 59(8)Fume exhaust lines covered by NFPA 59(9) Oilseed extraction plants covered by NFPA 36


This code applies to the storage, handling, transportation, and use of LP-Gas. A. 1.1 General Properties of LP-Gas. Liquefied petroleum gases (LP-Gases), as defined in this code (see 3.3.6), are gases at normal room temperature and atmospheric pressure. They liquefy under moderate pressure and readily vaporize upon release of the pressure. It is this property that permits the transportation and storage of LP-Gases in concentrated liquid form, although they normally are used in vapor form. For additional information on other properties of LP-Gases, see Annex B. Federal Regulations. Regulations of the U.S. Department of Transportation (DOT) are referenced throughout this code. Prior to April 1, 1967, these regulations were promulgated by the Interstate Commerce Commission (ICC). The Federal Hazardous Substances Act (15 U.S.C. 1261) requires cautionary labeling of refillable cylinders of liquefied petroleum gases distributed for consumer use. They are typically 40 lb (13 kg) and less and are used with outdoor cooking appliances, portable lamps, camping stoves, and heaters. The Federal Hazardous Substances Act is administered by the U.S. Consumer Product Safety Commission under regulations codified at 16 CFR 1500, Commercial Practices, Chapter 11, "Consumer Product Safety Commission."


This code shall apply to the design, construction, location, installation, operation, and maintenance of refrigerated and nonrefrigerated utility gas plants. Coverage of liquefied petroleum gas systems at utility gas plants shall extend to the point where LP-Gas or a mixture of LP-Gas and air is introduced into the utility distribution system.

ANSI/NFPA 59A-2015, Standard for the Production, Storage, and Handling of Liquefied Natural Gas (LNG)

This standard provides minimum fire protection, safety, and related requirements for the location, design, construction, security, operation, and maintenance of liquefied national gas (LNG) plants.

ANSI/NFPA 600-2014, Standard on Industrial Fire Brigades

This standard presents requirements for organizing, operating, training, and equipping industrial fire brigades. It also contains requirements for the occupational safety and health of industrial fire brigade members while performing fire fighting and related activities.


This standard shall apply to the selection, requirements, duties, and training of security personnel who will perform fire loss prevention duties. It shall cover the following three categories of security services:

(1) Protection of the property, including times when management is not present
(2) Access and egress control into and within the confines of the protected property
(3) Carrying out procedures for the orderly conduct of various operations at the property.

ANSI/NFPA 61-2013, Standard for the Prevention of Fires and Dust Explosions in Agricultural and Food Processing Facilities

1.1 Scope. 1.1.1 This standard shall apply to all of the following:

(1) All facilities that receive, handle, process, dry, blend, use, mill, package, store, or ship dry agricultural bulk materials, their by-products, or dusts that include grains, oilseeds, agricultural products, legumes, sugar, flour, spices, feeds, and other related materials.

(2) All facilities designed for manufacturing and handling starch, including drying, grinding, conveying, processing, packaging, and storing dry or modified starch, and dry products and dusts generated from these processes.

(3) All facilities designed for manufacturing and handling starch, including drying, grinding, conveying, processing, packaging, and storing dry or modified starch, and dry products and dusts generated from these processes.

(4) Facilities using ethylene oxide as a chemical feedstock

(5) Ethylene oxide in chambers 0.283 m^3 (10 ft^3) or less in volume, or for containers holding 200 g (7.05 oz) of ethylene oxide or less.

(6) LP delivery is the outlet of the customer meter or at the point of delivery for the gas used with oxygen for gas or a mixture of LP-Gas and air is introduced into the utility distribution system.

(7) Carrying out procedures for the occupational safety and health of industrial fire brigade members while performing fire fighting and related activities.

(8) Facilities using ethylene oxide as a chemical feedstock

(9) Ethylene oxide in chambers 0.283 m^3 (10 ft^3) or less in volume, or for containers holding 200 g (7.05 oz) of ethylene oxide or less.
ANSI/NFPA 654-2012, Standard for the Prevention of Fire and Dust Explosions from the Manufacturing, Processing, and Handling of Combustible Particulate Solids

1.1.1* This standard shall apply to all phases of the manufacture, processing, blending, pneumatic conveying, repackaging, and handling of combustible particulate solids or hybrid mixtures, regardless of concentration or particle size, where the materials present a fire or explosion hazard. 1.1.2 This standard shall apply to systems that convey combustible particulate solids that are produced as a result of a principal or incidental activity, regardless of concentration or particle size, where the materials present a fire or explosion hazard. 1.1.3 This standard shall not apply to materials covered by the following documents, unless specifically referenced by the applicable document: (1) NFPA 30B, Code for the Manufacture and Storage of Aerosol Products (2) NFPA 61, Standard for the Prevention of Fires and Dust Explosions in Agricultural and Food Products Facilities (3) NFPA 120, Standard for Coal Preparation Plants (4) NFPA 432, Code for the Storage of Organic Peroxide Formulations (5) NFPA 480, Standard for the Storage, Handling, and Processing of Magnesium Solids and Powders (6) NFPA 481, Standard for the Production, Processing, Handling, and Storage of Titanium (7) NFPA 482, Standard for the Production, Process, Handling, and Storage of Zirconium (8) NFPA 485, Standard for the Storage, Handling, Processing, and Use of Lithium Metal (9) NFPA 495, Explosive Materials Code (10) NFPA 651, Standard for the Machining and Finishing of Aluminum and the Production and Handling of Aluminum Powders (11) NFPA 655, Standard for Prevention of Sulfur Fires and Explosions (12) NFPA 664, Standard for the Prevention of Fires and Explosions in Wood Processing and Woodworking Facilities

ANSI/NFPA 655-2011, Standard for Prevention of Sulfur Fires and Explosions

1.1 Scope. 1.1.1* This standard shall apply to the crushing, grinding, or pulverizing of sulfur and to the handling of sulfur in any form. 1.1.2 This standard shall not apply to the mining of sulfur, recovery of sulfur from process streams, or transportation of sulfur.


1.1 Scope. This standard shall establish the minimum requirements for fire and explosion prevention and protection of industrial, commercial, or institutional facilities that process wood or manufacture wood products, using wood or other cellulose fiber as a substitute for or additive to wood fiber, and that process wood, creating wood chips, particles, or dust. 1.1.1 Woodworking and wood processing facilities shall include, but are not limited to, wood flour plants, industrial woodworking plants, furniture plants, plywood plants, composite board plants, lumber mills, and production-type woodworking shops and carpentry shops that are incidental to facilities that would not otherwise fall within the purview of this standard. 1.1.2* This standard shall apply to woodworking operations that occupy areas of more than 465 m2 (5000 ft2) or where dust-producing equipment requires an aggregate dust collection flow rate of more than 2549 m3/hr (1500 ft3/min).

ANSI/NFPA 67-2015, Guideline on Explosion Protection for Gaseous Mixtures in Pipe Systems

This guide applies to the design, installation, and operation of piping systems containing flammable gases, where there is a potential for ignition.

ANSI/NFPA 68-2012, Standard on Explosion Protection by Deflagration Venting

This standard applies to the design, location, installation, maintenance, and use of devices and systems that vent the combustion gases and pressures resulting from a deflagration within an enclosure so that structural and mechanical damage is minimized.

ANSI/NFPA 69-2013, Standard on Explosion Prevention Systems

Covers the design, construction, operation, maintenance and testing of systems for the prevention of deflagration explosions by means of the following methods: (a) control of oxidant concentration; (b) control of combustible concentration; (c) explosion suppression; (d) deflagration pressure containment; (e) spark extinguishing systems.

ANSI/NFPA 70-2013, National Electrical Code®

This Code covers the installation of electrical conductors, equipment, and raceways; signaling and communications conductors, equipment, and raceways; and optical fiber cables and raceways for the following: (1) Public and private premises, including buildings, structures, mobile homes, recreational vehicles, and floating buildings (2) Yards, lots, parking lots, carnivals, and industrial substations (3) Installations of conductors and equipment that connect to the supply of electricity (4) Installations used by the electric utility, such as office buildings, warehouses, garages, machine shops, and recreational buildings, that are not an integral part of a generating plant, substation, or control center.


This standard establishes test methods to assess the propagation of flame of various textiles and films under specified fire test condition


This standard provides criteria for defining and identifying fire retardant—treated wood and fire retardant—coated building materials. A.1.1 Fire resistance ratings measured on an hourly basis are not covered in this standard. To establish such ratings, tests should be made in accordance with NFPA 251.


1.1 Scope. This standard shall address the health, flammability, instability, and related hazards that are presented by short-term, acute exposure to a material under conditions of fire, spill, or similar emergencies.

ANSI/NFPA 705-2012, Recommended Practice for a Field Flame Test for Textiles and Films

This recommended practice provides guidance to enforcement officials for the field application of an open flame to textiles and films that have been in use in the field or for which reliable laboratory data are not available. There is no known correlation between this recommended practice and NFPA 701, Standard Methods of Fire Tests for Flame Propagation of Textiles and Films, or full-scale fire behavior

ANSI/NFPA 708-2015, Recommended Practice for Electrical Equipment Maintenance

This recommended practice applies to preventive maintenance for electrical, electronic, and communication systems and equipment and is not intended to duplicate or supersed the instructions that manufacturers normally provide. Systems and equipment covered are typical of those installed in industrial plants, institutional and commercial buildings, and large multifamily residential complexes.

ANSI/NFPA 70E-2014, Standard for Electrical Safety in the Workplace®

This standard addresses electrical safety-related work practices for employee workspaces for the safeguarding of employees relative to the hazards associated with electrical energy during activities such as the installation, inspection, operation, maintenance, and demolition of electric conductors, electric equipment, signaling and communications conductors and equipment, raceways and safe work practices for employees performing other work activities that can expose them to electrical hazards as well as safe work practices.

1.1 Scope. This standard covers the installation and maintenance of carbon monoxide detection and warning equipment, including mobile homes and manufactured homes.

ANSI/NFPA 73-2015, Standard for Electrical Inspections for Existing Dwellings

This standard covers the inspection and testing of electrical equipment and wiring in existing dwellings, including multifamily dwellings.

ANSI/NFPA 730-2013, Guide for Premises Security

This guide describes the selection, application, installation, testing, and maintenance of electronic premises security systems.


This standard covers the application, location, installation, testing, and maintenance of electronic premises security systems.

ANSI/NFPA 75-2009, Standard for the Protection of Information Technology Equipment

This standard applies to the installation and testing of power supplies for information technology equipment.

ANSI/NFPA 750-2014, Standard on Water Mist Fire Protection Systems

This standard applies to the design, installation, maintenance, and testing of water mist fire protection systems.


This standard applies to the design, installation, and testing of fire protection systems for telecommunications facilities.

ANSI/NFPA 77-2013, Recommended Practice on Static Electricity

This recommended practice applies to the identification, assessment, and control of static electricity hazards in buildings and structures.

ANSI/NFPA 780-2013, Standard for the Installation of Lightning Protection Systems

This standard applies to the installation and testing of lightning protection systems in buildings and structures.

ANSI/NFPA 79-2012, Electrical Standard for Industrial Machinery

This standard applies to the design, installation, and testing of machinery.

ANSI/NFPA 790-2013, Standard for Competency of Third-Party Field Evaluation Bodies

This standard applies to the competency of third-party field evaluation bodies.

ANSI/NFPA 791-2013, Recommended Practice and Procedures for Unlabeled Electrical Equipment Evaluation

This standard applies to the evaluation of unlabeled electrical equipment for compliance with recognized standards.

ANSI/NFPA 80-2015, Standard for Fire Doors and Other Opening Protectives

This standard applies to the design, installation, and testing of fire doors and other opening protectives.


This standard applies to the design, installation, and testing of fire protection systems for facilities handling radioactive materials.


This standard applies to the design, installation, and testing of fire protection systems for advanced light water reactors.


This standard applies to the design, installation, and testing of performance-based fire protection systems for light water reactors.

This standard provides minimum requirements for a risk-informed, performance-based change process for the fire protection program for advanced nuclear reactor electric generating plants during construction and all phases of plant operation, including shutdown, degraded conditions, and decommissioning. Fundamental fire protection elements for advanced nuclear reactor electric generating plants can be found in NFPA804, Standard for Fire Protection for Advanced Light Water Reactor Electric Generating Plants.

ANSI/NFPA 80A-2011, Recommended Practice for Protection of Buildings from Exterior Fire Exposures

1.1 Scope. This recommended practice addresses separation distances between buildings to limit exterior fire spread based on exterior openings and other construction features.

ANSI/NFPA 82-2013, Standard on Incinerators and Waste and Linen Handling Systems and Equipment

This standard covers requirements for the installation, maintenance, and use of waste and recyclables storage rooms, containers, handling systems, incinerators, compactors, and linen and laundry handling systems. This standard does not include design criteria for the purpose of reducing air pollution. For such criteria, consult the authorities having jurisdiction. The requirements in this standard shall not apply to one- or two-family residential structures.

ANSI/NFPA 820-2015, Standard for Fire Protection in Wastewater Treatment and Collection Facilities

This standard shall establish minimum requirements for protection against fire and explosion hazards in wastewater treatment plants and associated collection systems, including the hazard classification of specific areas and processes.


This code applies to the following: Technological advances in recent years and, in particular, the pervasiveness of microprocessor-based hardware make it even more important that only highly qualified individuals be employed in applying the requirements of this code to operating systems. Each type of hardware has its own unique features and operational modes. It is vital that the designer of the safety system be completely familiar with the features and weaknesses of the specific hardware and possess a thorough understanding of this code and its intent.

ANSI/NFPA 850-2014, Recommended Practice for Fire Protection for Electric Generating Plants and High Voltage Direct Current Converter Stations

This document provides recommendations for fire prevention and fire protection for electric generating plants and high voltage direct current converter stations, except as follows: Nuclear power plants are addressed in NFPA 805, Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants; hydroelectric plants are addressed in NFPA851, Recommended Practice for Fire Protection for Hydroelectric Generating Plants; and fuel cells are addressed in NFPA 853, Standard for the Installation of Stationary Fuel Cell Power Systems.

ANSI/NFPA 851-2014, Recommended Practice for Fire Protection for Hydroelectric Generating Plants

This document provides recommendations (not requirements) for fire prevention and fire protection for hydroelectric generating plants. The term “hydroelectric generating plant” also can be referred to as “station,” “project,” “unit(s),” “facility,” or “site.”


This standard shall apply to the design, construction, and installation of stationary fuel cell power systems. The scope of this document shall include the following: (1) A singular prepackaged, self-contained power system unit (2) Any combination of prepackaged, self-contained power system units (3) Power system units comprising two or more factory-matched modular components intended to be assembled in the field (4) Engineered and field-constructed power systems that employ fuel cells.

ANSI/NFPA 86-2011, Standard for Ovens and Furnaces

1.1.1 This standard applies to Class A, Class B, Class C, and Class D ovens, dryers, and furnaces, thermal oxidizers, and any other heated enclosure used for processing of materials. 1.1.2* Within the scope of this standard, a Class A, Class B, or Class C oven is any heated enclosure operating at approximately atmospheric pressure and used for commercial and industrial processing of materials. 1.1.3 A Class A oven can utilize a low-oxygen atmosphere. 1.1.4 This standard applies to bakery ovens and Class A ovens, in all respects, and where reference is made to ANSI Z50.1, Bakery Equipment — Safety Requirements, those requirements shall apply to bakery oven construction and safety. 1.1.5 This standard applies to atmosphere generators and atmosphere supply systems serving Class C furnaces and to furnaces with integral quench tanks or molten salt baths. 1.1.6* This standard applies to Class D ovens and furnaces operating above ambient temperatures to over 5000°F (2760°C) and at pressures normally below atmospheric to 1078 torr (1.33 x 1076 Pa).

ANSI/NFPA 87-2011, Recommended Practice for Fluid Heaters

1.1 Scope 1.1.1 This recommended practice shall apply to fluid heaters including thermal fluid heaters and process fluid heaters. 1.1.2 The fluid shall be flowing, under pressure, and indirectly heated. 1.1.3 This recommended practice shall not apply to water or steam heaters.

ANSI/NFPA 88A-2011, Standard for Parking Structures

1.1 Scope. This standard shall cover the construction and protection of, as well as the control of hazards in, open and enclosed parking structures. This standard shall not apply to one- and two-family dwellings.


These regulations shall control the minimum energy-efficient requirements for the following:(1)The design, construction, reconstruction, alteration, repair, demolition, removal, inspection, issuance, and revocation of permits or licenses, installation of equipment related to energy conservation in all buildings and structures

ANSI/NFPA 901-2015, Standard Classifications for Incident Reporting and Fire Protection Data

This document describes and defines data elements and classifications used by many fire departments in the United States and other countries to describe fire damage potential and experience during incidents. It does not provide guidelines for a reporting system or related forms.


This code describes principles and practices of protection for cultural resource properties (including, but not limited to, museums, libraries, and places of worship), their contents, and collections, against conditions or physical situations with the potential to cause damage or loss. This code covers ongoing operations and rehabilitation and acknowledges the need to preserve culturally significant and character-defining building features and sensitive, often irreplaceable, collections and to provide continuity of operations. * Principles and practices for life safety in cultural resource properties are outside the scope of this code. Where this code includes provisions for maintaining means of egress and controlling occupant load, it is to facilitate the evacuation of items of cultural significance, allow access for damage limitation teams in an emergency, and prevent damage to collections through overcrowding or as an unintended consequence of an emergency evacuation. Library and museum collections that are privately owned and not open to the public shall not be required to meet the requirements of this code.
1.1* Scope. This standard shall cover construction, installation, operation, and maintenance of systems for air conditioning and ventilating, including filters, ducts, and related equipment, to protect life and property from fire, smoke, and gases resulting from fire or from conditions having manifestations similar to fire.

ANSI/NFPA 90B-2011, Standard for the Installation of Warm Air Heating and Air-Conditioning Systems
1.1* Scope. This standard shall cover construction, installation, operation, and maintenance of systems for warm air heating and air conditioning, including filters, ducts, and related equipment to protect life and property from fire, smoke, and gases resulting from fire or from conditions having manifestations similar to fire.

ANSI/NFPA 91-2014, Standard for Exhaust Systems for Air Conveying of Vapors, Gases, Mists, and Noncombustible Particulate Solids
This standard provides technical requirements for exhaust systems that will protect lives and property from fires and explosions and minimize damage in the event that such fires and explosions occur.

This code describes principles and practices of fire safety for historic structures and for those who operate, use, or visit them. 1.1.2* Collections within libraries, museums, and places of worship are not within the scope of this code. A.1.1.2 Collections within libraries, museums and places of worship should be evaluated and protected in accordance with NFPA 909, Code for the Protection of Cultural Resource Properties — Museums, Libraries, and Places of Worship.

ANSI/NFPA 92-2014, Standard for Smoke Control Systems
This standard shall apply to the design, installation, acceptance testing, operation, and ongoing periodic testing of smoke control systems. This standard incorporates methods for applying engineering calculations and reference models to provide a designer with the tools to develop smoke control system designs.

ANSI/NFPA 921-2013, Guide for Fire and Explosion Investigations
This document is designed to assist individuals who are charged with the responsibility of investigating and analyzing fire and explosion incidents and rendering opinions as to the origin, cause, responsibility, or prevention of such incidents.

ANSI/NFPA 950-2014, Standard for Data Development and Exchange for the Fire Service
This standard is designed to standardize data for interoperable information sharing in support of the all-hazards response. 1.1.2 To describe a digital information structure and associated requirements and workflows common to fire and emergency services delivery and management for emergency response and administrative use.

ANSI/NFPA 951-2015, Guide to Building and Utilizing Data Information
The intent of this document is to provide guidance in the development of an “integrated information management system” which facilitates information sharing. The resulting system shall be designed to support a communications pathway for all relevant components of the national preparedness and response framework.

This code shall apply to the design, installation, operation, and maintenance of compressed natural gas (CNG) and liquefied natural gas (LNG) engine fuel systems on vehicles of all types and for fueling vehicle (dispensing) systems and associated storage, including the following: (1) Original equipment manufacturers (OEMs) (2) Final-stage vehicle integrator/manufacturer (FSVIM) (3) Vehicle fueling (dispensing) systems This code shall apply to the design, installation, operation, and maintenance of liquefied natural gas (LNG) engine fuel systems on vehicles of all types, to their associated fueling (dispensing) facilities, and to LNG to CNG facilities with LNG storage in ASME containers of 70,000 gal (265 m3) or less. Vehicles and fuel supply containers complying with federal motor vehicle safety standards (FMVSS) covering the installation of CNG fuel systems on vehicles and certified by the respective manufacturer as meeting these standards shall not be required to comply with Sections 4.4, 4.8, 4.9, and 4.10 and Chapter 6 (except Sections 6.9, 6.11, 6.12, 6.13, and 6.14). This code shall apply to the design, installation, operation, and maintenance of compressed hydrogen (GH2) and liquefied compressed hydrogen (LH2). This code shall include marine, highway, rail, off-road, and industrial vehicles. Vehicles that are required to comply with applicable federal motor vehicle safety standards covering the installation of LNG fuel systems on vehicles and that are certified by the manufacturer as meeting these standards shall not be required to comply with Chapter 11, except 11.12.8. This code shall apply to testing, service, and maintenance of GH2 engine fuel systems. Vehicles that meet FMVSS and other applicable standards shall not be required to meet these standards.

ANSI/NFPA 99-2012, Standard for Health Care Facilities
1.1.1 The scope of this document is to establish criteria to minimize the hazards of fire, explosion, and electricity in health care facilities providing services to human beings. 1.1.2 Annex D covers principles of design and use of electrical and electronic appliances generating high-frequency currents for medical treatment in hospitals, clinics, ambulatory care facilities, and dental offices, whether fixed or mobile. 1.1.2.1 Areas Not Addressed. The following areas are not addressed: (1) Communication equipment, resuscitation equipment (e.g., defibrillators), or physiological stimulators (e.g., used for anesthesia, acupuncture). (2) Experimental or research apparatus built to order, or under development, provided such apparatus is used under qualified supervision and provided the builder demonstrates to the authority having jurisdiction that the apparatus has a degree of safety equivalent to that described in Annex D. 1.1.3 Annex E retains the established requirements that would be necessary for the safe use of flammable inhalation anesthetics should the use of this type of anesthetic be reintroduced. 1.1.4 Chapter 4, Electrical Systems, covers the performance, maintenance, and testing of electrical systems (both normal and essential) used within health care facilities. 1.1.4.1 Areas Not Addressed. The following areas are not addressed in NFPA 99, but are addressed in other NFPA documents: (1) Specific requirements for wiring and installation on equipment are covered in NFPA 70, National Electrical Code®. (2) Requirements for illumination and identification of means of egress in health care facilities are covered in NFPA 101®, Life Safety Code®. (3) Requirements for fire protection signaling systems. 1.1.5 Areas Not Addressed. The following areas are not addressed: (1) Communication equipment, resuscitation equipment (e.g., defibrillators), or physiological stimulators (e.g., used for anesthesia, acupuncture). (2) Experimental or research apparatus built to order, or under development, provided such apparatus is used under qualified supervision and provided the builder demonstrates to the authority having jurisdiction that the apparatus has a degree of safety equivalent to that described in Annex D. 1.1.6 Annex E retains the established requirements that would be necessary for the safe use of flammable inhalation anesthetics should the use of this type of anesthetic be reintroduced.

ANSI/NFPA 99B-2010, Standard for Hypobaric Facilities
1.1.* This standard shall apply to all hypobaric facilities in which humans will be occupants or are intended to be occupants of the hypobaric chamber. 1.1.2 This standard shall not apply to hypobaric facilities used for animal experimentation if the size of the hypobaric chamber does not allow for human occupancy.

NFRC (National Fenestration Rating Council)
ANSI/NFRC 100-2017, Procedure for Determining Fenestration Product U-factors
This standard specifies a method for determining fenestration product U-factor (thermal transmittance).

This standard specifies a method for calculating solar heat gain coefficient (SHGC) and visible transmittance (VT) at normal (perpendicular) incidence for fenestration products containing glazings or glazing with applied films, with specular optical properties calculated in accordance with ISO 15099 (except where noted) or tested in accordance with NFRC 201, NFRC 202, and NFRC 213.
ANSI/NFRC 400-2014 (R2017), Procedure for Determining Fenestration Product Air Leakage
This standard specifies a procedure for determining fenestration product air leakage.

NFSI (National Floor Safety Institute)
This test method specifies the procedures and device used for both laboratory and field testing to measure the wet SCOF of common hard-surface floor materials.

Specifies the procedures and devices used for both laboratory and field testing to measure the wet dynamic coefficient of friction (DCOF) of common hard-surface floor materials.

ANSI/NFSI B101.5-2014, Standard Guide for Uniform Labeling Method for Identifying the Wet Static and Wet Dynamic Coefficient of Friction (Traction) of Floor Coverings, Floor Coverings with Coatings, and Treated Floor Coverings
This guideline sets forth a uniform product labeling method which identifies the wet static and wet dynamic coefficient of friction (DCOF) of floor coverings, floor coverings with coatings, and treated floor coverings.

ANSI/NFSI B101.6-2012, Standard Guide for Commercial Entrance Matting in Reducing Slips, Trips and Falls
Provides the criteria for the selection, installation, inspection, care, and maintenance of entrance mats and runners in commercial facilities in reducing slips, trips, and falls.

NGWA (National Ground Water Association)
ANSI/NGWA 01-2014, NGWA Water Well Construction Standard
Document defines construction for residential, municipal, irrigation, industrial and monitoring water wells. Topics include: site selection; casing and casing installation; screens, filter pack, and formation stabilizer; grouting; plumbness and alignment; development; testing for performance; data recording; disinfection with chlorine; water sampling and analysis; and permanent well and test hole decommissioning. Document is not intended for consideration as an ISO or ISO/IEC JTC 1 standard. All Comments must be submitted on the standard comment form located at http://www.ngwa.org/Professional-Resources/standards/Documents/071013%20Standard%20Comment%20Form.pdf

NIRMA (Nuclear Information and Records Management Association)
ANSI/NIRMA CM 1.0-2007 (R2015), Guidelines for Configuration Management of Nuclear Facilities
This ANSI/NIRMA Standard applies to operating nuclear facilities and is not intended to address CM-related issues for new nuclear facility projects.
NIRMA has surveyed nuclear industry stakeholders to identify required updates to this ANSI/NIRMA CM Standard. No issues have been identified for operating nuclear facilities for which the current revision 2007 requires update. Thus, NIRMA proposes to reaffirm the current 2007 version at this time.

NISO (National Information Standards Organization)
Guidance is presented for authors and editors preparing abstracts that represent the content of texts reporting on the results of experimental work or descriptive or discursive studies. Suggestions for the placement of abstracts within publications or other media are given, along with recommendations for abstracting specific documents. Types of abstracts and their content are described. Also included are suggestions on the style of abstracts and a list of selected readings on the subject of abstracting. Examples of abstracts are appended.

ANSI/NISO Z39.18-2005 (R2010), Scientific and Technical Reports - Preparation, Presentation, and Preservation
This standard outlines the elements, organization and design of scientific and technical reports, including guidance for uniform presentation of front and back matter, text, and visual and tabular matter in print and digital formats, as well as recommendations for multimedia reports.

ANSI/NISO Z39.19-2005 (R2010), Guidelines for the Construction, Format, and Management of Monolingual Controlled Vocabularies
Presents guidelines and conventions for the contents, display, construction, testing, maintenance, and management of monolingual controlled vocabularies. It focuses on controlled vocabularies that are used for the representation of content objects in knowledge organization systems including lists, synonym rings, taxonomies, and thesauri.

ANSI/NISO Z39.2-1994 (R2016), Information Interchange Format
The basis for the MARC (Machine Readable Catalog) record, this standard specifies the requirements for a generalized interchange format that can be used for the communication of records in any media.

Defines a unique numbering system that improves access to the wealth of scientific and technical reports issued by the government and private organizations. The STRN has an alphanumeric code with a maximum length of 34; for international application an optional country code can be added. The standard explains how and where the code should be assigned and used. A central authority to coordinate and monitor assignments of the code is designated.

ANSI/NISO Z39.29-2005 (R2010), Bibliographic References
This standard provides rules, guidelines, and examples for the creation of bibliographic references to numerous types of print, audiovisual, and electronic materials, both published and unpublished, arranged in fifteen broad categories. The bibliographic references should result in the unique identification of most print and non-print materials. This standard is intended for a broad audience, including the creators of bibliographic references, the processors who publish and otherwise display references, and the ultimate users of the references.

ANSI/NISO Z39.32-1996 (R2012), Information on Microfiche Headers
Defines the specific eye-legible information that should appear on the limited space available on microfiche so the fiche can be correctly identified and properly filed. The standard describes where to place the data, the order of the information, and a recommended type size and contrast to maximize readability. Many examples show how to use the standard.

ANSI/NISO Z39.41-1997 (S2015), Placement Guidelines for Information on Spines
Describes and allocates areas on the spines of printed bindings, covers, containers, or other protective enclosures. It describes, at a high level, both the kinds of information to be printed on spines and the order and placement of the information.

ANSI/NISO Z39.43-1993 (R2017), Standard Address Number (SAN) for the Publishing Industry
The Standard Address Number (SAN) is a seven-digit numeric identifier used to identify organizations and businesses interacting with the publishing industry (including book and serial manufacturers, libraries, publishers, etc.). Originally created to expedite paper-based transactions such as purchase orders and returns, the SAN has been designated as the organizational identifier for use in EDI transactions in the publishing industry.
This standard establishes criteria for coated and uncoated paper that will last several hundred years without significant deterioration under normal use and storage conditions in libraries and archives. This standard identifies the specific properties of such paper and specifies the tests required to demonstrate these properties. The standard does not address environmental impact issues of manufacturing.

This standard defines a client/server based service and protocol for Information Retrieval. It specifies procedures and formats for a client to search a database provided by a server, retrieve database records, and perform related information retrieval functions. The protocol addresses communication between information retrieval applications at the client and server; it does not address interaction between the client and the end-user.

This standard identifies categories for basic library statistical data reported at the national level, and provides associated definitions of terms.

ANSI/NISO Z39.71-2006 (R2011), Holdings Statements for Bibliographic Items
This standard specifies display requirements in any physical or electronic medium for holdings statements for bibliographic items to promote consistency in the communication and exchange of holdings information. It identifies and defines the data elements for holdings statements in one or more libraries or institutions.

ANSI/NISO Z39.73-1994 (R2012), Single-Tier Steel Bracket Library Shelving
Reduces the costs of purchases of steel, single-tier, freestanding shelving while ensuring that the shelving meets minimum performance requirements that can be verified by an independent testing laboratory. Since this is a performance standard rather than an engineering specification, Z39.73 allows for advances in materials, technology and engineering. It is based on information collected by the American Library Association from a quarter century of laboratory testing on the performance of single-tier steel library shelving.

ANSI/NISO Z39.74-1996 (R2012), Guides to Accompany Microform Sets
Describes the basic requirements for user guides that accompany microform sets so microform publishers can provide the most useful and comprehensive guides to their publications. The standard gives practical information on all of the details that should be covered, so your guides will be both complete and efficiently arranged. Special instructions are given for archival and manuscript collections and for government documents and newspapers.

This standard defines a protocol that is limited to the exchange of messages between and among computer-based applications to enable them to perform the functions necessary to lend and borrow items, to provide controlled access to electronic resources, and to facilitate co-operative management of these functions.

The purpose of this Protocol Implementation Profile 1 (IMP1) is to specify details of implementation of the NISO Circulation Interchange Part 1: Protocol (NCIP). This IMP1 was developed primarily to support three broad application areas: Direct Consortal Borrowing, Circulation/Interlibrary Loan Interchange, and Self Service Circulation. Secondly, the profile was intended for use with emerging application areas such as the management of electronic resources.

ANSI/NISO Z39.85-2012, The Dublin Core Metadata Element Set
 Defines fifteen metadata elements for resource description in a cross disciplinary information environment. The revision deletes a sentence from the comments of the "subject" element to eliminate a potential ambiguity.

This standard defines the format and content of the electronic file set that comprises a digital talking book (DTB) and establishes a limited set of requirements for DTB playback devices.

This standard defines a set of metadata elements for raster digital images to enable users to develop, exchange, and interpret digital image files. The dictionary has been designed to facilitate interoperability between systems, services, and software as well as to support the long-term management of and continuing access to digital image collections.

ANSI/NISO Z39.88-2004 (R2010), The OpenURL Framework for Context-Sensitive Services
The OpenURL Framework Standard defines an architecture for creating OpenURL Framework Applications. An OpenURL Framework Application is a networked service environment, in which packages of information are transported over a network. This Standard specifies how to construct these packages as Representations of abstract information constructs called ContextObjects.

This standard specifies the use of ANSI/NISO Z39.50-2003 in library applications. It specifies Z39.50 client and Z39.50 server behavior for search and retrieval across online library catalogs. The specifications included in this standard use The Bath Profile: A Z39.50 Specification for Library Applications and Resource Discovery (Release 2) as its foundation. Conformant use of this standard will improve interoperability between Z39.50 implementations.

This standard defines an automated request and response model for the harvesting of electronic resource usage data utilizing a Web services framework that can replace the user-mediated collection of usage data reports. It was designed as a generalized protocol extendible to a variety of usage reports. An extension designed specifically to work with COUNTER reports is provided. This revision extends the filter support to allow multiple optional filters and/or report attributes to be included in the SUSHI Request.

ANSI/NISO Z39.96-2015, JATS: Journal Article Tag Suite
JATS: Journal Article Tag Suite (1.0), achieved through Continuous Maintenance procedure. Includes changes submitted through February, 2015, approved by NISO JATS Standing Committee and NISO Content and Collection Management Topic Committee.

This specification details the nature of the Authoring and Interchange Format profiles and how they are created. These profiles use XML markup languages to represent different kinds of information resources (books, periodicals, etc.), with the intent of producing documents suitable for transformation into different universally accessible formats. It uses a modular, extensible architecture to permit the creation of any number of document models, each custom-tailored for a particular kind of information resource. It is intended primarily for agencies interested in creating conformant profiles for new documents types and for processing agent developers.

The ResourceSync specification describes a synchronization framework for the web consisting of various capabilities that allow third-party systems to remain synchronized with a servers evolving resources. The capabilities may be combined in a modular manner to meet local or community requirements. This specification also describes how a server should advertise the synchronization capabilities it supports and how third-party systems may discover this information. The proposed revised standard includes edits to address problems related to the conflation of a resource and the datetime of notification of a change to the resource.
This standard applies to the binding of books and periodicals using methods and materials that result in volumes that are sturdy, durable, and flexible enough to withstand the rigors of library use.

NIST/ITL (National Institute of Standards and Technology/Information Technology Laboratory)

ANSI B65-1-2011, Graphic technology - Safety requirements for graphic technology equipment and systems - Part 2: Prepress and press equipment and systems

Provides additional safety requirements for the design and construction of new prepress and press equipment, and the auxiliary equipment integrated into the press control system.

ANSI B65-2011, Graphic technology - Safety requirements for graphic technology equipment and systems - Part 3: Binding and finishing equipment and systems

Provides safety requirements specific to binding and finishing equipment and systems. This standard is intended to be used in conjunction with the general requirements given in B65-1. It provides additional safety requirements for the design and construction of new equipment used to convert printed or blank substrates into cut, folded, collated, assembled, bound, or otherwise finished product. It can also be applicable to processes for preparing substrate for the printing process and to a wide range of equipment used in the binding and finishing process.

ANSI B65-5-2011, Graphic technology - Safety requirements for graphic technology equipment and systems - Part 5: Stand-alone platen presses

Provides additional press design safety requirements for the design and construction of new manually fed or automatic stand-alone platen press systems intended for diecutting, creasing, embossing, foil stamping and/or printing of paper, board and other materials processed in a similar manner.

ANSI/NAPIM 177.1-2007 (R2011), Safety standard - Three-roll printing ink mills

Applies to all three-roll mills used in the printing ink manufacturing industry. The purpose of this standard is to establish safety requirements with respect to safety controls, operating procedures, and design of three-roll mills.

ANSI/NAPIM 177.2-2006 (R2011), Safety standard - Printing ink vertical post mixers

The requirements of this standard apply to vertical post mixers designed to be used in the manufacturing of printing inks. The purpose of this standard is to establish safety requirements with respect to the design and operation of vertical post mixers.

NPES (ASC CGATS) (Association for Suppliers of Printing, Publishing and Converting Technologies)

ANSI CGATS 12642-1 (IT8.7/3)-2015, Graphic technology - Input data for characterization of four-colour process printing - Part 1: Initial data set

This part of ISO 12642 defines an input data file, a measurement procedure, and an output data format for use in characterizing any four-colour printing process.

ANSI CGATS 12642-2 (IT8.7/4)-2015, Graphic technology - Input data for characterization of 4-colour process printing -- Part 2: Expanded data set

This part of ISO 12642 defines a data set of ink value combinations that are intended to be used to characterize 4-colour process printing. This data set is not optimized for any printing process or application area but is robust enough for all general applications. The needs of publication, commercial, and package printing with offset, gravure, flexography, and other printing processes have been considered. While it is primarily aimed at process colour printing with CMYK inks, it can also be used with any combination of three chromatic coloured inks and a dark ink. It is an alternate to the ISO 12642-1 data set where more robust data is required.

ANSI CGATS.17-2009 (R2015), Graphic technology - Exchange format for color and process control data using XML or ASCII text

This standard defines an exchange format for color and process control data (and the associated metadata necessary for its proper interpretation) in electronic form using either XML or ASCII formatted data files. It maintains human readability of the data as well as enabling machine readability. It includes a series of predefined tags and keywords and provides extensibility through provision for the dynamic definition of additional tags and keywords as necessary. It is focused primarily on spectral measurement data, colorimetric data, and densitometric data.

ANSI CGATS.20-2002 (R2012), Graphic technology - Variable printing data exchange using PPM and PDF (PPML/VDX)

This standard specifies the methods for the use of the Personalized Print Markup Language (PPML) and the Portable Document Format (PDF) for the exchange or identification of all elements necessary to render a variable data imaging job as intended by the sender. This standard specifies document layout and content data and makes provision for product intent specifications using the Job Definition Format (e.g., paper selection, binding, finishing, etc.).

ANSI CGATS.5-2009, Graphic technology - Spectral measurement and colorimetric computation for graphic arts images

This standard establishes a methodology for reflection and transmission spectral measurement and colorimetric parameter computation for graphic arts images. Graphic arts includes, but is not limited to, the preparation of material for, and volume production by, production printing processes which include offset lithography, letterpress, flexography, gravure and screen printing.

ANSI CGATS.7-2003 (R2013), Graphic technology - Pallet loading for printed materials

This standard specifies the stacking, unitizing, protection and labeling of palletized printed materials. It also specifies the functional design of pallets used to transport printed materials, and gives specifications for their loading onto delivery vehicles.

ANSI CGATS.9-2007 (R2012), Graphic technology - Graphic arts transmission densitometry measurements - Terminology, equations, image elements and procedures

This standard defines terminology, equations, process control elements, and procedures for measurement and communication of transmission densitometry data for graphic arts halftone images.
This standard specifies the CMYK standard colour image data that represents a set of standard colour images to be used for evaluation of changes in image quality during coding, image processing (including transformation, compression and decompression), film recording or printing which can be used for research, development, product evaluation and process control.

This part of ISO 12640 specifies a set of 15 standard colour images (encoded as both 16-bit XYZ and 8-bit RGB digital data provided in electronic data files) that can be used for the evaluation of changes in image quality during coding, image processing (including colour re-rendering and colour space transformations, compression and decompression), displaying on a colour monitor or printing. These can be used for many graphic technology applications such as research, development, product evaluation, and process control.

This part of ISO 12640-2-2007 (R2013), Graphic technology - Prepress digital data exchange - Part 2: X/Y/sRGB encoded standard colour image data (XYZ/SCID)

This part of ISO 12640 specifies a set of three chromatic inks and a dark ink.

This part of ISO 12640 specifies a set of standard colour images (encoded as both 16-bit Adobe RGB [1998] digital data [Adobe RGB(1998)/SCID]) that can be used for the evaluation of changes in image quality during coding, image processing (including colour re-rendering and colour space transformations, compression and decompression), displaying on a colour monitor and printing. These can be used for research, testing and assessing of output systems such as printers, colour management systems and colour profiles. This standard is only available on DVD.

This part of ISO 12640 specifies the methods for the use of the Portable Document Format (PDF) for the dissemination of compound CMYK digital data, in a single exchange, that is complete and ready for final print reproduction.

This part of ISO 12640-3-2004/ISO 15930-3 -2002 (R2013), Graphic technology - Prepress digital data exchange - Use of PDF - Part 3: Complete exchange suitable for color managed workflows (PDF/X-3)

This part of CGATS ISO 15930 specifies the use of the Portable Document Format (PDF) for the dissemination of complete digital data, in a single exchange, that contains all elements necessary for final print reproduction. These exchanges will support both colour-managed workflows and traditional CMYK workflows.

This part of CGATS ISO 15930-6-2004 (R2009), Graphic Technology - Prepress digital exchange using PDF - Part 6: Complete exchange of printing data suitable for colour-managed workflows using PDF 1.4 (PDF/X-3)

This part of CGATS ISO 15930 specifies the use of the Portable Document Format (PDF) Version 1.4 for the dissemination of complete digital data, in a single exchange, that contains all elements ready for final print reproduction. Colour-managed, CMYK, gray, RGB or spot colour data are supported.

ANSI IT8.6-2002 (R2013), Graphic technology - Prepress digital data exchange - Diecutting data (DDES3)

This standard establishes a data exchange format to enable transfer of numerical control information between diecutting systems and between diecutting systems and electronic prepress systems. The information will typically consist of numerical control information used in the manufacture of dies.

ANSI IT8.7/1-1993 (R2013), Graphic technology - Color transmission target for input scanner calibration

This standard defines the layout and colorimetric values of a target which can be manufactured on any positive color transparency film and which is intended for use in the calibration of a photographic film/scanner combination (as used in the preparatory process for printing and publishing).

ANSI IT8.7/2-1993 (R2013), Graphic technology - Color reflection target for input scanner calibration

This standard defines the layout and colorimetric values of a target which can be manufactured on any positive color photographic paper and which is intended for use in the calibration of a photographic paper/scanner combination (as used in the preparatory process for printing and publishing).

ANSI IT8.7/3-2010, Graphic technology - Input data for characterization of 4-color process printing

This standard defines a data set of ink value combinations that may be used to characterize four-color process printing. Such characterization data may be created by rendering as images the ink values specified in this document and by measuring the printed sheet.

ANSI IT8.7/4-2005 (R2010), Graphic technology - Input data for characterization of 4-color process printing - Expanded data set

This standard defines a data set of ink value combinations that may be used to characterize four-color process printing. This data set is not optimized for any printing process or application area, but is robust enough for all general applications. The needs of publication, commercial, and package printing with offset lithography, gravure, flexography, and other printing processes have been considered. While it is primarily aimed at process color printing with CMYK inks, it may also be used with any combination of three chromatic inks and a dark ink.

ANSI/CGATS 21-1-2013, Graphic technology - Printing from digital data across multiple technologies - Part 1: Principles

This part of CGATS 21 establishes principles for the use of color characterization data as the definition of the intended relationship between input data and printed color for copy preparation, job assembly, proofing, and graphic arts production printing. Additional Parts of CGATS 21 specify a limited number of characterized reference printing conditions that span the expected range of color gamuts used for the production of printed material from digital data, regardless of printing process used. The procedure to be used to adjust color characterization data for the normally expected range of substrate color is specified.

ANSI/CGATS ISO 12639-2004 (R2013), Graphic technology - Prepress digital data exchange - Tag image file format for image technology (TIFF/IT)

This standard specifies a media-independent means for prepress electronic data exchange using a tag image file format. This standard defines image file formats for encoding colour continuous-tone picture images, colour line-art images, high-resolution continuous-tone images, monochrome continuous-tone picture images, binary picture images, binary line-art images, screened data, and images of composite final pages.

ANSI/CGATS 4-2011 (R2016), Graphic technology - Graphic arts reflection densitometry measurements - Terminology, equations, image elements and procedures

This standard defines terms, equations and procedures for measurement, use, and communication of data obtained using reflection densitometry in the graphic arts. Graphic arts includes, but is not limited to, the preparation of material for, and volume production by, production printing processes, which include offset lithography, letterpress, flexography, gravure, and screen printing. This standard also applies to measurement of materials produced by systems such as photographic, ink jet, thermal transfer, electrophotographic, and toner technology (including off-press proofs), etc., when used for graphic arts applications.

ANSI/CGATS/ISO 12639 Amd2-2006, Graphic technology - Prepress digital data exchange - Tag image file format for image technology (TIFF/IT) - Amendment 1

The purpose of Amendment 1 is to add an informative annex relating to the incorporation of JBIG2-Amd2 compressed data into TIFF/IT.
This part of ISO 12640 specifies a set of standard large gamut colour images (encoded as 16-bit CIELAB digital data) that can be used for the evaluation of changes in image quality during coding, image processing (including transformation, compression and decompression), displaying on a colour monitor and printing. These images can be used for research, testing and assessment of output systems such as printers, colour management systems and colour profiles.

ANSI/CGATS/ISO 12646-2008, Graphic technology - Displays for colour proofing - Characteristics and viewing conditions
This standard specifies the minimum requirements for the characteristics of displays to be used for soft proofing of colour images. Included are requirements for uniformity, convergence, refresh rate, display diagonal size, spatial resolution and glare of the screen surface. The dependence of colorimetric properties on the electrical drive signals and viewing direction, especially for flat panel displays, is also specified.

ANSI/CGATS/ISO 12646-2017, Graphic technology - Displays for colour proofing - Characteristics
This International Standard specifies requirements for two conformance levels for the characteristics of displays to be used for soft proofing of colour images. Included are requirements for uniformity and variations of electro-optical properties with viewing direction for different driving signals.

ANSI/CGATS/ISO 12646/Amd 1:2008, Graphic technology - Displays for colour proofing - Characteristics and viewing conditions
AMENDMENT 1
This document amends CGATS/ISO 12646:2008 (identical national adoption of ISO 12646:2008)

ANSI/CGATS/ISO 15790-2005 (R2013), Graphic technology and photography - Certified reference materials for reflection and transmission metrology - Documentation and procedures for use, including determination of combined standard uncertainty
This standard specifies the documentation requirements for certified reference materials (CRMs), procedures for the use of CRMs, and procedures for the computation and reporting of the combined standard uncertainty of reflectance and transmittance measurement systems used in graphic arts, photographic and other imaging industries.

ANSI/CGATS/ISO 15930-4-2004 (R2009), Graphic technology - Prepress digital data exchange using PDF - Part 4: Complete exchange of CMYK and spot colour printing data using PDF 1.4 (PDF/X-1a)
This part of ISO 15930 specifies the use of Portable Document Format (PDF) Version 1.4 for the dissemination of complete digital data, in a single exchange, that contains all elements ready for final print reproduction. CMYK and spot-colour data are supported in any combination.

ANSI/CGATS/ISO 15930-7-2010 (R2016), Graphic technology - Prepress digital data exchange using PDF - Part 7: Complete exchange of printing data (PDF/X-4) and partial exchange of printing data with external profile reference (PDF/X-4p) using PDF 1.6
This part of CGATS/ISO 15930 specifies the use of Portable Document Format (PDF) Version 1.6 for the dissemination of digital data intended for print reproduction. When all elements necessary for final print reproduction are contained within the file, it is designated as PDF/X-4. If a required ICC profile is externally supplied and unambiguously identified, it is designated as PDF/X-4p. Colour-managed, CMYK, gray, RGB or spot colour data are supported, as are PDF transparency and optional content. Files can be prepared for use with gray, RGB and CMYK printing characterizations.

ANSI/CGATS/ISO 15930-8-2010 (R2016), Graphic technology - Prepress digital data exchange using PDF - Part 8: Partial exchange of printing data using PDF 1.6 (PDF/X-5)
This part of CGATS/ISO 15930 specifies the use of Portable Document Format (PDF) Version 1.6 for the dissemination of digital data intended for print, whereby all elements necessary for final print reproduction are either included or provision is made for unique identification of externally supplied graphical content or n colorant ICC profiles. Colour-managed, CMYK, gray, RGB or spot colour data are supported in any combination; as are PDF transparency and optional content. Files can be prepared for use with gray, RGB, CMYK and n-colorant printing characterizations.

NPPC (National Pork Producers Council)
ANSI/GELPP 0001-2002 (R2012), Good Environmental Livestock Production Practices - Concentrated Livestock Operations - General Site Conditions
The Good Environmental Livestock Production Practice (GELPP) standard series addresses environmental issues related to livestock production. The GELPPs combine Best Management Practices (BMPs) obtained from various sources including USDA-NRCS publications, university publications, commodity groups, and other livestock industry experts. This GELPP (0001-2002) is applicable to any Animal Feeding Operation's (AFO) production area such as: buildings, sheds, lots and related systems.

The Good Environmental Livestock Production Practice (GELPP) standard series addresses environmental issues related to livestock production. The GELPPs combine Best Management Practices (BMPs) obtained from various sources including USDA-NRCS publications, university publications, commodity groups, and other livestock industry experts. This GELPP (0003-2002) is applicable to any Animal Feeding Operation's (AFO) with outdoor manure and/or storm water storage.

ANSI/GELPP 0004-2002 (R2012), Good Environmental Livestock Production Practices - Concentrated Livestock Operations - Manure Utilization
The Good Environmental Livestock Production Practice (GELPP) standard series addresses environmental issues related to livestock production. The GELPPs combine Best Management Practices (BMPs) obtained from various sources including USDA-NRCS publications, university publications, commodity groups, and other livestock industry experts. This GELPP (0004-2002) is applicable to any Animal Feeding Operation’s (AFO) that engages in manure utilization activities such as: planning and land application aspects, records, etc.

The Good Environmental Livestock Production Practice (GELPP) standard series addresses environmental issues related to livestock production. The GELPPs combine Best Management Practices (BMPs) obtained from various sources including USDA-NRCS publications, university publications, commodity groups, and other livestock industry experts. This GELPP (0005-2002) is applicable to any Animal Feeding Operation’s (AFO) mortality management such as planning, collection, records, etc.
NSAA (ASC B77) (National Ski Areas Assc.)


This document establishes a standard for the design, manufacture, construction, operation, and maintenance of passenger ropeways. For this standard, passenger ropeway categories include: - aerial ropeways (single and double reversible); - aerial lifts (detachable lifts, chair lifts, and similar equipment); - surface lifts (1-bar lifts, 2-bar lifts, platter lifts, and similar equipment); - tows (wire rope and fiber rope tows) - conveyors.

ANSI B77.2-2014, Funiculars - Safety Standard

Revises the standard dealing with Funicular systems, especially such a system operated on a steep incline with simultaneous ascending and descending carriers on (usually very nearly parallel!) guideways counterbalancing on another, are also known as cable railways or inclines. This document establishes a standard for the design, manufacture construction, operation, and maintenance of Funiculars for passenger transport that meet the criteria of the standard.

NSF (NSF International)

ANSI/BIFMA e3-2012 (i7), Furniture Sustainability Standard

Issue 7: The purpose of the ballot is to propose new and clarifying language in section 7.

ANSI/BIFMA e3-2012 (i8), Furniture Sustainability Standard

Issue 8 - Provides updates to section 5 of e3.

ANSI/BIFMA e3-2012 (i9), Furniture Sustainability Standard

Issue 9 - Provide updates to section 6 of e3.

ANSI/BIFMA e3-2013 (i19r1), Furniture Sustainability

This Standard is applicable to all business and institutional furniture; this includes but is not limited to moveable walls, systems furniture, desking systems, casegoods, tables, seating, and accessories. The Standard is also applicable to materials and components manufactured by suppliers to furniture manufacturers.

ANSI/BIFMA e3-2013 (i20r1), Furniture Sustainability

This Standard is applicable to all business and institutional furniture; this includes but is not limited to moveable walls, systems furniture, desking systems, casegoods, tables, seating, and accessories. The Standard is also applicable to materials and components manufactured by suppliers to furniture manufacturers.

ANSI/BIFMA e3-2014 (i17r1), Furniture Sustainability Standard

This Standard is applicable to all business and institutional furniture; this includes but is not limited to moveable walls, systems furniture, desking systems, casegoods, tables, seating, and accessories. The Standard is also applicable to materials and components manufactured by suppliers to furniture manufacturers.

ANSI/BIFMA e3-2014 (i21r1), Furniture Sustainability Standard

This sustainability standard is applicable to all business and institutional furniture; this includes but is not limited to moveable walls, systems furniture, desking systems, casegoods, tables, seating, and accessories. The Standard is also applicable to materials and components manufactured by suppliers to furniture manufacturers.

ANSI/NSF 12-2009 (i6), Automatic Ice Making Equipment

Issue 6 - Boilerplate revisions in the family of food equipment standards including normative references.

ANSI/NSF 12-2012 (i7), Automatic ice making equipment

Issue 7 - The purpose of this ballot is to update the Normative References and boilerplate language in the Food Equipment family of Standards.

ANSI/NSF 12-2017 (i11r1), Automatic Ice Making Equipment

This Standard contains requirements for automatic ice making equipment and devices used in the manufacturing, processing, storing, dispensing, packaging, and transportation of ice intended for human consumption.

ANSI/NSF 13-2007 (i3), Refuse processors and processing systems

Issue 3: To update the Normative References and boilerplate language in the Food Equipment family of Standards.

ANSI/NSF 13-2009 (i4), Refuse processors and processing systems

Issue 4 - Boilerplate updates in the family of food equipment standards including normative references.

ANSI/NSF 13-2012 (i5), Refuse processors and processing systems

Issue 5 - The purpose of this ballot is to update the Normative References and boilerplate language in the Food Equipment family of Standards.

ANSI/NSF 13-2017 (i6r2), Refuse Processors and Processing Systems

Equipment covered by this Standard includes but is not limited to pulpers, disposers, and compactors used for processing refuse generated from facilities that may generate food wastes. These refuse processors are not intended for compaction of hazardous or infectious material. Specifically excluded are refuse collection trucks and refuse processors intended for use at transfer stations and in industrial operations.

ANSI/NSF 14-2007 (i17), Plastic piping system components and related materials

Issue 17: To allow manufacturers to use rework material per the proposed alternative practice provided that the regrind containers are labeled in accordance with a standard protocol developed to address traceability.

ANSI/NSF 14-2007 (i20), Plastic piping system components and related materials

Issue 20: To update the chlorine resistance test requirements for a PEX pipe manufacturer using a PEX material that already has chlorine resistance classification.

ANSI/NSF 14-2008 (i21), Plastics piping system components and related materials

Issue 21-To update Section 2.0 Normative References of NSF/ANSI Standard 14.
Issue 22: To update the QC tables with the addition of new standards that are already referenced in the normative reference section.

Issue 23: To add QC requirements in Table 10 for polyethylene pipe.

Issue 24: To require that each colored pipe made from a classified material be tested to section 5.7.

Issue 27: Update Section 2 Normative References

To update Section 2, Normative References of NSF/ANSI Standard 14.

Issue 29: Add dezincification and resistance to stress corrosion requirements in NSF/ANSI 14 with the addition of a new section, Section 5.8.

Issue 31: Add QC tables for testing of UL and AWWA standards

Issue 32: Add a footnote to Table 10 to perform the burst test on pipe sizes 24-63 once per week.

Issue 33: This would change the burst pressure test for the sulfone family of fittings for PEX tubing in Table 11 from weekly to annually.

Issue 34: This issue would remove the word ‘may’ from sections 3.1, 3.57, 5.2.1, and 6.2 in Standard 14.

Issue 35: This would remove the burst test requirement for DWA pipe and fittings from Tables 12 and 13.

Issue 37: Update Table 3 for MEK test method.

Issue 38: Clarify the intent of the ‘Degree of Crosslinking’ Test, by adding a footnote indicating that the test shall be performed on samples collected from the post-cure process.

Issue 41: This proposal removes the weekly burst pressure requirement for reducer bushings.

Issue 43: Add QC requirements in Table 10 for PVC pressure pipe and fabricated fittings having recycle content.

Issue 44: Add dezincification and resistance to stress corrosion requirements in this Standard apply to thermoplastic and thermoset plastic piping system components, including but not limited to pipes, fittings, valves, joining materials, gaskets, and appurtenances. The established physical, performance, and health effects requirements also apply to materials (resin or blended compounds) and ingredients used to manufacture plastic piping system components. This Standard provides definitions and requirements for materials, ingredients, products, quality assurance, marking, and recordkeeping.

Issue 46: Update normative references under section 2 of NSF/ANSI 14

Issue 47: This issue proposes the addition of QC requirements specific to PEX tubing.

Issue 48: This issue proposes to update Table 33 under NSF/ANSI 14 for PVC pressure pipe and fabricated fitting for water transmission and distribution to reflect QC requirements per AWWA C900 and AWWA C905.

Issue 49: This issue addresses the variable outcomes in Chlorine Resistance - Dependent Transfer Listing requirements for solid wall pipe by updating the current method and adding an additional method for testing.

Issue 50: This issue addresses the updates in the normative references by updating the QC tables in NSF/ANSI 14.
ANSI/NSF 14-2014 (i54r1), Plastics Piping System Components and Related Materials
This Standard establishes minimum physical, performance, and health effects requirements for plastic piping system components and related materials. These criteria were established for the protection of public health and the environment.

ANSI/NSF 14-2014 (i55r1), Plastics piping system components and related materials
This Standard establishes minimum physical, performance, and health effects requirements for plastic piping system components and related materials. These criteria were established for the protection of public health and the environment.

ANSI/NSF 14-2014 (i56r1), Plastics Piping System Components and Related Materials
This Standard establishes minimum physical, performance, and health effects requirements for plastic piping system components and related materials. These criteria were established for the protection of public health and the environment.

ANSI/NSF 14-2014 (i57r2), Plastics Piping System Components and Related Materials
This Standard establishes minimum physical, performance, and health effects requirements for plastic piping system components and related materials. These criteria were established for the protection of public health and the environment.

ANSI/NSF 14-2014 (i58r2), Plastics Piping System Components and Related Materials
This Standard establishes minimum physical, performance, and health effects requirements for plastic piping system components and related materials. These criteria were established for the protection of public health and the environment.

ANSI/NSF 14-2014 (i59r1), Plastics Piping System Components and Related Materials
This Standard establishes minimum physical, performance, and health effects requirements for plastic piping system components and related materials. These criteria were established for the protection of public health and the environment.

ANSI/NSF 14-2014 (i61r1), Plastics Piping System Components and Related Materials
This Standard establishes minimum physical, performance, and health effects requirements for plastic piping system components and related materials. These criteria were established for the protection of public health and the environment.

ANSI/NSF 14-2014 (i64r1), Plastics piping system components and related materials
The physical, performance, and health effects requirements in this Standard apply to thermoplastic and thermoset plastic piping system components including, but not limited to, pipes, fittings, valves, joining materials, gaskets, and appurtenances. The established physical, performance, and health effects requirements also apply to materials (resin or blended compounds) and ingredients used to manufacture plastic piping system components. This Standard provides definitions and requirements for materials, ingredients, products, quality assurance, marking, and recordkeeping.

ANSI/NSF 14-2014 (i68r1), Plastics Piping System Components and Related Materials
This Standard establishes minimum physical, performance, and health effects requirements for plastic piping system components and related materials. These criteria were established for the protection of public health and the environment.

ANSI/NSF 14-2015 (i65r1), Plastics Piping System Components and Related Materials
This Standard establishes minimum physical, performance, and health effects requirements for plastic piping system components and related materials. These criteria were established for the protection of public health and the environment.

ANSI/NSF 14-2015 (i67r1), Plastics piping system components and related materials
The physical, performance, and health effects requirements in this Standard apply to thermoplastic and thermoset plastic piping system components including, but not limited to, pipes, fittings, valves, joining materials, gaskets, and appurtenances. The established physical, performance, and health effects requirements also apply to materials (resin or blended compounds) and ingredients used to manufacture plastic piping system components. This Standard provides definitions and requirements for materials, ingredients, products, quality assurance, marking, and recordkeeping.

ANSI/NSF 14-2015 (i69r1), Plastics piping system components and related materials
This Standard establishes minimum physical, performance, and health effects requirements for plastic piping system components and related materials. These criteria were established for the protection of public health and the environment.

ANSI/NSF 14-2015 (i70r1), Plastics piping system components and related materials
This Standard establishes minimum physical, performance, and health effects requirements for plastic piping system components and related materials. These criteria were established for the protection of public health and the environment.

ANSI/NSF 14-2015 (i71r1), Plastic Piping System Components and Related Materials
This Standard establishes minimum physical, performance, and health effects requirements for plastic piping system components and related materials. These criteria were established for the protection of public health and the environment.

ANSI/NSF 14-2016 (i72r1), NSF/ANSI 14 - Plastics piping system components and related materials
The physical, performance, and health effects requirements in this Standard apply to thermoplastic and thermoset plastic piping system components including, but not limited to, pipes, fittings, valves, joining materials, gaskets, and appurtenances.

ANSI/NSF 14-2016 (i73r1), NSF/ANSI 14 - Plastics piping system components and related materials
The physical, performance, and health effects requirements in this Standard apply to thermoplastic and thermoset plastic piping system components including, but not limited to, pipes, fittings, valves, joining materials, gaskets, and appurtenances.

ANSI/NSF 14-2016 (i74r1), Plastics Piping System Components and Related Materials
This Standard establishes minimum physical, performance, and health effects requirements for plastic piping system components and related materials. These criteria were established for the protection of public health and the environment.

ANSI/NSF 14-2016 (i75r1), Plastics Piping System Components and Related Materials
This Standard establishes minimum physical, performance, and health effects requirements for plastic piping system components and related materials. These criteria were established for the protection of public health and the environment.

ANSI/NSF 14-2016 (i76r1), NSF 14 Plastic Piping System Components and Related Materials
This Standard establishes minimum physical, performance, and health effects requirements for plastic piping system components and related materials. These criteria were established for the protection of public health and the environment.

ANSI/NSF 14-2016 (i77r2), NSF/ANSI 14 - Plastics piping system components and related materials
The physical, performance, and health effects requirements in this Standard apply to thermoplastic and thermoset plastic piping system components including, but not limited to, pipes, fittings, valves, joining materials, gaskets, and appurtenances.

ANSI/NSF 14-2016 (i78r2), NSF/ANSI 14 - Plastics piping system components and related materials
The physical, performance, and health effects requirements in this Standard apply to thermoplastic and thermoset plastic piping system components including, but not limited to, pipes, fittings, valves, joining materials, gaskets, and appurtenances.

ANSI/NSF 14-2016 (i79r1), NSF 14 - Plastics piping system components and related materials
This Standard establishes minimum physical, performance, and health effects requirements for plastic piping system components and related materials. These criteria were established for the protection of public health and the environment.

ANSI/NSF 14-2016 (i80r1), NSF/ANSI 14 - Plastics piping system components and related materials
This Standard establishes minimum physical, performance, and health effects requirements for plastic piping system components and related materials. These criteria were established for the protection of public health and the environment.
ANSI/NSF 14-2016 (i79r2), NSF 14 - 2014
Plastics piping system components and related materials

The physical, performance, and health effects requirements in this Standard apply to thermoplastic and thermoset plastic piping system components including, but not limited to, pipes, fittings, valves, joining materials, gaskets, and appurtenances.

ANSI/NSF 14-2016 (i80r1), Plastics piping system components and related materials
The physical, performance, and health effects requirements in this Standard apply to thermoplastic and thermoset plastic piping system components including, but not limited to, pipes, fittings, valves, joining materials, gaskets, and appurtenances.

ANSI/NSF 14-2016 (i81r1), NSF/ANSI 14: Plastics Piping System Components and Related Materials

The physical, performance, and health effects requirements in this Standard apply to thermoplastic and thermoset plastic piping system components including, but not limited to, pipes, fittings, valves, joining materials, gaskets, and appurtenances.

ANSI/NSF 14-2017 (i78r1), Plastics Piping System components and related materials
The physical, performance, and health effects requirements in this Standard apply to thermoplastic and thermoset plastic piping system components including, but not limited to, pipes, fittings, valves, joining materials, gaskets, and appurtenances.

ANSI/NSF 14-2017 (i82r1), Plastics Piping System Components and Related Materials
The physical, performance, and health effects requirements in this Standard apply to thermoplastic and thermoset plastic piping system components including, but not limited to, pipes, fittings, valves, joining materials, gaskets, and appurtenances.

ANSI/NSF 14-2017 (i83r1), NSF/ANSI 14: Plastics Piping System Components and Related Materials
The physical, performance, and health effects requirements in this Standard apply to thermoplastic and thermoset plastic piping system components including, but not limited to, pipes, fittings, valves, joining materials, gaskets, and appurtenances.

ANSI/NSF 140-2007 (i2), Sustainable Carpet Assessment
Issue 2: To provide a market-based definition for a path to sustainable carpet, establish performance requirements for public health and environment, and address the triple bottom line, economic-environmental-social, throughout the supply chain.

ANSI/NSF 140-2009 (i4), Sustainable Carpet Assessment
Issue 4 - Fluorosurfactants based on a fluorinated chain of 8 or more carbons present significant concerns for toxicity, persistence, and bioaccumulation. The current version of the standard does not address this class of chemicals specifically in section 6 Public Health and Environment.

ANSI/NSF 140-2009 (i7), Sustainable Carpet Assessment
Issue 7: Remove fluorine test requirement from Table 9.2

ANSI/NSF 140-2009 (i8), Sustainable Carpet Assessment
Issue 8: Eliminate the words after ISO 14001 and ‘performance track’ in Section 9.5.

ANSI/NSF 140-2010 (i10), Sustainable Carpet Assessment
Issue 10 - This ballot would add a Table titled 9.2A - Performance Testing for Wool Rich Carpet to the standard.

ANSI/NSF 140-2010 (i11), Sustainability Assessment for Carpet
Issue 11: To allow 24 hours test results from the Carpet and Rug Institutes’ Green Label Plus program for carpet to be used to meet the requirements of section 6.3.5.1 Minimization of Indoor Formaldehyde Emissions.

ANSI/NSF 140-2010 (i14r1), Sustainability Carpet Assessment
Issue 14 - The purpose of this ballot is to include language that was issued via formal interpretation in September 2008. This pertains to section 7.3.2.

ANSI/NSF 140-2010 (9), Sustainable Carpet Assessment
Issue 9 - revise the definition of renewable energy in 3.14

ANSI/NSF 140-2012 (i16), Sustainability Assessment for Carpet
Issue 16 - Addresses PBTs and updates the reference to RoHS in Annex A.

ANSI/NSF 140-2012 (i17), Sustainability Carpet Assessment
Issue 17 - The purpose of this ballot is to change the prerequisites listing in section 4 and one revision in Section 10. Due to an error in the revision 2 ballot document, the corrected text is being reballoted as revision 3.

ANSI/NSF 140-2012 (i18), Sustainability Assessment for Carpet
Issue 18: Revision 2 narrows the scope of the ballot to only revise Table 10.1. The remaining revisions were deferred to a task group.

ANSI/NSF 140-2012 (i19), Sustainability Assessment for Carpet
Issue 19 - The purpose of this ballot is to update section 8 for EPP, bio-based and recycled content.

ANSI/NSF 140-2012 (i21), Sustainability Carpet Assessment
Issue 21: The purpose of this ballot is to add language in several sections to clarify intent.

ANSI/NSF 140-2012 (i22), Sustainability Assessment for Carpet
Issue 22: The purpose of this ballot is to add a column for validity of test data to Table 9.2.

ANSI/NSF 140-2013 (i120), Sustainability Assessment for Carpet
The purpose of this ballot is to update the normative references in the Standard.

ANSI/NSF 140-2013 (i20r2), Sustainability Assessment for Carpet
Issue 20 - This Standard can be used on any carpet product; however, it is intended to be used for evaluation of commercial carpet products by providing a product evaluation methodology that is additive to emerging commercial green building standards.

ANSI/NSF 140-2013 (i23), Sustainability Assessment for Carpet
Issue 23: The purpose of this ballot is to address various motions from the 2012 JC meeting and other outstanding ballots.

ANSI/NSF 140-2013 (i24), Sustainability Assessment for Carpet
Issue 24 - The purpose of this ballot is to update the reference to a specific product type in 8.1. The language addresses coal fly ash in general; therefore it does not need to be specifically stated. Other product types are not listed but fail under this criterion.

ANSI/NSF 140-2013 (i64r4), Sustainability Assessment for Carpet
Issue 6 revision 4: The purpose of this ballot is to revise the social indicator criteria in the Standard.

ANSI/NSF 140-2015 (i26r4), NSF/ANSI 140: Sustainability Assessment for Carpet
This sustainability standard is intended to enable organizations throughout the carpet supply chain to apply performance requirements to achieve sustainable attributes and demonstrate compliance with levels of achievement through quantifiable metrics. While this Standard can be used on any carpet product, it is intended to be used for evaluation of commercial carpet products by providing a product evaluation methodology that is additive to emerging commercial green building standards. This Standard does not apply to the packaging of sustainable carpets or to the adhesive or padding products used in the installation of carpet products.

ANSI/NSF 14159-2-2010 (i2), Hygiene requirements for the design of hand held tools used in meat and poultry processing equipment
Issue 2 - NSF/ANSI 14159-2 is open for revision as part of its prescribed five-year review.

ANSI/NSF 169-2005 (i11), Special purpose food equipment and devices
Issue 1: This Standards establishes minimum food protection & sanitation requirements for the materials, design, construction, & performance of special purpose food handling & processing equipment & devices not fully covered by other individual standards.
ANSI/NSF 169-2007 (i2), Special purpose food equipment and devices
Issue 2 - To update the Normative References and boilerplate language in the Food Equipment family of Standards.

ANSI/NSF 169-2009 (i4), Special purpose food equipment and devices
Issue 4 - Boilerplate revisions in the family of food equipment standards including normative references.

ANSI/NSF 169-2012 (i5), Special purpose food equipment and devices
Issue 5 - The purpose of this ballot is to update the Normative References and boilerplate language in the Food Equipment family of Standards.

ANSI/NSF 169-2016 (i7r2), NSF 169-12 Special Purpose Food Equipment and Devices
Equipment covered by this Standard includes, but is not limited to, specialty equipment items or devices that have special, complex, or multiple functions such as refrigeration heating equipment, and refrigerated tumblers equipment. These are applicable provisions and additional specific requirements or exceptions as might be needed for proper evaluation of devices or equipment for which individual standards do not exist.

ANSI/NSF 170-2007 (i4), Glossary of food equipment terminology
Issue 4: The purpose of this ballot is to update normative references.

ANSI/NSF 170-2007 (i7), Glossary of food equipment terminology
Issue 7 - The purpose of this ballot is to define the term frost top unit.

ANSI/NSF 170-2008 (i5), Glossary of food equipment terminology
Issue 5: The purpose of this ballot is to update the food shield definition and add definitions for cafeteria counter, carving station, cooking station, elementary school, mobile buffet counter, multiple tier, and self service food shields.

ANSI/NSF 170-2009 (i12), Glossary of Food Equipment Terminology
Issue 12: To update the normative references in the standard.

ANSI/NSF 170-2009 (i10), Glossary of food equipment terminology
Issue 10 - to define the terms - average rotational speed and variable capacity compressor and modify the term - compressor percentage run time.

ANSI/NSF 170-2010 (i9), Glossary of food equipment terminology
Issue 9: The purpose of the ballot is to modify the following definitions: dishwashing machine, final chemical sanitizing rinse, final hot water sanitizing rinse and final rinse. A new definition is proposed for a post-sanitizing rinse.

ANSI/NSF 170-2011 (i12), Glossary of food equipment terminology
Issue 12 - The purpose of this ballot is to modify the term ‘slicers’.

ANSI/NSF 170-2011 (i13), Glossary of food equipment terminology
Issue 13 - The purpose of this ballot is to define the terms ‘drip tray’ and ‘drip trough’.

ANSI/NSF 170-2014 (i15r1), Glossary of Food Equipment Terminology
Definitions covered by this Standard consist of terminology related to food equipment, including terms describing equipment, materials, design, construction, and performance testing. This Standard includes common definitions of terms used throughout NSF Food Equipment and Sanitation Standards.

ANSI/NSF 170-2015 (i16r2), Glossary of Food Equipment Terminology
Definitions covered by this Standard consist of terminology related to food equipment, including terms describing equipment, materials, design, construction, and performance testing. This Standard includes common definitions of terms used throughout NSF Food Equipment and Sanitation Standards.

ANSI/NSF 170-2015 (i17r2), Glossary of Food Equipment Terminology
Definitions covered by this Standard consist of terminology related to food equipment, including terms describing equipment, materials, design, construction, and performance testing. This Standard includes common definitions of terms used throughout NSF Food Equipment and Sanitation Standards.

ANSI/NSF 170-2015 (i18r3), Glossary of food equipment technology
Definitions covered by this Standard consist of terminology related to food equipment, including terms describing equipment, materials, design, construction, and performance testing. This Standard includes common definitions of terms used throughout NSF Food Equipment and Sanitation Standards.

ANSI/NSF 170-2017 (i19r1), Glossary of Food Equipment Terminology
Definitions covered by this Standard consist of terminology related to food equipment, including terms describing equipment, materials, design, construction, and performance testing. This Standard includes common definitions of terms used throughout NSF Food Equipment and Sanitation Standards.

ANSI/NSF 173 2012 (i45), Dietary Supplements
Issue 45: The purpose of this ballot is to modify 5.3.2 Pesticides and 7.2.1 Multi-residue method in NSF/ANSI 173. The proposed changes will allow NSF international increased flexibility in conducting pesticide testing, due to the variations and limitations in manufacturer testing. Additionally, a modification to the requirements specific to Panax ginseng or Panax quinquefolius to only apply the zero tolerance limits to products sold and/or distributed within the United States is proposed.

ANSI/NSF 173-2007 (i14), Dietary Supplements
Issue 14: To revise Section 8 to broaden the testing of raw materials as part of a comprehensive Good Manufacturing Practices raw materials acceptance program.

ANSI/NSF 173-2007 (i22), Dietary Supplements
Issue 22: Incorporate language that requires manufacturers to comply with new federal legislation on the reporting of adverse events from dietary supplements to the US FDA.

ANSI/NSF 173-2007 (i23), Dietary Supplements
Issue 23: Incorporate language on the handling and storage of raw materials in an effort to reduce cross-contamination from allergens.

ANSI/NSF 173-2007 (i25), Dietary Supplements
Issue 25: To incorporate general requirements for formulation submissions to demonstrate product compliance.

ANSI/NSF 173-2008 (i20r2), Dietary Supplements
Issue 20, r2: To incorporate testing requirements for potential contaminants in fish oil.

ANSI/NSF 173-2008 (i27), Dietary Supplements
Issue 27: To replace Section 8 of NSF/ANSI 173 with 21 CFR § 111. Additional requirements, including Recall procedures, compliance with the 2002 Bioterrorism Act, and AER reporting system, which are not covered in 21 CFR § 111, will remain.

ANSI/NSF 173-2009 (i24), Dietary Supplements
Issue 24: add modifications to the define the types of ingredients that are associated with the acceptable limits categories in tables 6A and 6B.

ANSI/NSF 173-2010 (i35), Dietary Supplements
Issue 35: Recently an error was identified in ANSI/NSF 173 related to the disintegration testing for delayed release/enteric coated capsules and tablets. Section 5.4 Disintegration of NSF/ANSI 173 - Dietary Supplements needs to be updated.

ANSI/NSF 173-2010 (i31), Dietary Supplements
Issue 31: Diethylene glycol (DEG) is a suspected contaminant of glycerin. The U.S. Food and Drug Administration (FDA) has recommended that pharmaceutical manufacturers screen for diethylene glycol contamination in glycerin supplies. Glycerin may be used as a humectant, solvent, sweetener, or filler (among other uses) in dietary supplements. Sections 5.3.6 Industrial Contaminants and 7.5 Test Methods for Industrial Contaminants of NSF/ANSI 173 - Dietary Supplements needs to be updated.
ANSI/NSF 173-2010 (i33r2), NSF/ANSI - 173 - Dietary Supplements

Issue 33: The purpose of this ballot is to update Section 7.3 of the current version of NSF/ANSI Standard 173 to allow test methods for microbiological contaminants to be more in sync with the current promulgated version of the United States Pharmacopeia (USP). As well, alternate test methodologies are identified.

ANSI/NSF 173-2010 (i34), NSF/ANSI 173 - Dietary Supplements

Issue 34: The acceptance levels for dioxins and dioxin-like PCBs do not currently allow for a dose-related risk evaluation based on the wording in NSF/ANSI Standard 173, Section 5.3.6 Industrial Contaminants.

ANSI/NSF 173-2011 (i29), Dietary Supplements

Issue 29: The purpose of this ballot is four-fold: (1) to update Section 6, Test methods used by testing laboratories for identification and quantification of ingredients—raw materials and finished products; (2) to update Section 7.4, Test methods for chemical contaminants; (3) to remove Tables 3 and 4; and (4) to update the quality assurance sections related to verification testing performed to evaluate compliance with the Standard.

ANSI/NSF 173-2011 (i30), Dietary Supplements

Issue 30: The purpose of this ballot is to update Sections 5.3.4 Natural toxins and 7.4 Test methods for chemical contaminants of NSF/ANSI 173, and to revise Table A1 - Botanicals known or suspected to contain aristolochic acid.

ANSI/NSF 173-2011 (i36), Dietary Supplements

Issue 36: Reduces the current limit in ANSI/NSF 173 for lead content in finished products to 10 micrograms per day. This change would harmonize the lead limit with current APHA and USP limits.

ANSI/NSF 173-2011 (i38), Dietary Supplements

Issue 38: The purpose of this ballot is to add additional Normative References and a definition for ‘qualified individual’ to NSF/ANSI 173.

ANSI/NSF 173-2011 (i39), Dietary Supplements

Issue 39: The purpose of this ballot is to update the subsection heading for 6.1.1.1 Macroscopic test methods in NSF/ANSI 173.

ANSI/NSF 173-2011 (i40), Dietary Supplements

Issue 40: The purpose of this ballot is three-fold: (1) To eliminate discrepancies with the language in 7.4; (2) To achieve consistency with language in paragraphs related to method selection and development; (3) To ensure that all language meets ANSI requirements.

ANSI/NSF 173-2012 (i37), Dietary Supplements

Issue 37: Reduces the current limit in ANSI/NSF 173 for cadmium content in finished products to 4.1. This change would harmonize the cadmium limit with the current AHPA limit.

ANSI/NSF 173-2012 (i41), Dietary Supplements

Issue 41: Corrects the finished product acceptance level for mercury in ANSI/NSF 173 to 0.002 mg/day (2 ug/day).

ANSI/NSF 173-2012 (i43), Dietary Supplements

Issue 43: The purpose of this ballot is to modify NSF/ANSI 173 to allow NSF International increased flexibility in selecting finished product claims for analysis based on the number of finished product claims and ingredients present on the product label.

ANSI/NSF 173-2012 (i44), Dietary Supplements

Issue 44: The purpose of this ballot is to modify 5.2.2 Finished products in NSF/ANSI 173. The proposed changes will allow NSF International increased flexibility in selecting finished product claims for analysis based on the number of finished product claims and ingredients present on the product label.

ANSI/NSF 173-2012 (i46), Dietary Supplements

Issue 46: The purpose of this ballot is to update NSF/ANSI 173 with a requirement for testing Diethylene Glycol (DEG) in Glycerin ingredients.

ANSI/NSF 173-2013 (i47r2), Dietary Supplements

Issue 47: This ballot proposes updates to several parts of NSF/ANSI 173, Section 5, to clarify product requirements.

ANSI/NSF 173-2013 (i48), Dietary Supplements

Issue 48: The purpose of this ballot is to update and clarify the language in NSF/ANSI 173, Section 5.4.1, to ensure that the requirement is clearly defined.

ANSI/NSF 173-2015 (i50r3), Dietary Supplements

This Standard contains requirements for dietary supplements that contain one or more of the following dietary ingredients: a vitamin, a mineral, an herb or other botanical, an amino acid, a dietary substance for use by humans to supplement the diet by increasing the total dietary intake, or a concentrate, metabolite, constituent, extract, or combinations of these ingredients.

ANSI/NSF 173-2016 (i49r1), Dietary Supplements

This Standard contains requirements for dietary supplements that contain one or more of the following dietary ingredients: a vitamin, a mineral, an herb or other botanical, an amino acid, a dietary substance for use by humans to supplement the diet by increasing the total dietary intake, or a concentrate, metabolite, constituent, extract, or combinations of these ingredients.

ANSI/NSF 173-2016 (i51r2), Dietary Supplements

This Standard contains requirements for dietary supplements that contain one or more of the following dietary ingredients: a vitamin, a mineral, an herb or other botanical, an amino acid, a dietary substance for use by humans to supplement the diet by increasing the total dietary intake, or a concentrate, metabolite, constituent, extract, or combinations of these ingredients.

ANSI/NSF 173-2016 (i54r1), Dietary Supplements

This Standard contains requirements for dietary supplements that contain one or more of the following dietary ingredients: a vitamin, a mineral, an herb or other botanical, an amino acid, a dietary substance for use by humans to supplement the diet by increasing the total dietary intake, or a concentrate, metabolite, constituent, extract, or combinations of these ingredients.

ANSI/NSF 173-2016 (i60r1), Dietary Supplements

The purpose of NSF/ANSI 173 is to serve as an evaluation tool for analyzing dietary supplements. Certification to this Standard serves as a communication tool between manufacturers of ingredients and finished product, retailers, healthcare practitioners, and consumers. This Standard provides test methods and evaluation criteria to allow for the determination that a dietary supplement contains the ingredients claimed on the label, either qualitatively or quantitatively, and that it does not contain specific undeclared contaminants.

ANSI/NSF 177-2014 (i51r1), Shower Filtration Systems - Aesthetic Effects

The point-of-use shower filtration systems addressed by this Standard are designed to be used for the reduction of specific substances that may be present in potable water (public or private). Systems covered under this Standard are intended to reduce substances affecting the aesthetic quality of the water. Only whole systems shall be evaluated under this Standard. Systems with components or functions covered under other NSF or NSF/ANSI standards or criteria shall comply with those applicable requirements.

ANSI/NSF 18-2007 (i9), Manual food and beverage dispensing equipment

Issue 9 - To update the Normative References and boilerplate language in the Food Equipment family of Standards.
ANSI/NSF 18-2009 (i11), Food Equipment - Manual food and beverage
Issue 11 R2 - To update the boilerplate changes in the family of food equipment standards. Additionally, changes to Section 6 and Annex B are proposed.

ANSI/NSF 18-2011 (i13), Manual food and beverage dispensing equipment
Issue 13 - Establishes requirements in NSF 18 for dispensing equipment designed to maintain the safety of potentially hazardous foods held under controlled conditions without refrigeration for dispensers that operate with a mechanical barrier that is also the original hermetic seal.

ANSI/NSF 18-2012 (i12), Manual food and beverage dispensing equipment
Issue 12 - The purpose of this ballot is to update the Normative References and boilerplate language in the Food Equipment family of Standards.

ANSI/NSF 18-2016 (i14r1), Manual Food and Beverage Dispensing Equipment
This Standard contains requirements for equipment and devices that manually dispense food or beverages, in bulk or in portions. The materials, design, and construction requirements of this Standard may also be applied to an item that is manufactured as a component of food and beverage dispensing equipment. This Standard does not apply to vending machines, dispensing freezers, or bulk milk dispensing equipment covered by the scope of other NSF Standards.

ANSI/NSF 184-2010 (i4), Residential dishwashers
Issue 4 - NSF/ANSI 184 is open for revision as part of its prescribed five-year review.

ANSI/NSF 184-2014 (i5r1), Residential Dishwashers
Equipment covered by this Standard includes all residential dishwashers. This Standard does not establish equipment installation requirements. While the requirements of this Standard are intended to ensure equipment may be installed in a sanitary manner, proper installation of equipment shall be governed by the applicable codes.

ANSI/NSF 2-2006 (i13), Food equipment
Issue 13 - The purpose is to allow the use of ColiScan; MF and CHROMagarTM as equivalent, alternate, selective media to Chromocult; for the recovery and enumeration of E. coli 11229 for all in Place Cleaning assays.

ANSI/NSF 2-2007 (i11), Food Equipment
Issue 11 - To address electronic thermometers power loss.

ANSI/NSF 2-2007 (i12), Food equipment
Issue 12 - To update the Normative References and boilerplate language in the Food Equipment family of Standards.

ANSI/NSF 2-2008 (i4), Food Equipment
Issue 4 - The purpose of this ballot is to update section 5.35 Food shields.

ANSI/NSF 2-2009 (i15), Food Equipment
Issue 15 - Boilerplate modifications to be made throughout the family of food equipment standards including normative references.

ANSI/NSF 2-2009 (i16), Food equipment
Issue 16 - The purpose of this revision is to include an exemption from the material smoothness and cleanability requirements for woven silicone baking mats used for baking bread products only.

ANSI/NSF 2-2010 (i17), Food equipment
Issue 17 - The purpose of this ballot is to eliminate the exemption for bun and baking pans that permits an unsealed seam on a rolled bead and clarify the requirements for attaching handles to lids in 5.30 Pots, pans, and utensils.

ANSI/NSF 2-2012 (i18), Food equipment
Issue 18 - The purpose of this ballot is to update the Normative References and boilerplate language in the Food Equipment family of Standards.

ANSI/NSF 2-2012 (i21), Food equipment
Issue 21 - The purpose of this ballot is to update the requirement in 5.4.6 - Beverage (urn) stands, which is outdated, does not reflect advancements and changes in commercial hot and cold beverage equipment.

ANSI/NSF 2-2014 (i20r2), Food Equipment
Equipment covered by this Standard includes, but is not limited to, bakery, cafeteria, kitchen, and pantry units and other food handling and processing equipment such as tables and components, counters, hoods, shelves, and sinks.

ANSI/NSF 2-2014 (i21r2), Food Equipment
This Standard establishes minimum food protection and sanitation requirements for the materials, design, fabrication, construction, and performance of food handling and processing equipment.

ANSI/NSF 2-2015 (i24r2), NSF/ANSI 2: Food Equipment
Equipment covered by this Standard includes, but is not limited to, bakery, cafeteria, kitchen, and pantry units and other food handling and processing equipment such as tables and components, counters, hoods, shelves, and sinks.

ANSI/NSF 2-2016 (i23r2), Food Equipment
This Standard establishes minimum food protection and sanitation requirements for the materials, design, fabrication, construction, and performance of food handling and processing equipment.

ANSI/NSF 2-2016 (i25r2), Food Equipment
This Standard establishes minimum food protection and sanitation requirements for the materials, design, fabrication, construction, and performance of food handling and processing equipment.

ANSI/NSF 20-2012 (i5), Commercial bulk milk dispensing equipment
Issue 5 - The purpose of this ballot is to update the Normative References and boilerplate language in the Food Equipment family of Standards.

ANSI/NSF 20-2016 (i6r1), Commercial Bulk Milk Dispensing Equipment
This Standard contains requirements for bulk milk dispensers designed to dispense servings of milk or milk products by manual or machine actuation. This Standard does not apply to dispensing freezers (soft-serve machines), vending machines, or manual food and beverage dispensing equipment covered by the scope of other NSF standards.

ANSI/NSF 20-2016 (i6r1), Commercial Bulk Milk Dispensing Equipment
This Standard contains requirements for bulk milk dispensers designed to dispense servings of milk or milk products by manual or machine actuation. This Standard does not apply to dispensing freezers (soft-serve machines), vending machines, or manual food and beverage dispensing equipment covered by the scope of other NSF standards.

ANSI/NSF 21-2007 (i3), Thermostatic refuse containers
Issue 3 - To update the Normative References and boilerplate language in the Food Equipment family of Standards.

ANSI/NSF 21-2009 (i4), Thermostatic refuse containers
Issue 4 - Boilerplate updates in the family of food equipment standards including normative references.

ANSI/NSF 21-2012 (i5), Thermostatic refuse containers
Issue 5 - The purpose of this ballot is to update the Normative References and boilerplate language in the Food Equipment family of Standards.

ANSI/NSF 21-2015 (i6r3), Thermoplastic Refuse Containers
This Standard contains sanitation requirements for new thermoplastic refuse containers intended for the indoor and outdoor storage of refuse. Thermoplastic refuse container materials and components covered under other NSF or NSF/ANSI Standards or Criteria shall also comply with the requirements therein. This Standard is not intended to restrict new unit design, provided that such design meets the minimum specifications described herein.

ANSI/NSF 222-2006 (R2011) (i3), Ozone generators
Issue 3: Reaffirms ANSI/NSF 222, Ozone generators, as required every five years by American National Standards Institute (ANSI). This is a reaffirmation ballot, and as such no substantive changes are being recommended to the Standard.

ANSI/NSF 223-2012, Conformity Assessment Requirements for Certification Bodies that Certify Products pursuant to NSF/ANSI Standard 60: Drinking Water Treatment Chemicals - Health Effects
The proposed standard, NSF 223, establishes minimum requirements for certification bodies to be used when certifying products to NSF/ANSI Standard 60.
ANSI/NSF 223-2013 (i2), Conformity Assessment Requirements for Certification Bodies that Certify Products Pursuant to NSF/ANSI 60: Drinking Water Treatment Chemicals - Health Effects

This Standard establishes requirements for activities to be performed when certification bodies certify products to NSF/ANSI 60, including documentation reviews, product testing, and facility audits conducted during surveillance.

ANSI/NSF 223-2013 (i3r1), Conformity Assessment Requirements for Certification Bodies that Certify Products Pursuant to NSF/ANSI 60: Drinking Water Treatment Chemicals - Health Effects

This Standard establishes minimum requirements for certification bodies to be used when certifying products to NSF/ANSI 60 - Drinking Water Treatment Chemicals - Health Effects. These requirements are supplemental to those contained in ISO Guide 65 or ISO 17020 and do not replace the requirements of either ISO standard. By specifying this Standard, users of product certifications can communicate their expectation that certification activities addressed herein are performed in the particular manner described.

ANSI/NSF 223-2013 (i4r1), Conformity Assessment Requirements for Certification Bodies that Certify Products Pursuant to NSF/ANSI 60: Drinking Water Treatment Chemicals - Health Effects

This Standard establishes minimum requirements for certification bodies to be used when certifying products to NSF/ANSI 60 - Drinking Water Treatment Chemicals - Health Effects. These requirements are supplemental to those contained in ISO Guide 65 or ISO 17020 and do not replace the requirements of either ISO standard. By specifying this Standard, users of product certifications can communicate their expectation that certification activities addressed herein are performed in the particular manner described.

ANSI/NSF 223-2015 (i5r1), Conformity Assessment Requirements for Certification Bodies that Certify Products Pursuant to NSF/ANSI 60-Dinking Water Treatment Chemicals - Health Effects

This Standard establishes minimum requirements for certification bodies to be used when certifying products to NSF/ANSI 60 - Drinking Water Treatment Chemicals - Health Effects. These requirements are supplemental to those contained in ISO Guide 65 or ISO 17020 and do not replace the requirements of either ISO standard. By specifying this Standard, users of product certifications can communicate their expectation that certification activities addressed herein are performed in the particular manner described.

ANSI/NSF 24-2008 (i2), Plumbing system components for recreational vehicles, Issue 2

Issue 2 - To clarify that toilets under NSF/ANSI 24 shall comply with only the Function Test of IAPMO TS 12, and not all sections of IAPMO TS 12.

ANSI/NSF 24-2008 (i3), Plumbing system components for recreational vehicles, Issue 3

Issue 3 - To remove the requirement for mechanical seal toilets under NSF/ANSI 24 to comply with the 'structural strength and integrity' and 'wear and cleanability' sections of ANSI Z124.4.

ANSI/NSF 24-2008 (i4), Plumbing system components for recreational vehicles, Issue 4

Issue 4 - To add requirements for mechanical seal toilets and tanks to meet the appropriate sections of IAPMO TS-1.

ANSI/NSF 24-2008 (i6), Plumbing system components for recreational vehicles

Issue 6: Body Waste Inlet - clarification to piping size and harmonization with NFPA 1192.

ANSI/NSF 24-2009 (i5), Plumbing system components for recreational vehicles

Issue 5 - To update Section 21 requirements for flexible dry vent assembly of ANSI/NSF24.

ANSI/NSF 24-2010 (i7), Plumbing System Components for Recreational Vehicles

Issue 7: This issue removes the colorfastness and cigarette tests for plastic mechanical seal toilets.

ANSI/NSF 24-2014 (i8r1), Plumbing System Components for Recreational Vehicles

This Standard covers pipe, fittings, valves, traps, vents, tanks, pumps, connectors, fixtures, appliances, and similar appurtenances used in a plumbing system of a recreational vehicle.

ANSI/NSF 24-2015 (i10r2), Plumbing system components for recreational vehicles

This Standard covers pipe, fittings, valves, traps, vents, tanks, pumps, connectors, fixtures, appliances, and similar appurtenances used in a plumbing system of a recreational vehicle.

ANSI/NSF 240-2011 (R2017) (i2r1), Drainfield Trench Product Sizing for Gravity Dispersal Onsite Wastewater Treatment and Disposal Systems

This Standard provides a methodology to compare, assess and document product sizing criteria for alternative or proprietary products with respect to conventional coarse aggregate used in onsite wastewater dispersal drainfields, based on comparative hydraulic performance. The comparative treatment performance of alternative products compared to performance of conventional systems is not within the scope of this Standard

ANSI/NSF 240-2011, Drainfield Trench Product Sizing for Gravity Dispersal Onsite Wastewater Treatment and Disposal Systems

Issue 1 - Revision 5: The purpose of this ballot is to create an American National Standard that provides laboratory and field evaluation methods for comparing gravity dispersal drainfield products based on hydraulic performance used in place of conventional coarse aggregate within onsite wastewater treatment and disposal systems.

ANSI/NSF 245-2010 (i4), NSF/ANSI 245 wastewater treatment systems-nitrogen reduction

Issue 4 - The purpose of this ballot is to update the table in Section 8.3.3 Analysis which requires treated effluent analysis for TKN, NO2 and NO3. However, this same section requires the raw influent to be analyzed for TKN and not NO2 or NO3, thus not meeting the definition of total nitrogen. The result is a potential discrepancy in calculating the total nitrogen reduction performance.

ANSI/NSF 245-2010 (i5), Wastewater Treatment Systems - Nitrogen reduction

Issue 5: The purpose of this ballot is to update the Normative References in several of the Wastewater Treatment Standards.

ANSI/NSF 245-2012 (i6), Wastewater treatment systems - Nitrogen reduction

Issue 6: The purpose of this ballot is to make the language relating to failure sensing equipment in the wastewater standards consistent as well as update it regarding the testing procedure.

ANSI/NSF 245-2013 (i7), Wastewater treatment systems - Nitrogen reduction

Issue 7: The purpose of this ballot is to update the language in section 8.4.1 for consistency among wastewater standards. The change in section 9 addresses a comment on the ballot 4020 regarding when adjustments to alkalinity are made, they are required to be reported. Issue 7 r3 - This is a boilerplate ballot for wastewater treatment systems standards.

ANSI/NSF 25-2007 (i6), Vending machines for food and beverage

Issue 6: To update the Normative References and boilerplate language in the Food Equipment family of Standards.

ANSI/NSF 25-2007 (i7), Vending machines for food and beverages

Issue 7 - To allow the use of ColiScan® and CHROMagarTM as equivalent, alternate, selective media to Chromocult®; for the recovery and enumeration of Escherichia coli 11229 for the In Place Cleaning assay specified in NSF/ANSI 25.

ANSI/NSF 25-2009 (i8), Vending machines for food and beverages

Issue 8 - Boilerplate updates in the family of food equipment standards including normative references.

ANSI/NSF 25-2012 (i9), Vending machines for food and beverages

Issue 9 - The purpose of this ballot is to update the Normative References and boilerplate language in the Food Equipment family of Standards.

ANSI/NSF 25-2017 (i11r1), Vending Machines for Food and Beverages

This Standard contains requirements for food and beverage vending machines, including those that vend packaged food and beverages and those that vend food and beverages in bulk.
ANSI/NSF 29-2007 (i2), Detergent and chemical feeders for commercial spray-type dishwashing machines

Issue 2: To update the Normative References and boilerplate language in the Food Equipment family of Standards.

ANSI/NSF 29-2009 (i3), Detergent and chemical feeders for commercial spray-type dishwashing machines

Issue 3 - Boilerplate updates in the family of food equipment standards including normative references.

ANSI/NSF 29-2012 (i4), Detergent and chemical feeders for commercial spray-type dishwashing machines

Issue 4 - The purpose of this ballot is to update the Normative References and boilerplate language in the Food Equipment family of Standards.

ANSI/NSF 3-2006 (i5), Commercial warewashing equipment

Issue 5 - To A) remove the requirement for either a self-draining pump or a drain plug on the pump, and B) allow the final rinse pressure gauge to read 5 to 30 psi rather than 20 +/- 5 psi.

ANSI/NSF 3-2007 (i4), Commercial warewashing equipment

Issue 6 - To update Normative references, 6.2.2 - Chemical sanitizing dishwashing & glasswashing machines & 6.2.4 - Chemical sanitizing pot, pan, & utensil washing machines test methods.

ANSI/NSF 3-2008 (i7), Commercial warewashing equipment

Issue 7 - To include and modify language to be consistent with the boilerplate language in NSF/ANSI 2 Food equipment.

ANSI/NSF 3-2009 (i8), Commercial warewashing equipment

Issue 8 - Boilerplate updates in the family of food equipment standards including normative references.

ANSI/NSF 3-2010 (i6), Commercial warewashing equipment

Issue 9: The purpose of this ballot is threefold: (1) to modify ANSI/NSF 305 by updating Table 5.1 to show a missing process known as ‘Etherification of glycercin and glycercin making polyglycerols’; (2) to update the naming conventions so that the botano-chemical process names are the same in Table 5.1, Table 6.1 and Annex E; and (3) to incorporate additional language allowing for the use of catalysts meeting the chemical definition of catalyst (3.3) in the botano-chemical processes (5.3.1).

ANSI/NSF 3-2011 (i7), Commercial warewashing equipment

Issue 10: Incorporates a note into ANSI/NSF 305 concerning compliance with the California Organic Products Act (COPA) of 2003 and the proper calculation.

ANSI/NSF 3-2011 (i12), Personal Care Products Containing Organic Ingredients

Issue 11: To add additional wording in ANSI/NSF 3 to allow for bagging and labeling of commercial dishwashing machines with soap bars or pastes, and to include soap bars or pastes in ANSI/NSF 3.

ANSI/NSF 3-2017 (i2r1), Commercial Warewashing Equipment

This Standard applies to commercial dishwashing, glasswashing, and pot, pan, and utensil washing machines that wash their contents by applying sprays of detergent solutions with or without blasting media granules, and sanitize their contents by applying sprays of hot water or chemical sanitizing solutions. Stationary rack and conveyor machines are covered under this Standard.

ANSI/NSF 3-A 14159-1-2014 (i4r1), Hygiene Requirements for the Design of Meat and Poultry Processing Equipment

This NSF/ANSI 3-A Standard applies to equipment intended for use in the slaughter, processing, and packaging of meat and poultry products, excluding hand held tools and mechanical belt conveyors. The requirements are to be applied by designers and manufacturers who in turn are to provide guidance to the users for the intended use of the equipment.

ANSI/NSF 3-A 14159-2-2014 (i5r1), Hygiene Requirements for the Design of Hand Held Tools Used in Meat and Poultry Processing

This NSF/3-A/ANSI Standard applies to hand held tools intended for use in the slaughter, processing, and packaging of meat and poultry products.

ANSI/NSF 3-A 14159-3-2010 (i3), Hygiene requirements for the design of mechanical belt conveyors used in meat and poultry processing equipment

Issue 3 - NSF/ANSI 14159-3 is open for revision as part of its prescribed five-year review.

ANSI/NSF 3-A 14159-3-2014 (i6r1), Hygiene Requirements for the Design of Mechanical Belt Conveyors Used in Meat and Poultry Processing

This American National Standard applies to exposed product mechanical belt conveyors, either singularly or as a component of equipment, intended for use in the slaughter, processing, and packaging of meat and poultry products.

ANSI/NSF 3-A 14159-3-2015 (i3r1), Hygiene Requirements for the Design of Mechanical Belt Conveyors Used in Meat and Poultry Processing

This American National Standard applies to exposed product mechanical belt conveyors, either singularly or as a component of equipment, intended for use in the slaughter, processing, and packaging of meat and poultry products.

ANSI/NSF 305-2011 (i10), Personal Care Products Containing Organic Ingredients

Issue 10: Incorporates a note into ANSI/NSF 305 concerning compliance with the California Organic Products Act (COPA) of 2003 and the proper calculation.

ANSI/NSF 305-2011 (i5), Personal Care Products Containing Organic Ingredients

Issue 5: The purpose of this ballot is threefold: (1) to modify ANSI/NSF 305 by updating Table 5.1 to show a missing process known as ‘Etherification of glycercin and glycercin making polyglycerols’; (2) to update the naming conventions so that the botano-chemical process names are the same in Table 5.1, Table 6.1 and Annex E; and (3) to incorporate additional language allowing for the use of catalysts meeting the chemical definition of catalyst (3.3) in the botano-chemical processes (5.3.1).

ANSI/NSF 305-2011 (i6), Personal Care Products Containing Organic Ingredients

Issue 6: The purpose of this ballot is to provide a means for companies to source ingredients by modifying NSF/ANSI 305 to include language allowing plant-based products certified to EC 834/2007 and EC 889/2008 (European Union organic regulations) to be considered equivalent to USDA NOP standards certification.

ANSI/NSF 305-2011 (i7), Personal Care Products Containing Organic Ingredients

Issue 7: The purpose of this ballot is threefold: (1) to modify ANSI/NSF 305 by updating Table 5.1 to show a missing process known as ‘Etherification of glycercin and glycercin making polyglycerols’; (2) to update the naming conventions so that the botano-chemical process names are the same in Table 5.1, Table 6.1 and Annex E; and (3) to incorporate additional language allowing for the use of catalysts meeting the chemical definition of catalyst (3.3) in the botano-chemical processes (5.3.1).

ANSI/NSF 305-2011 (i8), Personal Care Products Containing Organic Ingredients

Issue 8: The purpose of this ballot is four-fold: (1) to change Annex G from &##8216;Informative’ to &##8216;Normative’; (2) to amend the introductory note in Annex G; (3) to specify in Table G.3 that Glycine betaine extracted from sugar beets is allowed; and (4) to clarify in Table G.3 that in addition to betaines other that Glycine betaine extracted from sugar beets, amphoteretic surfactants are also prohibited under NSF/ANSI 305.

ANSI/NSF 305-2011 (i9), Personal Care Products Containing Organic Ingredients

Issue 9: The purpose of this ballot is to include the California Organic Products Act of 2003 as a normative reference, and also to update sections 2.1 Normative references and 2.2 Informational references in NSF/ANSI 305.

ANSI/NSF 305-2011 (i3), Personal Care Products Containing Organic Ingredients

Modifies ANSI/NSF 305 by incorporating additional language agreed to by the Joint Committee on Organic Personal Care for clarifying Grapefruit Seed Extract in Table 5.2 – Preservative ingredients allowed in “Contains Organic” products.
ANSI/NSF 305-2012 (i13), Personal Care Products Containing Organic Ingredients

Issue 13: This ballot includes proposed updates to section content and titles for the following in ANSI/NSF 305: 5.2 Organic production system plan; 7.1 Use of the term "organic"; 7.4 Packaged products labeled "100 percent organic" or "organic" or "made with organic"; 7.5.1 Personal care packaged products; and 7.5.2 Agricultural packaged products.

ANSI/NSF 305-2012 (i14), Personal Care Products Containing Organic Ingredients

Issue 14: The purpose of this ballot is to provide additional clarification in 6.3 Mined Minerals, water and salt with regards to Aloe and processed Mined Minerals.

ANSI/NSF 305-2014 (i20r1), Personal Care Products Containing Organic Ingredients

This Standard specifies materials, processes, production criteria, and conditions that shall be met in order for personal care products to make organic label and marketing claims under this Standard. This Standard intends to address products with a minimum organic content of 70% (O70). Products intended to be labeled with organic processing claims currently defined under the USDA National Organic Program (NOP), including "100% Organic", "Organic", and "Made with Organic", are not covered by this Standard.

ANSI/NSF 305-2015 (i19r2), NSF/ANSI 305: Personal Care Products Containing Organic Ingredients

This Standard encourages participation in the manufacturing of personal care products using organically grown ingredients within the supply chain. It emphasizes open disclosure of impacts and benefits, and does not compromise proprietary, patented, or trade secret information. Production practices implemented in accordance with this Standard shall maintain or improve the natural resources of the operation, including soil and water quality. This Standard is to be used voluntarily by companies that may not be able to meet the current USDA organic food regulations.

ANSI/NSF 305-2015 (i21r4), Personal Care Products Containing Organic Ingredients

This Standard encourages participation in the manufacturing of personal care products using organically grown ingredients within the supply chain. It emphasizes open disclosure of impacts and benefits, and does not compromise proprietary, patented, or trade secret information. Production practices implemented in accordance with this Standard shall maintain or improve the natural resources of the operation, including soil and water quality. This Standard is to be used voluntarily by companies that may not be able to meet the current USDA organic food regulations.

ANSI/NSF 305-2016 (i26r1), Personal Care Products Containing Organic Ingredients

This Standard specifies materials, processes, production criteria, and conditions that shall be met in order for personal care products to make organic label and marketing claims under this Standard. This Standard intends to address products with a minimum organic content of 70% (O70).

ANSI/NSF 305-2016 (i28r1), Personal Care Products Containing Organic Ingredients

This Standard specifies materials, processes, production criteria, and conditions that shall be met in order for personal care products to make organic label and marketing claims under this Standard. This Standard intends to address products with a minimum organic content of 70% (O70).

ANSI/NSF 321-2010 (R2016), Goldenseal Root (Hydrastis canadensis)

The purpose of this Standard is to serve as an evaluation tool for analyzing the botanical dietary supplement Goldenseal Root (Hydrastis canadensis). NSF/ANSI 321 contains requirements for dietary supplements that contain goldenseal root as an ingredient. It allows for the determination that this botanical ingredient is accurately identified, that the product contains the quantity of dietary ingredients and marker constituents as determined by the American Herbal Pharmacopoeia (AHP), that the ingredient does not contain unacceptable quantities of contaminants, conforms to the compliance criteria of the AHP, and can be used to facilitate GMP compliance.

ANSI/NSF 320-2009 (i1), Glossary of drinking water treatment unit terminology

Issue 1 - The NSF Glossary of drinking water treatment unit terminology was developed as a means of ensuring greater consistency in the terminology used within the various NSF Drinking Water Treatment Unit Standards. The technical terms used in all NSF Drinking Water Treatment Unit Standards have been edited for consistency and compiled into this document. In addition, new definitions have been added as needed.

ANSI/NSF 330-2012 (i4), Glossary of drinking water treatment unit terminology

Multiple revisions are being proposed to NSF/ANSI 330: - a statement is being added to clarify the use of undated references (this statement is being added to all NSF Standards) and referenced standards are being added to Section 2, Normative references; - all definitions specific to NSF/ANSI 222, which is now maintained by the Joint Committee on Recreational Water Facilities, are being removed from this Standard; - all definitions of ‘rated service cycle’ and ‘service cycle’ are being revised; an - the definition of ‘unit void volume’ is being revised per the 2012 DWTU JC meeting to include the procedure used to establish the

ANSI/NSF 330-2013 (i3), Glossary of drinking water treatment unit terminology

Definitions covered by this Standard consist of terminology related to drinking water treatment units including terms describing materials, design, construction, and performance testing. This Standard includes definitions of terms used in NSF Drinking Water Treatment Unit Standards.

ANSI/NSF 330-2013 (i5), Glossary of Drinking Water Treatment Unit Terminology

The purpose of this Glossary is to provide a single resource containing all of the technical terms used in all NSF Drinking Water Treatment Unit Standards.

ANSI/NSF 330-2014 (i6r3), Glossary of Drinking Water Treatment Unit Terminology

Definitions covered by this Standard consist of terminology related to drinking water treatment units including terms describing materials, design, construction, and performance testing. This Standard includes definitions of terms used in NSF Drinking Water Treatment Unit Standards.

ANSI/NSF 330-2015 (i7r4), Glossary of Drinking Water Treatment Unit Terminology

This Standard establishes definitions for drinking water treatment units and related components.

ANSI/NSF 330-2015 (i8), Glossary of Drinking Water Treatment Unit Terminology

This Standard establishes definitions for drinking water treatment units and related components.

ANSI/NSF 332-2010 (i2 rev 3), Sustainability Assessment for Resilient Floor Coverings

Issue 2 revision 3 - changes to the proposed draft standard are included in this revision. As used in this Standard, ‘resilient floor coverings’ includes, but is not limited to, vinyl tile, vinyl composition tile, sheet vinyl, rubber, polymeric, and linoleum flooring products in which the wearing surface is non-textile. Also included are flooring accessories such as wall base, moldings, and stair treads. The Standard is applicable to products manufactured in one facility or multiple facilities, one country or multiple countries.

ANSI/NSF 332-2011 (i3), Sustainability Assessment for Resilient Flooring

Issue 3 - Revises the normative references throughout the standard.
ANSI/NSF 332‐2011 (i4), Sustainability Assessment for Resilient Flooring

Issue 4: The purpose of this ballot is to add a specific reference to the RoHS list in section 5.4.1 and clarify how to achieve points for section 5.4.3.

ANSI/NSF 332‐2011 (i6), Sustainability Assessment for Resilient Flooring

Issue 6 - The purpose of this ballot is to add language in section 6.4.2 Reduced water consumption.

ANSI/NSF 332‐2012 (i7r1), Sustainability Assessment for Resilient Flooring

Issue 7 - Review GHG inventory section 6.6 and update normative references.

ANSI/NSF 332‐2015 (i8r1), NSF/ANSI 332‐2012 Sustainability Assessment for Resilient Floor Coverings

This Standard establishes a consistent approach to the evaluation and determination of environmentally preferable and sustainable resilient floor coverings. The Standard includes relevant criteria across the product(s) life cycle from raw material extraction through manufacturing, use, and end-of-life management. As used in this Standard, “resilient floor coverings” includes, but is not limited to, vinyl tile, vinyl composition tile, sheet vinyl, rubber, polymeric, and linoleum flooring products in which the wearing surface is non‐textile. Also included are flooring accessories such as wall base, moldings, and stair treads. The Standard is applicable to products manufactured in one facility or multiple facilities, one country or multiple countries.

ANSI/NSF 336‐2011 (i1), Commercial Furnishings Fabric Sustainability Assessment

Issue 1: The standard received one negative vote during the ballot of the textiles standard at the CPHC that was not resolved. The purpose of this ballot is to alter 5.4.2.9 on Nylon Fibers to resolve that comment and negative vote. The commenter and response have been included with this ballot as a referenced item. Please see that item for further detail. Only the proposed change to section 5.4.2.9 is within the scope of this ballot.

ANSI/NSF 342‐2010 (i1), Sustainability Assessment for Wallcovering Manufacturing & Distribution

Issue 1 - The purpose of the sustainable assessment for Wallcovering products is to facilitate the thorough communication of information that is verifiable, accurate, and credible associated with the production, distribution, and use of wallcovering products.

ANSI/NSF 342‐2012 (i2r1), Sustainability Assessment for Wallcovering Products

Change the language in Section 7.3.1 and remove Section 7.3.3 from the document.

ANSI/NSF 342‐2012 (i2r2), Sustainability Assessment for Wallcovering Products

Change the language in Section 7.3.1 and remove Section 7.3.3 from the document.

ANSI/NSF 342‐2012 (i3r1), Sustainability Assessment for Wallcovering Products

Change the language in Section 7.3.1 and remove Section 7.3.3 from the document.

ANSI/NSF 342‐2012 (i4), Sustainability Assessment for Wallcovering Products

Change the language in Section 7.3.1 and remove Section 7.3.3 from the document.

ANSI/NSF 342‐2014 (i4), Sustainability Assessment for Wallcovering Products

The overall purpose of this Standard is to facilitate the thorough communication of information that is verifiable, accurate, and credible associated with the production, distribution, and use of wallcovering products. Such communication is expected to encourage the demand for and supply of products that cause less impact on the environment and society, thereby stimulating the potential for market‐driven continuous improvement. The standard is voluntary and encourages inclusive participation in the production and distribution of sustainable wallcovering products within the supply chain.

ANSI/NSF 342‐2014 (i5), Sustainability Assessment for Wallcovering Products

Issue 2: The purpose of this ballot is to revise language in Sections 7.2.2 and 8.2.2.2.

ANSI/NSF 342‐2014 (i6r1), Sustainability Assessment for Wallcovering Products

The overall purpose of this Standard is to facilitate the thorough communication of information that is verifiable, accurate, and credible associated with the production, distribution, and use of wallcovering products. Such communication is expected to encourage the demand for and supply of products that cause less impact on the environment and society, thereby stimulating the potential for market‐driven continuous improvement. The standard is voluntary and encourages inclusive participation in the production and distribution of sustainable wallcovering products within the supply chain.

ANSI/NSF 342‐2014 (i7r1), Sustainability Assessment for Wallcovering Products

The overall purpose of this Standard is to facilitate the thorough communication of information that is verifiable, accurate, and credible associated with the production, distribution, and use of wallcovering products. Such communication is expected to encourage the demand for and supply of products that cause less impact on the environment and society, thereby stimulating the potential for market‐driven continuous improvement. The standard is voluntary and encourages inclusive participation in the production and distribution of sustainable wallcovering products within the supply chain.

ANSI/NSF 342‐2012 (i2), Sustainability Assessment for Single Ply Roofing Membranes

Issue 2: The purpose of this ballot is to revise language in the following sections: 2.1 Normative References 2.2 Informative References 5.7 Post‐Consumer Single Ply Roofing Membrane Reclamation 5.8 Pre‐Consumer Single Ply Roofing Membrane Reclamation 6.5 Optimization of Material Resources 7.3 Durability 7.4 Membrane Surface Contribution 7.5.2 Quality Management System (QMS)

ANSI/NSF 35‐2007 (i3), High pressure decorative laminates (HPDL) for surfacing food equipment

Issue 3: To update the Normative References and boilerplate language in the Food Equipment family of Standards.

ANSI/NSF 35‐2009 (i5), High pressure decorative laminates for surfacing food service equipment

Issue 5: Normative references update

ANSI/NSF 35‐2012 (i6), High pressure decorative laminates (HPDL) for surfacing food service equipment

Issue 6 - The purpose of this ballot is to update the Normative References and boilerplate language in the Food Equipment family of Standards.

ANSI/NSF 350‐1‐2011 (i1), Onsite residential and commercial graywater treatment systems for subsurface discharge

Issue 1 - Revision 2: The overall purpose of this Standard is to establish minimum materials, design and construction, and performance requirements for onsite residential and commercial graywater treatment systems. It includes graywater only as the influent source, and treated effluent criteria suitable for outdoor restricted urban water use, such as subsurface irrigation.

ANSI/NSF 350‐1‐2013 (i4r2), Wastewater treatment systems - Onsite residential and commercial graywater treatment systems for subsurface discharge

Issue 4: The purpose of this ballot is to update the language in section 8.4.1 for consistency among wastewater standards. The change in section 9 addresses a comment on the ballot 40i20 regarding when adjustments to alkalinity are made, they are required to be reported.

ANSI/NSF 350‐1‐2013 (i4r3), Wastewater treatment systems - Onsite residential and commercial graywater treatment systems for subsurface discharge

Issue 4 revision 3: This is boilerplate for the wastewater treatment systems standards.
ANSI/NSF 350-1-2013 (i5), Onsite residential and commercial graywater treatment systems for subsurface discharge

This Standard contains minimum requirements for onsite residential and commercial graywater treatment systems. Graywater reuse treatment systems having a rated treatment capacity up to 5,678 L/day (1,500 gal/d). This applies to onsite residential and commercial reuse treatment systems that treat combined graywater, laundry water only from residential laundry facilities, and bathing water only.

Commercial graywater reuse treatment systems: This applies to onsite commercial reuse treatment systems that treat combined commercial facility graywater with capacities exceeding 5,678 L/day (1,500 gal/day) and commercial facility laundry water only of any capacity.

ANSI/NSF 350-2011 (i2), Onsite residential and commercial water reuse treatment systems

Issue 2 - Adds in the language that is included in 350-1 relating to concentration values for the challenge water after parameters are added. In addition, a correction to section 5 was made such that water tightness testing applies to all systems claiming conformance to the standard.

ANSI/NSF 350-2012 (i3), Wastewater treatment systems - Onsite residential and commercial water reuse treatment systems

Issue 3: The purpose of this ballot is to make the language relating to failure sensing equipment in the wastewater standards consistent as well as update it regarding the testing procedure.

ANSI/NSF 350-2013 (i4), Wastewater treatment systems - Onsite residential and commercial water reuse treatment systems

Issue 4: The purpose of this ballot is to update the language in section 8.4.1 for consistency among wastewater standards. The change in section 9 addresses a comment on the ballot 4020 regarding when adjustments to alkalinity are made, they are required to be reported.

ANSI/NSF 350-2013 (i4r3), Wastewater treatment systems - Onsite residential and commercial water reuse treatment systems

Issue 4 revision 3: This is boilerplate for the wastewater treatment systems standards.

ANSI/NSF 350-2013 (i5), Onsite residential and commercial reuse treatment systems

This Standard contains minimum requirements for onsite residential and commercial water treatment systems. Systems may include: Graywater treatment systems having a rated treatment capacity up to 5,678 L/day (1,500 gal/day). Residential wastewater treatment systems having a rated treatment capacity up to 5,678 L/day (1,500 gal/day). Commercial treatment systems that treat combined commercial facility wastewater and commercial facility laundry water of any capacity, and those treatment systems that treat graywater from commercial facilities with capacities exceeding 5,678 L/day (1,500 gal/day).

ANSI/NSF 350-2015 (i6r1), Wastewater treatment systems - Onsite residential and commercial water reuse treatment systems

This Standard contains minimum requirements for onsite residential and commercial water treatment systems.

ANSI/NSF 350-2016 (i11r1), Onsite residential and commercial water reuse treatment systems

This Standard contains minimum requirements for onsite residential and commercial water treatment systems.

ANSI/NSF 350-2017 (i15r1), Onsite Residential and Commercial Water Reuse Treatment Systems

This Standard contains minimum requirements for onsite residential and commercial water treatment systems.

ANSI/NSF 350-2017 (i9r1), Onsite Residential and Commercial Reuse Treatment Systems

This Standard contains minimum requirements for onsite residential and commercial water treatment systems.

ANSI/NSF 358-1-2014 (i2r1), Polyethylene Pipe and Fittings for Water-Based Ground-Source Geothermal Heat Pump Systems

This Standard establishes the minimum physical and performance requirements for plastic piping system components. These criteria were established for the protection of property, public health and the environment.

ANSI/NSF 358-1-2017 (i3), Polyethylene Pipe and Fittings for Water-Based Ground-Source Geothermal Heat Pump Systems

ANSI/NSF 358-2-2012, Polypropylene Pipe and Fittings for Water-Based Ground-Source Geothermal Heat Pump Systems

This proposed standard will be separated into four separate ballot documents based on material types. NSF 358-2 addresses products in polypropylene systems.

ANSI/NSF 358-3-2016 (i12r), Cross-Linked Polyethylene (PEX) Pipe and Fittings for Water-Based Ground-source (Geothermal) Heat Pump Systems

The physical and performance requirements in this Standard apply to plastic piping system components as well as non-plastic components of the ground loop heat exchanger including but not limited to cross-linked polyethylene (PEX) pipes and fittings used in water-based ground-source heat pump systems.

ANSI/NSF 358-3-2016 (i2r1), NSF/ANSI 358-3 Cross-linked Polyethylene (PEX) Pipe and Fittings for Water-Based Ground-Source (Geothermal) Heat Pump Systems

The physical and performance requirements in this Standard apply to plastic piping system components as well as non-plastic components of the ground loop heat exchanger including but not limited to cross-linked polyethylene (PEX) pipes and fittings used in water-based ground-source heat pump systems.

ANSI/NSF 358-111-2011 (i1), Valves for Crosslinked Polyethylene (PEX) Water Distribution Tubing Systems

Issue 1: To establish a standard for testing inline valves.

ANSI/NSF 358-116 , Valves for crosslinked polyethylene (PEX) water distribution tubing systems

This Standard covers components intended for use in residential and commercial, hot and cold, potable water distribution systems; and sealed central heating, including under-floor heating systems. This Standard excludes supply stops and fixture fittings (faucets).

ANSI/NSF 36-2007 (i4), Dinnerware

Issue 4: To update the Normative References and boilerplate language in the Food Equipment family of Standards.

ANSI/NSF 36-2009 (i5), Dinnerware

Issue 5 - Boilerplate revisions in the family of food equipment standards including normative references.

ANSI/NSF 36-2012 (i6), Dinnerware

Issue 6 - The purpose of this ballot is to update the Normative References and boilerplate language in the Food Equipment family of Standards.

ANSI/NSF 360-2010, NSF 360 Field Performance Evaluation

NSF 360 - Field Performance Verification was developed as a means to properly evaluate the performance of residential wastewater treatment systems under field conditions. Establishment of a national standard ensures a single, comprehensive method for properly conducting independent field performance studies, and enables broad acceptance of data to minimize redundant efforts.
ANSI/NSF 360-2014 (i2r1), Field Performance Verification

This wastewater standard provides site selection, field sampling, analytical, and statistical methods for evaluating the field performance of residential wastewater treatment systems capable of providing at least secondary treatment.

ANSI/NSF 363-2016 (i2r1), Good Manufacturing Practices (GMP) for Pharmaceutical Excipients

The purpose of NSF/IPEC/ANSI 363 is to serve as an evaluation tool for analyzing pharmaceutical excipients. Certification to this Standard serves as a communication tool between manufacturers of excipients and finished product, pharmaceutical regulators, pharmacy organizations, and consumers. This Standard provides guidance to allow for the determination that a pharmaceutical excipient is within the specifications stated by the manufacturer, either qualitatively or quantitatively, and that it does not contain specific undeclared contaminants. In some instances, validated laboratory methods are not yet available for analyzing certain ingredients.

ANSI/NSF 363-2016 (i3r1), Good Manufacturing Practices (GMP) for Pharmaceutical Excipients

The purpose of NSF/IPEC/ANSI 363 is to serve as an evaluation tool for analyzing pharmaceutical excipients. Certification to this Standard serves as a communication tool between manufacturers of excipients and finished product, pharmaceutical regulators, pharmacy organizations, and consumers. This Standard provides guidance to allow for the determination that a pharmaceutical excipient is within the specifications stated by the manufacturer, either qualitatively or quantitatively, and that it does not contain specific undeclared contaminants. In some instances, validated laboratory methods are not yet available for analyzing certain ingredients.

ANSI/NSF 363-2016 (i4r2), NSF 363-2014 Good Manufacturing Practices(GMP) for Pharmaceutical Excipients

The purpose of NSF/IPEC/ANSI 363 is to serve as an evaluation tool for analyzing pharmaceutical excipients. Certification to this Standard serves as a communication tool between manufacturers of excipients and finished product, pharmaceutical regulators, pharmacy organizations, and consumers. This Standard provides guidance to allow for the determination that a pharmaceutical excipient is within the specifications stated by the manufacturer, either qualitatively or quantitatively, and that it does not contain specific undeclared contaminants. In some instances, validated laboratory methods are not yet available for analyzing certain ingredients.

ANSI/NSF 363-2016 (i5r1), Good Manufacturing Practices (GMP) for Pharmaceutical Excipients

The purpose of NSF/IPEC/ANSI 363 is to serve as an evaluation tool for analyzing pharmaceutical excipients. Certification to this Standard serves as a communication tool between manufacturers of excipients and finished product, pharmaceutical regulators, pharmacy organizations, and consumers. This Standard provides guidance to allow for the determination that a pharmaceutical excipient is within the specifications stated by the manufacturer, either qualitatively or quantitatively, and that it does not contain specific undeclared contaminants. In some instances, validated laboratory methods are not yet available for analyzing certain ingredients.

ANSI/NSF 363-2016 (i6r1), NSF 363-2014 Good Manufacturing Practices(GMP) for Pharmaceutical Excipients

The purpose of NSF/IPEC/ANSI 363 is to serve as an evaluation tool for analyzing pharmaceutical excipients. Certification to this Standard serves as a communication tool between manufacturers of excipients and finished product, pharmaceutical regulators, pharmacy organizations, and consumers. This Standard provides guidance to allow for the determination that a pharmaceutical excipient is within the specifications stated by the manufacturer, either qualitatively or quantitatively, and that it does not contain specific undeclared contaminants. In some instances, validated laboratory methods are not yet available for analyzing certain ingredients.

ANSI/NSF 363-2016 (i7r1), Good Manufacturing Practices (GMP) for Pharmaceutical Excipients

The purpose of NSF/IPEC/ANSI 363 is to serve as an evaluation tool for analyzing pharmaceutical excipients. Certification to this Standard serves as a communication tool between manufacturers of excipients and finished product, pharmaceutical regulators, pharmacy organizations, and consumers. This Standard provides guidance to allow for the determination that a pharmaceutical excipient is within the specifications stated by the manufacturer, either qualitatively or quantitatively, and that it does not contain specific undeclared contaminants. In some instances, validated laboratory methods are not yet available for analyzing certain ingredients.

ANSI/NSF 363-2016 (i8r1), Good Manufacturing Practices (GMP) for Pharmaceutical Excipients

The purpose of NSF/IPEC/ANSI 363 is to serve as an evaluation tool for analyzing pharmaceutical excipients. Certification to this Standard serves as a communication tool between manufacturers of excipients and finished product, pharmaceutical regulators, pharmacy organizations, and consumers. This Standard provides guidance to allow for the determination that a pharmaceutical excipient is within the specifications stated by the manufacturer, either qualitatively or quantitatively, and that it does not contain specific undeclared contaminants. In some instances, validated laboratory methods are not yet available for analyzing certain ingredients.

ANSI/NSF 363-2016 (i9r1), NSF 363-2014 Good Manufacturing Practices(GMP) for Pharmaceutical Excipients

The purpose of NSF/IPEC/ANSI 363 is to serve as an evaluation tool for analyzing pharmaceutical excipients. Certification to this Standard serves as a communication tool between manufacturers of excipients and finished product, pharmaceutical regulators, pharmacy organizations, and consumers. This Standard provides guidance to allow for the determination that a pharmaceutical excipient is within the specifications stated by the manufacturer, either qualitatively or quantitatively, and that it does not contain specific undeclared contaminants. In some instances, validated laboratory methods are not yet available for analyzing certain ingredients.

ANSI/NSF 363-2017 (i10r1), Good Manufacturing Practices (GMP) for Pharmaceutical Excipients

The purpose of NSF/IPEC/ANSI 363 is to serve as an evaluation tool for analyzing pharmaceutical excipients. Certification to this Standard serves as a communication tool between manufacturers of excipients and finished product, pharmaceutical regulators, pharmacy organizations, and consumers. This Standard provides guidance to allow for the determination that a pharmaceutical excipient is within the specifications stated by the manufacturer, either qualitatively or quantitatively, and that it does not contain specific undeclared contaminants. In some instances, validated laboratory methods are not yet available for analyzing certain ingredients.

ANSI/NSF 37-2007 (i3), Air curtains for entranceways in food and food service establishments

Issue 3: To update the Normative References and boilerplate language in the Food Equipment family of Standards.

ANSI/NSF 37-2009 (i4), Air curtains for entranceways in food and food service establishments

Issue 4 - Boilerplate revisions in the family of food equipment standards including normative references.

ANSI/NSF 37-2012 (i5), Air curtains for entranceways in food and food service establishments

Issue 5 - The purpose of this ballot is to update the Normative References and boilerplate language in the Food Equipment family of Standards.

ANSI/NSF 37-2017 (i6r6), Air Curtain for Entranceways for Food and Food Service Establishments

Equipment covered by this Standard includes, but is not limited to, air curtains for entranceways in food and food service establishments (e.g., service and customer entries, service windows, cooler and cold storage entries). Housing, air moving equipment, air directional regulating devices, and other appurtenances to the air curtain are included.

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ANSI/NSF 372-2010 (i1r2), Drinking Water System Components - Lead Content
Issue 1: To establish a new standard to house the lead content evaluation procedures currently located in NSF/ANSI 61, Annex G.

ANSI/NSF 372-2011 (i2), Drinking Water System Components Lead Contents
This proposed revision to NSF/ANSI 372 clarifies the intent and application of the criterion for the percentage of internal threads that are to be evaluated as wetted (25%) under section 4.

ANSI/NSF 372-2016 (i4r1), Drinking Water System Components - Lead Content
This standard establishes procedures for the determination of lead content based on the wetted surface areas of products.

ANSI/NSF 375-2015 (i1r2), Sustainability Assessment for Water Contact Products
This sustainability standard covers products that contact drinking water, wastewater, and recreational water and their packaging. The document includes relevant criteria across the product(s) life cycle from raw material extraction through manufacturing, use, and end-of-life management. The Standard may be primarily used by water contact product(s) manufacturers interested in understanding the sustainability performance of their product(s).

ANSI/NSF 4-2007 (i12), Commercial cooking, rethermalization, and powered hot food holding and transport equipment
Issue 12 - To update the Normative References and boilerplate language in the Food Equipment family of Standards.

ANSI/NSF 4-2009 (i16), Commercial cooking, rethermalization, and powered hot food holding and transport equipment
Issue 16 - Boilerplate updates in the family of food equipment including normative references.

ANSI/NSF 4-2011 (i17), Commercial cooking, rethermalization, and powered hot food holding and transport equipment
Issue 17 - The purpose of this ballot is clarify the requirements in section 5.43 drains in steam tables and bains-marie units and to modified the error in 1999.

ANSI/NSF 4-2014 (i18r3), Commercial Cooking, Rethermalization, and Powered Hot Food Holding and Transportation Equipment
Equipment covered by this Standard includes, but is not limited to, ranges, ovens, fat/oil fryers, fat/oil filters, griddles, tilting griddle skillets, broilers, steam and pressure cookers, kettles, rotissieres, toasters, coffee makers and other hot beverage makers, component water heating equipment, proofing boxes and cabinets, hot food holding equipment, rethermalization equipment, and hot food transport cabinets.

ANSI/NSF 4-2016 (i18r4), Commercial Cooking, Rethermalization, and Powered Hot Food Holding and Transportation Equipment
Equipment covered by this Standard includes, but is not limited to, ranges, ovens, fat/oil fryers, fat/oil filters, griddles, tilting griddle skillets, broilers, steam and pressure cookers, kettles, rotissieres, toasters, coffee makers and other hot beverage makers, component water heating equipment, proofing boxes and cabinets, hot food holding equipment, rethermalization equipment, and hot food transport cabinets.

ANSI/NSF 4-2016 (i23r1), Commercial Cooking, Rethermalization, and Powered Hot Food Holding and Transportation Equipment
Equipment covered by this Standard includes, but is not limited to, ranges, ovens, fat/oil fryers, fat/oil filters, griddles, tilting griddle skillets, broilers, steam and pressure cookers, kettles, rotissieres, toasters, coffee makers and other hot beverage makers, component water heating equipment, proofing boxes and cabinets, hot food holding equipment, rethermalization equipment, and hot food transport cabinets.

ANSI/NSF 4-2016 (i24r4), Commercial Cooking, Rethermalization, and Powered Hot Food Holding and Transportation Equipment
Equipment covered by this Standard includes, but is not limited to, ranges, ovens, fat/oil fryers, fat/oil filters, griddles, tilting griddle skillets, broilers, steam and pressure cookers, kettles, rotissieres, toasters, coffee makers and other hot beverage makers, component water heating equipment, proofing boxes and cabinets, hot food holding equipment, rethermalization equipment, and hot food transport cabinets.

ANSI/NSF 40-2009 (i19), Residential wastewater treatment systems
Issue 19: To clarify in 8.5.1.5, which spells out the details for performance testing, that samples are to be taken during the stress recovery period, not the stress loading period.

ANSI/NSF 40-2010 (i22), Residential wastewater treatment systems
Issue 22: The purpose of this ballot is to update the Normative References in several of the Wastewater Treatment Standards.

ANSI/NSF 40-2012 (i20), Residential wastewater treatment systems
Issue 20 - The purpose of this ballot is to harmonize the alkalinity parameters in NSF/ANSI 40 to that of NSF/ANSI 245 - Nitrogen Reduction.

ANSI/NSF 40-2012 (i25r2), Residential wastewater treatment systems
Issue 25 revision 2: The purpose of this ballot is to make the language relating to failure sensing equipment in the wastewater standards consistent as well as update it regarding the testing procedure. This revision incorporates comments received on revision 1.

ANSI/NSF 40-2013 (i26r3), Residential Wastewater Treatment Systems
The purpose of this ballot is to update the language in section 8.4.1 for consistency among wastewater standards. The change in section 9 addresses a comment on the ballot 40i20 regarding when adjustments to alkalinity are made, they are required to be reported.

ANSI/NSF 401-2016 (i3r1), Drinking water treatment units - Emerging compounds/incidental contaminants
The purpose of this Standard is to establish minimum requirements for materials, design and construction, and performance of drinking water treatment systems that are designed to reduce emerging compounds in public or private water supplies, such as pharmaceutical, personal care products (PPCPs), and endocrine disrupting compounds (EDCs).

ANSI/NSF 401-2016 (i6r1), NSF 401-2016 - Drinking water treatment units - Emerging compounds/incidental contaminants
The purpose of this Standard is to establish minimum requirements for materials, design and construction, and performance of drinking water treatment systems that are designed to reduce emerging compounds in public or private water supplies, such as pharmaceutical, personal care products (PPCPs), and endocrine disrupting compounds (EDCs).

ANSI/NSF 401-2016 (i7r1), Drinking water treatment units - Emerging compounds/incidental contaminants
The purpose of this Standard is to establish minimum requirements for materials, design and construction, and performance of drinking water treatment systems that are designed to reduce emerging compounds in public or private water supplies, such as pharmaceutical, personal care products (PPCPs), and endocrine disrupting compounds (EDCs).

ANSI/NSF 401-2016 (i5r1), Drinking water treatment units - Emerging compounds/incidental contaminants
The purpose of this Standard is to establish minimum requirements for materials, design and construction, and performance of drinking water treatment systems that are designed to reduce emerging compounds in public or private water supplies, such as pharmaceutical, personal care products (PPCPs), and endocrine disrupting compounds (EDCs).

ANSI/NSF 401-2017 (i5r1), Drinking water treatment units - Emerging compounds/incidental contaminants
The purpose of this Standard is to establish minimum requirements for materials, design and construction, and performance of drinking water treatment systems that are designed to reduce emerging compounds in public or private water supplies, such as pharmaceutical, personal care products (PPCPs), and endocrine disrupting compounds (EDCs).
ANSI/NSF 401-2017 (i8r1), Drinking water treatment units - Emerging compounds/incidental contaminants

The purpose of this Standard is to establish minimum requirements for materials, design and construction, and performance of drinking water treatment systems that are designed to reduce emerging compounds in public or private water supplies, such as pharmaceutical, personal care products (PPCPs), and endocrine disrupting compounds (EDCs).

ANSI/NSF 41-2011 (i5), Non-liquid saturated treatment systems

Issue 41 - Revision 2: This revision is only to update the normative references.

ANSI/NSF 41-2016 (i7r1), Non-liquid Saturated Treatment Systems

This Standard contains minimum requirements for treatment systems that do not utilize a liquid saturated media as a primary means of storing or treating human excreta or human excreta mixed with other organic household materials. It addresses treatment systems that treat both solid and liquid waste, as well as those that only treat solid waste. Management methods for the end products of these systems are not addressed by this Standard.

ANSI/NSF 416-2014 (i1r4), Sustainability Assessment for Water Treatment Chemical Products

This sustainability standard establishes a consistent approach to the evaluation and determination of environmentally preferable and sustainable chemical processes for water treatment chemical products. Many of these water treatment chemicals are used for public health protection. The document includes relevant criteria across the product(s) life cycle from raw material extraction through manufacturing, use, and end-of-life management.

ANSI/NSF 416-2014 (i2r1), Sustainability Assessment for Water Treatment chemical products

This sustainability standard establishes a consistent approach to the evaluation and determination of environmentally preferable and sustainable chemical processes for water treatment chemical products. Many of these water treatment chemicals are used for public health protection. The document includes relevant criteria across the product(s) life cycle from raw material extraction through manufacturing, use, and end-of-life management.

ANSI/NSF 418-2014 (i1r1), Effluent Filters Field Longevity Testing

The purpose of this standard is to establish consistent site selection and data evaluation methods for obtaining field longevity results for septic tank effluent filters.

ANSI/NSF 419-2015 (i1r3), Public Drinking Water Equipment Performance - Filtration

This standard is designed to describe the performance evaluation test procedure for the product specific challenge testing of full scale UF and MF membrane modules, bag filters, and cartridge filters for the removal of microbial contaminants.

ANSI/NSF 42-2007 (i50), Drinking water treatment units – Aesthetic Effects

Issue 50: To enable point-of-entry (POE) drinking water treatment systems to be covered by NSF/ANSI 61 & to use this universal materials safety standard for POE drinking water treatment units.

ANSI/NSF 42-2007 (i51), Drinking water treatment units - Aesthetic Effects

Issue 51 - To revise requirements for filter media.

ANSI/NSF 42-2007 (i52), Drinking water treatment units - Aesthetic Effects

Issue 52: To establish sample sizes for mechanical reduction tests other than cyst reduction.

ANSI/NSF 42-2007 (i56), Drinking water treatment units - Aesthetic effects

Issue 56 - To clarify that the active agent levels from two units will be evaluated against levels of toxicological significance in 6.12 - Active agents and additives, and will not be evaluated during extraction testing.

ANSI/NSF 42-2007 (i57), Drinking water treatment units - Aesthetic effects

Issue 57 - to set the influent organism limits in the Bacteriostatic test to values that are achievable without unusual means to control bacterial growth, but that still allow the proper evaluation of the bacteriostatic properties of products.

ANSI/NSF 42-2007 (i59), Drinking water treatment Units - Aesthetic effects

Issue 59 - to include USEPA methods 524.2 and 525.2 in Tables 1 and 2 and include language to ensure when using the GC/MS (method 625) an adequate analytical library has been developed.

ANSI/NSF 42-2007 (i60), Drinking water treatment Units - Aesthetic effects

Issue 60 - The proposed revision recommends not testing for CLASS III along with CLASSES I and II and to test CLASS III using only ISO coarse test dust, changing the flow reduction from 75% to 50%; and clarifying the language in 7.4.8.1 for sampling.

ANSI/NSF 42-2007 (i61), Drinking water treatment units - aesthetic effects

Issue 61: The proposed revision is to lower the maximum contaminant concentration (MCC) for lead for material extraction testing from 0.015 mg/L to 0.010 mg/L in Table 1 of the Drinking Water Treatment Unit Standards.

ANSI/NSF 42-2008 (i55), Drinking water treatment units - Aesthetic effects

Issue 55: The proposed revision is to allow the chloramines reduction test water to contain &math#8805; 0.2 mg/L organic nitrogen, if the analytical validation is conducted in such water.

ANSI/NSF 42-2008 (i62), Drinking water treatment units - Aesthetic effects

Issue 62 - To clarify the formulation review requirements and provide consistency between the Drinking Water treatment Unit Standards and NSF/ANSI 60 and NSF/ANSI 61.

ANSI/NSF 42-2009 (i64), Drinking Water Treatment Units - Aesthetic effects

Issue 64 - The proposed revision is to revise the criteria for laboratory evaluation of filter media.

ANSI/NSF 42-2009 (i66), Drinking Water Treatment Units - Aesthetic effects

Issue 66 - The proposed revision is to revise the procedure for collection of effluent samples when conducting mechanical reduction tests.

ANSI/NSF 42-2010 (i67), Drinking Water Treatment Units - Aesthetic effects

Issue 67 - The proposed revision is to correct an error that occurred during the reformatting of NSF/ANSI Standard 42 chlorine, chloride, sulfate, TDS, foaming agent, hydrogen sulfide, phenol, and pH test methods.

ANSI/NSF 42-2011 (i68), Drinking Water Treatment Units - Aesthetic effects

Issue 68 - The proposed revision is to clarify the rated service flow requirement by not allowing a rated service flow to be less than the required minimum service flow.

ANSI/NSF 42-2011 (i69), Drinking Water Treatment Units - Aesthetic Effects

Issue 69 - The proposed revision is to remove the filter media test from the minimum performance requirements (section 6).

ANSI/NSF 42-2012 (i71), Drinking Water Treatment Units - Aesthetic Effects

Issue 71: The proposed revision is to remove the component burst pressure test requirement from section 5 of the family of DWTU Standards.

ANSI/NSF 42-2012 (i72), Drinking Water Treatment Units - Aesthetic Effects

The proposed revision will remove the retesting requirement for contaminants that exceed the non-health based advisory concentration under section 4.2.3.6.

ANSI/NSF 42-2012 (i76), Drinking water treatment units - aesthetic effects

The proposed revision is to clarify under section 8 of NSF/ANSI 42 and NSF/ANSI 53, and section 7.1.1 of NSF/ANSI 58 (VOC reduction claims) that each certified system may only make a single capacity claim based on the lowest reduction capacity in any standard to which the model is certified.

ANSI/NSF 42-2013 (i74), Drinking Water Treatment Units - Aesthetic Effects

The point-of-use and point-of-entry systems addressed by this Standard are designed to be used for the reduction of specific substances that may be present in drinking water (public or private) that affect the aesthetic quality of water.
ANSI/NSF 42-2013 (i78), Drinking Water Treatment Units - Aesthetic Effects

It is the purpose of this Standard to establish minimum requirements for materials, design and construction, and performance of point-of-use and point-of-entry drinking water treatment systems that are designed to reduce specific aesthetic contaminants in public or private water supplies.

ANSI/NSF 42-2014 (i79r2), Drinking Water Treatment Units - Aesthetic Effects

It is the purpose of this Standard to establish minimum requirements for materials, design and construction, and performance of drinking water treatment systems that are designed to reduce specific aesthetic-related (non-health effects) contaminants in public or private water supplies. This Standard also specifies the minimum service-related obligations that the manufacturer shall extend to system owners.

ANSI/NSF 42-2014 (i80r1), Drinking Water Treatment Units - Aesthetic Effects

It is the purpose of this Standard to establish minimum requirements for materials, design and construction, and performance of drinking water treatment systems that are designed to reduce specific aesthetic-related (non-health effects) contaminants in public or private water supplies. This Standard also specifies the minimum product literature and labeling information that a manufacturer shall supply to authorized representatives and system owners as well as the minimum service-related obligations that the manufacturer shall extend to system owners.

ANSI/NSF 42-2015 (i73r5), Drinking Water Treatment Units - Aesthetic Effects

It is the purpose of this Standard to establish minimum requirements for materials, design and construction, and performance of drinking water treatment systems that are designed to reduce specific aesthetic-related (non-health effects) contaminants in public or private water supplies. This Standard also specifies the minimum product literature and labeling information that a manufacturer shall supply to authorized representatives and system owners as well as the minimum service-related obligations that the manufacturer shall extend to system owners.

ANSI/NSF 42-2015 (i82r1), Drinking Water Treatment Units - Aesthetic Effects

It is the purpose of this Standard to establish minimum requirements for materials, design and construction, and performance of drinking water treatment systems that are designed to reduce specific aesthetic-related (non-health effects) contaminants in public or private water supplies. This Standard also specifies the minimum product literature and labeling information that a manufacturer shall supply to authorized representatives and system owners as well as the minimum service-related obligations that the manufacturer shall extend to system owners.

ANSI/NSF 42-2015 (i83r2), Drinking Water Treatment Units - Aesthetic Effects

It is the purpose of this Standard to establish minimum requirements for materials, design and construction, and performance of drinking water treatment systems that are designed to reduce specific aesthetic-related (non-health effects) contaminants in public or private water supplies. This Standard also specifies the minimum product literature and labeling information that a manufacturer shall supply to authorized representatives and system owners as well as the minimum service-related obligations that the manufacturer shall extend to system owners.

ANSI/NSF 42-2015 (i84), Drinking Water Treatment Systems - Aesthetic Effects

It is the purpose of this Standard to establish minimum requirements for materials, design and construction, and performance of drinking water treatment systems that are designed to reduce specific aesthetic-related (non-health effects) contaminants in public or private water supplies. This Standard also specifies the minimum product literature and labeling information that a manufacturer shall supply to authorized representatives and system owners as well as the minimum service-related obligations that the manufacturer shall extend to system owners.

ANSI/NSF 42-2015 (i85), Drinking Water Treatment Systems - Aesthetic Effects

It is the purpose of this Standard to establish minimum requirements for materials, design and construction, and performance of drinking water treatment systems that are designed to reduce specific aesthetic-related (non-health effects) contaminants in public or private water supplies. This Standard also specifies the minimum product literature and labeling information that a manufacturer shall supply to authorized representatives and system owners as well as the minimum service-related obligations that the manufacturer shall extend to system owners.

ANSI/NSF 42-2016 (i75r1), Drinking Water Treatment Units - Aesthetic Effects

It is the purpose of this Standard to establish minimum requirements for materials, design and construction, and performance of drinking water treatment systems that are designed to reduce specific aesthetic-related (non-health effects) contaminants in public or private water supplies. This Standard also specifies the minimum product literature and labeling information that a manufacturer shall supply to authorized representatives and system owners as well as the minimum service-related obligations that the manufacturer shall extend to system owners.

ANSI/NSF 42-2016 (i92r1), NSF 42-2016 - Drinking Water Treatment Units - Aesthetic Effects

It is the purpose of this Standard to establish minimum requirements for materials, design and construction, and performance of drinking water treatment systems that are designed to reduce specific aesthetic-related (non-health effects) contaminants in public or private water supplies. This Standard also specifies the minimum product literature and labeling information that a manufacturer shall supply to authorized representatives and system owners as well as the minimum service-related obligations that the manufacturer shall extend to system owners.

ANSI/NSF 42-2017 (i91r1), Drinking Water Treatment Units - Aesthetic Effects

It is the purpose of this Standard to establish minimum requirements for materials, design and construction, and performance of drinking water treatment systems that are designed to reduce specific aesthetic-related (non-health effects) contaminants in public or private water supplies. This Standard also specifies the minimum product literature and labeling information that a manufacturer shall supply to authorized representatives and system owners as well as the minimum service-related obligations that the manufacturer shall extend to system owners.

ANSI/NSF 44-2007 (i24), Residential cation exchange water softeners

Issue 24 - To enable point-of-entry (POE) drinking water treatment systems to be covered by NSF/ANSI 61 and to use this universal materials safety standard for POE drinking water treatment units.

ANSI/NSF 44-2007 (i26), Residential cation exchange water softeners

Issue 26 - The purpose of this proposal is to update the pass/fail criteria levels in Tables 1 and 2 for cyclohexanone, methyl ethyl ketone, carbon disulfide, diethylene glycol, di-n-butyl phthalate, butyl benzyl phthalate, naphthalene, acetonitrile, and 1,4-dioxane to match the levels in NSF/ANSI 61.

ANSI/NSF 44-2007 (i27), Residential cation exchange water softeners

Issue 27 - to include USEPA methods 524.2 and 525.2 in Tables 1 and 2 and include language to ensure when using the GC/MS (method 625) an adequate analytical library has been developed.

ANSI/NSF 44-2007 (i28), Residential cation exchange water softeners

Issue 28: The proposed revision is to lower the maximum contaminant concentration (MCC) for lead for material extraction testing from 0.015 mg/L to 0.010 mg/L in Table 1 of the Drinking Water Treatment Unit Standards.

ANSI/NSF 44-2007 (i29), Residential cation exchange water softeners

Issue 29 - To clarify the formulation review requirements and provide consistency between the Drinking Water treatment Unit Standards and NSF/ANSI 60 and NSF/ANSI 61.
ANSI/NSF 44-2012 (i33), Residential Cation Exchange Water Softeners

Issue 33: The proposed revision is to remove the component burst pressure test requirement from section 5 of the family of DWTU Standards.

ANSI/NSF 44-2012 (i34), Residential Cation Exchange Water Softeners

The proposed revision will remove the retesting requirement for contaminants that exceed the non-health based advisory concentration under section 4.2.3.6.

ANSI/NSF 44-2014 (i35), Residential Cation Exchange Water Softeners

The purpose of this Standard is to establish minimum requirements for materials, design and construction, and performance of residential cation exchange water softeners.

ANSI/NSF 44-2014 (i36r1), Residential Cation Exchange Water Softeners

The purpose of this Standard is to establish minimum requirements for materials, design and construction, and performance of residential cation exchange water softeners. This Standard also specifies the minimum product literature that manufacturers shall supply to authorized representatives and owners, as well as the minimum service-related obligations that manufacturers shall extend to owners.

ANSI/NSF 44-2015 (i37r1), Residential Cation Exchange Water Softeners

The purpose of this Standard is to establish minimum requirements for materials, design and construction, and performance of residential cation exchange water softeners. This Standard also specifies the minimum product literature that manufacturers shall supply to authorized representatives and owners, as well as the minimum service-related obligations that manufacturers shall extend to owners.

ANSI/NSF 44-2015 (i38r2), Residential Cation Exchange Water Softeners

The purpose of this Standard is to establish minimum requirements for materials, design and construction, and performance of residential cation exchange water softeners. This Standard also specifies the minimum product literature that manufacturers shall supply to authorized representatives and owners, as well as the minimum service-related obligations that manufacturers shall extend to owners.

ANSI/NSF 44-2015 (i39), Residential Cation Exchange Water Softeners

The purpose of this Standard is to establish minimum requirements for materials, design and construction, and performance of residential cation exchange water softeners. This Standard also specifies the minimum product literature that manufacturers shall supply to authorized representatives and owners, as well as the minimum service-related obligations that manufacturers shall extend to owners.

ANSI/NSF 44-2016 (i41r1), NSF 44-2016 - Residential Cation Exchange Water Softeners

The purpose of this Standard is to establish minimum requirements for materials, design and construction, and performance of residential cation exchange water softeners. This Standard also specifies the minimum product literature that manufacturers shall supply to authorized representatives and owners, as well as the minimum service-related obligations that manufacturers shall extend to owners.

ANSI/NSF 44-2017 (i42r1), Residential Cation Exchange Water Softeners

The purpose of this Standard is to establish minimum requirements for materials, design and construction, and performance of residential cation exchange water softeners. This Standard also specifies the minimum product literature that manufacturers shall supply to authorized representatives and owners, as well as the minimum service-related obligations that manufacturers shall extend to owners.

ANSI/NSF 46-2007 (i14), Evaluation of components and devices used in wastewater treatment systems

Issue 14: To incorporate a buoyancy test method into section 10.4.5, Bypass Protection Test, and to include two particle size specifications for effluent filters; 1/8th inch and 1/16th inch.

ANSI/NSF 46-2007, Addendum 1 (i16), Evaluation of components and devices used in wastewater treatment systems

Issue 16: To modify the language to require the use of the geometric mean rather than the arithmetic average for fecal coliform analysis.

ANSI/NSF 46-2009 (i17), Evaluation of components and devices used in wastewater treatment systems

Issue 17: To update the temperature specifications for influent wastewater characteristics for testing according to Section 11.6.2.2.2.

ANSI/NSF 46-2009 (i18), Evaluation of components and devices used in wastewater treatment systems

Issue 18: To remove section 11.4.1 relating to noise levels of chlorinators.

ANSI/NSF 46-2010 (i20), Evaluation of components and devices used in wastewater treatment systems

Issue 20: The purpose of this ballot is to update the Normative References in several of the Wastewater Treatment Standards.

ANSI/NSF 46-2012 (i21), Evaluation of components and devices used in wastewater treatment systems

Issue 21: The purpose of this ballot is to make the language relating to failure sensing equipment in the wastewater standards consistent as well as update it regarding the testing procedure.

ANSI/NSF 46-2013 (i22r2), Evaluation of components and devices used in wastewater treatment systems

This Standard is intended for use with components and devices not covered by other NSF wastewater standards. Components and devices covered by this Standard are intended for use with greywater or blackwater or both. Management methods for the end-products of these components and devices are not addressed in this Standard. This Standard shall in no way restrict new system designs, provided that such designs meet the minimum specifications described herein.

ANSI/NSF 46-2014 (i24r1), Plumbing System Components for Recreational Vehicles

This Standard covers pipe, fittings, valves, traps, vents, tanks, pumps, connectors, fixtures, appliances, and similar appurtenances used in a plumbing system of a recreational vehicle.

ANSI/NSF 46-2014 (i25r1), Evaluation of Components Used in Wastewater Treatment Systems

This Standard is intended for use with components and devices not covered by other NSF wastewater standards. Components and devices covered by this Standard are intended for use with greywater or blackwater or both. Management methods for the end-products of these components and devices are not addressed in this Standard. This Standard shall in no way restrict new system designs, provided that such designs meet the minimum specifications described herein.

ANSI/NSF 46-2014 (i26r1), Evaluation of Components Used in Wastewater Treatment Systems

This Standard is intended for use with components and devices not covered by other NSF wastewater standards. Components and devices covered by this Standard are intended for use with greywater or blackwater or both. Management methods for the end-products of these components and devices are not addressed in this Standard. This Standard shall in no way restrict new system designs, provided that such designs meet the minimum specifications described herein.

ANSI/NSF 46-2015 (i28r1), Evaluation of Components and Devices Used in Wastewater Treatment Systems

This Standard is intended for use with components and devices not covered by other NSF wastewater standards. Components and devices covered by this Standard are intended for use with greywater or blackwater or both. Management methods for the end-products of these components and devices are not addressed in this Standard. This Standard shall in no way restrict new system designs, provided that such designs meet the minimum specifications described herein.
such designs meet the minimum specifications no way restrict new system designs, provided that Revision 2 has clarification to the location of the process for aerosol introduction point information.

class II biosafety cabinets.

consistency throughout the standard.

to be consistent with background noise levels.

‐ Issue 16

ANSI/NSF 49

Issue 15

ANSI/NSF 49

added the reference to ASHRAE Standard 111‐ Issue 14

ANSI/NSF 49

language.

Issue 13

ANSI/NSF 49

paragraph of F.1.

and to correct the referenced year in the first

Issue 35

ANSI/NSF 49

updated for consistency with Annex A.

Issue 28

ANSI/NSF 49

standard.

Issue 27

ANSI/NSF 49

language in Annex F, section F.1.1 in NSF/ANSI 49.

Issue 26

ANSI/NSF 49

same language is already part of Annex F (F.7.3.3):.

‐ Issue 19

Revise Noise Level Test acceptance criteria to be consistent with background noise levels.

‐ Issue 20

To add language in the Section F.7.3.2 for consistency throughout the standard.

‐ Issue 12

To add in Section 3.13 specification for use in class II biosafety cabinets.

‐ Issue 13

To add in Section 3.4.2.2 clarification language.

‐ Issue 14

Concurrent Balance Definition This revision added the reference to ASHRAE Standard 111-1988.

‐ Issue 15

Biosafety Cabinetry: Design, Construction, Performance, and Field Certification

Issue 15- To add in the standard a listing process for aerosol introduction point information.

‐ Issue 12r2

Biosafety Cabinetry: Design, Construction, Performance, and Field Certification

Issue 15- revision 2 To add in the standard a listing process for aerosol introduction point information. Revision 2 has clarification to the location of the engineering schematic.

‐ Issue 16

Biosafety cabinetry

Issue 17- To add in section F.7.3.2 interlock requirements for both type B cabinets.

‐ Issue 18

To add language in F.1 regarding downflow velocity readings.

‐ Issue 26

To update the reported values in Annex A and F and throughout the standard where necessary.

‐ Issue 30

Class II (laminar flow) biosafety cabinetry

‐ Issue 34

Biosafety Cabinetry: Design, Construction, Performance, and Field Certification

Issue 34- Acceptance Statements in Annex F will be updated for consistency with Annex A.

‐ Issue 35

Biosafety Cabinetry: Design, Construction, Performance, and Field Certification

Issue 35-The purpose of this ballot is to add the definition of w.g. to the standard; to update the UL reference throughout the standard where necessary; and to correct the referenced year in the first paragraph of F.1.

‐ Issue 36

Biosafety Cabinetry: Design, Construction, Performance, And Field Certification

Issue 36 - The purpose of this ballot is to update section 5.4 with the definition of A1 cabinets.

‐ Issue 23

Biosafety Cabinetry: Design, Construction, Performance, and Field Certification

Issue 23 - to disallow certification of direct connected Type A biosafety cabinets

‐ Issue 29

Biosafety Cabinetry: Design, Construction, Performance, and Field Certification

Issue 29 - The purpose of this ballot is to revise sections relating to uniform and zoned downflow.

‐ Issue 37

Biosafety Cabinetry: Design, Construction, Performance, and Field Certification

Issue 37 - The purpose of this ballot is to update illustrations, references and additional material on decontamination as well as organization of the informational annexes in the standard.

‐ Issue 41

The purpose of this ballot is to modify NSF/ANSI 49 to be more inclusive of markets outside North America by modifying Section 6 - Performance of the Standard.

‐ Issue 27

The purpose of this ballot is to update the Class I and III definitions in the NSF/ANSI 49 Standard.

‐ Issue 42

Biosafety Cabinetry: Design, Construction, Performance and Field Certification

Issue 42: The purpose of this ballot is to update language in Annex F, section F.1.1 in NSF/ANSI 49.

‐ Issue 43

Biosafety Cabinetry: Design, Construction, Performance and Field Certification

Issue 43: The purpose of this ballot is to provide language in the body of NSF/ANSI 49 (5.2, Canopy Connect exhaust and 5.2.3.4, Type A1 or A2 exhaust alarm) to allow canopy testing for class II, type A1 & A2 cabinets. This same language is already part of Annex F (F.7.3.3):.

‐ Issue 44

Biosafety Cabinetry: Design, Construction, Performance and Field Certification

Issue 44: The purpose of this ballot is to include a test method for biosafety cabinets with an interior sidewall dimension of three feet or less in NSF/ANSI 49.

‐ Issue 46

Biosafety Cabinetry: Design, Construction, Performance and Field Certification

Issue 46: The purpose of this ballot is to add a reference to non-back-pressure compensated readings used in a Direct Inflow Measurement (DIM) in Annex A, Annex B, and Annex F of NSF/ANSI 49, as well as to include language in Annex A, Annex E, and Annex F of NSF/ANSI 49 for the 12 inch clearance requirement used for measuring an exhaust HEPA filter.

‐ Issue 48r7

Biosafety Cabinetry: Design, Construction, Performance, and Field Certification

This Standard applies to Class II (laminar flow) biosafety cabinetry designed to minimize hazards inherent in work with agents assigned to biosafety levels 1, 2, 3, or 4. It also defines the tests that shall be passed by such cabinetry to meet this Standard. This Standard includes basic requirements for the design, construction, and performance of biosafety cabinets that are intended to provide personnel, product, and environmental protection; reliable operation; durability and structural stability; cleanliness; limitations on noise level; illumination; vibration; and motor/blower performance.
ANSI/NSF 49-2014 (i49r1), Biosafety Cabinet: Design, Construction, Performance, and Field Certification

This Standard applies to Class II (laminar flow) biosafety cabinets designed to minimize hazards inherent in work with agents assigned to biosafety levels 1, 2, 3, or 4. It also defines the tests that shall be passed by such cabinetry to meet this Standard. This Standard includes basic requirements for the design, construction, and performance of biosafety cabinets that are intended to provide personnel, product, and environmental protection; reliable operation; durability and structural stability; cleanability; limitations on noise level; illumination; vibration; and motor/blower performance.

ANSI/NSF 49-2014 (i50r2), Biosafety Cabinet: Design, Construction, Performance, and Field Certification

This Standard applies to Class II (laminar flow) biosafety cabinets designed to minimize hazards inherent in work with agents assigned to biosafety levels 1, 2, 3, or 4. It also defines the tests that shall be passed by such cabinetry to meet this Standard. This Standard includes basic requirements for the design, construction, and performance of biosafety cabinets that are intended to provide personnel, product, and environmental protection; reliable operation; durability and structural stability; cleanability; limitations on noise level; illumination; vibration; and motor/blower performance.

ANSI/NSF 49-2014 (i51r1), Biosafety Cabinet: Design, Construction, Performance, and Field Certification

This Standard applies to Class II (laminar flow) biosafety cabinets designed to minimize hazards inherent in work with agents assigned to biosafety levels 1, 2, 3, or 4. It also defines the tests that shall be passed by such cabinetry to meet this Standard. This Standard includes basic requirements for the design, construction, and performance of biosafety cabinets that are intended to provide personnel, product, and environmental protection; reliable operation; durability and structural stability; cleanability; limitations on noise level; illumination; vibration; and motor/blower performance.

ANSI/NSF 49-2014 (i52r1), Biosafety Cabinet: Design, Construction, Performance, and Field Certification

This Standard applies to Class II (laminar flow) biosafety cabinets designed to minimize hazards inherent in work with agents assigned to biosafety levels 1, 2, 3, or 4. It also defines the tests that shall be passed by such cabinetry to meet this Standard. This Standard includes basic requirements for the design, construction, and performance of biosafety cabinets that are intended to provide personnel, product, and environmental protection; reliable operation; durability and structural stability; cleanability; limitations on noise level; illumination; vibration; and motor/blower performance.

ANSI/NSF 49-2014 (i53r1), Biosafety Cabinet: Design, Construction, Performance, and Field Certification

This Standard applies to Class II (laminar flow) biosafety cabinets designed to minimize hazards inherent in work with agents assigned to biosafety levels 1, 2, 3, or 4. It also defines the tests that shall be passed by such cabinetry to meet this Standard. This Standard includes basic requirements for the design, construction, and performance of biosafety cabinets that are intended to provide personnel, product, and environmental protection; reliable operation; durability and structural stability; cleanability; limitations on noise level; illumination; vibration; and motor/blower performance.

ANSI/NSF 49-2014 (i54r1), Biosafety Cabinet: Design, Construction, Performance, and Field Certification

This Standard applies to Class II (laminar flow) biosafety cabinets designed to minimize hazards inherent in work with agents assigned to biosafety levels 1, 2, 3, or 4. It also defines the tests that shall be passed by such cabinetry to meet this Standard. This Standard includes basic requirements for the design, construction, and performance of biosafety cabinets that are intended to provide personnel, product, and environmental protection; reliable operation; durability and structural stability; cleanability; limitations on noise level; illumination; vibration; and motor/blower performance.

ANSI/NSF 49-2014 (i55r1), Biosafety Cabinet: Design, Construction, Performance, and Field Certification

This Standard applies to Class II (laminar flow) biosafety cabinets designed to minimize hazards inherent in work with agents assigned to biosafety levels 1, 2, 3, or 4. It also defines the tests that shall be passed by such cabinetry to meet this Standard. This Standard includes basic requirements for the design, construction, and performance of biosafety cabinets that are intended to provide personnel, product, and environmental protection; reliable operation; durability and structural stability; cleanability; limitations on noise level; illumination; vibration; and motor/blower performance.

ANSI/NSF 49-2014 (i56r1), Biosafety Cabinet: Design, Construction, Performance, and Field Certification

This Standard applies to Class II (laminar flow) biosafety cabinets designed to minimize hazards inherent in work with agents assigned to biosafety levels 1, 2, 3, or 4. It also defines the tests that shall be passed by such cabinetry to meet this Standard. This Standard includes basic requirements for the design, construction, and performance of biosafety cabinets that are intended to provide personnel, product, and environmental protection; reliable operation; durability and structural stability; cleanability; limitations on noise level; illumination; vibration; and motor/blower performance.

ANSI/NSF 49-2014 (i57r1), Biosafety Cabinet: Design, Construction, Performance, and Field Certification

This Standard applies to Class II (laminar flow) biosafety cabinets designed to minimize hazards inherent in work with agents assigned to biosafety levels 1, 2, 3, or 4. It also defines the tests that shall be passed by such cabinetry to meet this Standard. This Standard includes basic requirements for the design, construction, and performance of biosafety cabinets that are intended to provide personnel, product, and environmental protection; reliable operation; durability and structural stability; cleanability; limitations on noise level; illumination; vibration; and motor/blower performance.

ANSI/NSF 49-2014 (i58r1), Biosafety Cabinet: Design, Construction, Performance, and Field Certification

This Standard applies to Class II (laminar flow) biosafety cabinets designed to minimize hazards inherent in work with agents assigned to biosafety levels 1, 2, 3, or 4. It also defines the tests that shall be passed by such cabinetry to meet this Standard. This Standard includes basic requirements for the design, construction, and performance of biosafety cabinets that are intended to provide personnel, product, and environmental protection; reliable operation; durability and structural stability; cleanability; limitations on noise level; illumination; vibration; and motor/blower performance.

ANSI/NSF 49-2014 (i59r1), Biosafety Cabinet: Design, Construction, Performance, and Field Certification

This Standard applies to Class II (laminar flow) biosafety cabinets designed to minimize hazards inherent in work with agents assigned to biosafety levels 1, 2, 3, or 4. It also defines the tests that shall be passed by such cabinetry to meet this Standard. This Standard includes basic requirements for the design, construction, and performance of biosafety cabinets that are intended to provide personnel, product, and environmental protection; reliable operation; durability and structural stability; cleanability; limitations on noise level; illumination; vibration; and motor/blower performance.

ANSI/NSF 49-2014 (i60r1), Biosafety Cabinet: Design, Construction, Performance, and Field Certification

This Standard applies to Class II (laminar flow) biosafety cabinets designed to minimize hazards inherent in work with agents assigned to biosafety levels 1, 2, 3, or 4. It also defines the tests that shall be passed by such cabinetry to meet this Standard. This Standard includes basic requirements for the design, construction, and performance of biosafety cabinets that are intended to provide personnel, product, and environmental protection; reliable operation; durability and structural stability; cleanability; limitations on noise level; illumination; vibration; and motor/blower performance.

ANSI/NSF 49-2014 (i61r2), Biosafety Cabinet: Design, Construction, Performance, and Field Certification

This Standard applies to Class II (laminar flow) biosafety cabinets designed to minimize hazards inherent in work with agents assigned to biosafety levels 1, 2, 3, or 4. It also defines the tests that shall be passed by such cabinetry to meet this Standard. This Standard includes basic requirements for the design, construction, and performance of biosafety cabinets that are intended to provide personnel, product, and environmental protection; reliable operation; durability and structural stability; cleanability; limitations on noise level; illumination; vibration; and motor/blower performance.

ANSI/NSF 49-2014 (i62r1), Biosafety Cabinet: Design, Construction, Performance, and Field Certification

This Standard applies to Class II (laminar flow) biosafety cabinets designed to minimize hazards inherent in work with agents assigned to biosafety levels 1, 2, 3, or 4. It also defines the tests that shall be passed by such cabinetry to meet this Standard. This Standard includes basic requirements for the design, construction, and performance of biosafety cabinets that are intended to provide personnel, product, and environmental protection; reliable operation; durability and structural stability; cleanability; limitations on noise level; illumination; vibration; and motor/blower performance.

ANSI/NSF 49-2014 (i63r1), Biosafety Cabinet: Design, Construction, Performance, and Field Certification

This Standard applies to Class II (laminar flow) biosafety cabinets designed to minimize hazards inherent in work with agents assigned to biosafety levels 1, 2, 3, or 4. It also defines the tests that shall be passed by such cabinetry to meet this Standard. This Standard includes basic requirements for the design, construction, and performance of biosafety cabinets that are intended to provide personnel, product, and environmental protection; reliable operation; durability and structural stability; cleanability; limitations on noise level; illumination; vibration; and motor/blower performance.

ANSI/NSF 49-2014 (i64r1), Biosafety Cabinet: Design, Construction, Performance, and Field Certification

This Standard applies to Class II (laminar flow) biosafety cabinets designed to minimize hazards inherent in work with agents assigned to biosafety levels 1, 2, 3, or 4. It also defines the tests that shall be passed by such cabinetry to meet this Standard. This Standard includes basic requirements for the design, construction, and performance of biosafety cabinets that are intended to provide personnel, product, and environmental protection; reliable operation; durability and structural stability; cleanability; limitations on noise level; illumination; vibration; and motor/blower performance.

ANSI/NSF 49-2014 (i65r1), Biosafety Cabinet: Design, Construction, Performance, and Field Certification

This Standard applies to Class II (laminar flow) biosafety cabinets designed to minimize hazards inherent in work with agents assigned to biosafety levels 1, 2, 3, or 4. It also defines the tests that shall be passed by such cabinetry to meet this Standard. This Standard includes basic requirements for the design, construction, and performance of biosafety cabinets that are intended to provide personnel, product, and environmental protection; reliable operation; durability and structural stability; cleanability; limitations on noise level; illumination; vibration; and motor/blower performance.

ANSI/NSF 49-2014 (i66r1), Biosafety Cabinet: Design, Construction, Performance, and Field Certification

This Standard applies to Class II (laminar flow) biosafety cabinets designed to minimize hazards inherent in work with agents assigned to biosafety levels 1, 2, 3, or 4. It also defines the tests that shall be passed by such cabinetry to meet this Standard. This Standard includes basic requirements for the design, construction, and performance of biosafety cabinets that are intended to provide personnel, product, and environmental protection; reliable operation; durability and structural stability; cleanability; limitations on noise level; illumination; vibration; and motor/blower performance.
This Standard applies to Class II (laminar flow) biosafety cabinetry designed to minimize hazards inherent in work with agents assigned to biosafety levels 1, 2, 3, or 4. It also defines the tests that shall be passed by such cabinetry to meet this Standard. This Standard includes basic requirements for the design, construction, and performance of biosafety cabinets that are intended to provide personnel, product, and environmental protection; reliable operation; durability and structural stability; cleanliness; limitations on noise level; illumination; vibration; and motor/blower performance.

ANSI/NSF 49-2016 (i7sr3), Biosafety Cabinetry: Design, Construction, Performance, and Field Certification

This Standard applies to Class II (laminar flow) biosafety cabinetry designed to minimize hazards inherent in work with agents assigned to biosafety levels 1, 2, 3, or 4. It also defines the tests that shall be passed by such cabinetry to meet this Standard. This Standard includes basic requirements for the design, construction, and performance of biosafety cabinets that are intended to provide personnel, product, and environmental protection; reliable operation; durability and structural stability; cleanliness; limitations on noise level; illumination; vibration; and motor/blower performance.

ANSI/NSF 49-2016 (i7sr2), NSF 49 - Biosafety Cabinetry: Design, Construction, Performance, and Field Certification

This Standard applies to Class II (laminar flow) biosafety cabinetry designed to minimize hazards inherent in work with agents assigned to biosafety levels 1, 2, 3, or 4. It also defines the tests that shall be passed by such cabinetry to meet this Standard. This Standard includes basic requirements for the design, construction, and performance of biosafety cabinets that are intended to provide personnel, product, and environmental protection; reliable operation; durability and structural stability; cleanliness; limitations on noise level; illumination; vibration; and motor/blower performance.

ANSI/NSF 49-2016 (i90r1), NSF 49 - Biosafety Cabinetry: Design, Construction, Performance, and Field Certification

This Standard applies to Class II (laminar flow) biosafety cabinetry designed to minimize hazards inherent in work with agents assigned to biosafety levels 1, 2, 3, or 4. It also defines the tests that shall be passed by such cabinetry to meet this Standard. This Standard includes basic requirements for the design, construction, and performance of biosafety cabinets that are intended to provide personnel, product, and environmental protection; reliable operation; durability and structural stability; cleanliness; limitations on noise level; illumination; vibration; and motor/blower performance.

ANSI/NSF 49-2016 (i96r1), NSF 49 - 2016 - Biosafety Cabinetry: Design, Construction, Performance, and Field Certification

This Standard applies to Class II (laminar flow) biosafety cabinetry designed to minimize hazards inherent in work with agents assigned to biosafety levels 1, 2, 3, or 4. It also defines the tests that shall be passed by such cabinetry to meet this Standard. This Standard includes basic requirements for the design, construction, and performance of biosafety cabinets that are intended to provide personnel, product, and environmental protection; reliable operation; durability and structural stability; cleanliness; limitations on noise level; illumination; vibration; and motor/blower performance.

ANSI/NSF 49-2017 (i73Br5), Biosafety Cabinetry: Design, Construction, Performance, and Field Certification

This Standard applies to Class II (laminar flow) biosafety cabinetry designed to minimize hazards inherent in work with agents assigned to biosafety levels 1, 2, 3, or 4. It also defines the tests that shall be passed by such cabinetry to meet this Standard. This Standard includes basic requirements for the design, construction, and performance of biosafety cabinets that are intended to provide personnel, product, and environmental protection; reliable operation; durability and structural stability; cleanliness; limitations on noise level; illumination; vibration; and motor/blower performance.
ANSI/NSF 50-2008 (i16), Circulation system components and related materials for swimming pools, spas/hot tubs
Issue 16: To incorporate requirements for the evaluation and testing of automated controllers (revision 2).

ANSI/NSF 50-2008 (i36), Circulation system components and related materials for swimming pools, spas/hot tubs
Issue 36: To allow manufacturers to set their own vertical lift claims for self-priming pumps.

ANSI/NSF 50-2008 (i37), Circulation system components and related materials for swimming pools, spa/hot tubs
Issue 37: To update Standard 50 with references to the appropriate standard(s) for evaluation of anti-entrapment safety vacuum release systems (SVRs).

ANSI/NSF 50-2008 (i43), Circulation system components and related materials for swimming pools, spa/hot tubs
Issue 43 - Life Testing revision 4: To eliminate the 80% pressure requirement from Section 13.4, Life Test.

ANSI/NSF 50-2008 (i44), Circulation system components and related materials for swimming pools, spa/hot tubs
Issue 44 - Skimmer performance To incorporate requirements for skimmer testing, including UV exposure, point load and deflection testing for skimmer lids; and requirements for water levels and flow rates.

ANSI/NSF 50-2008 (i46), Circulation system components and related materials for swimming pools, spa/hot tubs
Issue 46 - Pool Covers To include requirements for thorough evaluation of covers used on recreational water structures such as swimming pools, hot tubs, and spas.

ANSI/NSF 50-2008 (i48), Circulation system components and related materials for swimming pools, spa/hot tubs
Issue 48 - Pool Alarms. To include alarm requirements for pools and reference ASTM F2208.

ANSI/NSF 50-2008 (i50), Circulation system components and related materials for swimming pools, spa/hot tubs
Issue 50 - To address the evaluation of water quality testing devices.

ANSI/NSF 50-2008 (i51), Circulation system components and related materials for swimming pools, spa/hot tubs
Issue 51- To update the normative references in standard 50.

ANSI/NSF 50-2008 (i52), Circulation system components and related materials for swimming pools, spa/hot tubs
Issue 52- To update the name and scope of this standard.
ANSI/NSF 50-2011 (i71), Equipment for swimming pools, spas, hot tubs, and other recreational water facilities
Issue 71 - Revises the operating condition specifications in 15.2 for batch chlorination systems as discussed at the Joint Committee meeting in 2009.

ANSI/NSF 50-2011 (i73), Equipment for Swimming Pools, Spas, Hot Tubs and Other Recreational Water Facilities
Issue 73: The purpose of this issue is to include labeling requirements for filtration media.

ANSI/NSF 50-2012 (i72), Equipment for swimming pools, spas, hot tubs, and other recreational water facilities
Issue 72 - The purpose of this ballot is to include the test method for determination of the permeability and cake density of precoat filter media.

ANSI/NSF 50-2012 (i79), Equipment for swimming pools, spas, hot tubs, and other recreational water facilities
Issue 79 - The purpose of this ballot is to update the life testing requirements for process equipment.

ANSI/NSF 50-2012 (i81), Equipment for swimming pools, spas, hot tubs, and other recreational water facilities
Issue 81 - The purpose of this ballot is to address several issues that were motioned to ballot as written from the 2010 and 2011 Joint Committee on Recreational Water Facilities annual meetings. The following modifications are included in the ballot: &amp;#8226; The addition of requirements for fences and barriers (RWF-2010-11) &amp;#8226; Clarification with valve handles (RWF-2011-5) &amp;#8226; Spa temperature requirements (RWF-2010-4) &amp;#8226; Hardware interlock (RWF-2010-26) &amp;#8226; Sensor output signal requirements (RWF-2011-19)

ANSI/NSF 50-2012 (i82), Equipment for swimming pools, spas, hot tubs, and other recreational water facilities
Issue 82 - The purpose of this ballot is to delete the requirements for copper test kits for copper/silver ion generators in 16.1 and 16.16 of NSF 50.

ANSI/NSF 50-2012 (i83), Equipment for swimming pools, spas, hot tubs, and other recreational water facilities
Issue 83 - The purpose of this ballot is to rewrite and move the electrical requirements of NSF/ANSI 50. Section 4.2 of NSF 50 requires electrical components to comply with the applicable requirements of the National Electrical Code. This is a very broad statement that could be misinterpreted to mean that products that have been certified to NSF 50 are certified or otherwise compliant to all electrical standards referenced in the National Electric Code. There are over 80 UL standards specifically for electrical Pool equipment and hundreds of other electrical component standards worldwide.

ANSI/NSF 50-2012 (i84), Equipment for swimming pools, spas, hot tubs, and other recreational water facilities
Issue 84 - The purpose of this ballot is to address issues that were motioned to ballot from the 2009 and 2010 Joint Committee on Recreational Water Facilities annual meetings, and to modify incorrect references.

ANSI/NSF 50-2012 (i85), Equipment for swimming pools, spas, hot tubs, and other recreational water facilities
Issue 85 - The purpose of this ballot is to address several issues that were motioned to ballot as written from the 2011 Joint Committee on Recreational Water Facilities annual meetings. The following modifications are included in the ballot: Modification to Annex G (RWF-2011-3); modification to Electrolytic ClBr (RWF-2011-17); Non-integral strainers section (RWF-2011-22); and Feeder output flow control (RWF-2011-24)

ANSI/NSF 50-2012 (i86), Equipment for swimming pools, spas, hot tubs, and other recreational water facilities
Issue 86 - The purpose of this ballot is to replace withdrawn Standard ANSI/ASME A112.19.8a with ANSI/APSP 16.

ANSI/NSF 50-2013 (i87r1,2,and r3), Equipment for swimming pools, spas, hot tubs, and other recreational water facilities
This Standard covers materials, components, products, equipment and systems, related to public and residential recreational water facility operation.

ANSI/NSF 50-2013 (i47r3), Equipment for Swimming Pools, Spas, Hot Tubs and other Recreational Water Facilities
This Standard covers materials, components, products, equipment and systems, related to public and residential recreational water facility operation.

ANSI/NSF 50-2013 (i88r1), Equipment for Swimming Pools, Spas, Hot Tubs and other Recreational Water Facilities
Issue 88: This Standard covers materials, components, products, equipment and systems, related to public and residential recreational water facility operation.

ANSI/NSF 50-2014 (i49r5), Equipment for Swimming Pools, Spas, Hot Tubs and other Recreational Water Facilities
Issue 49: This Standard covers materials, components, products, equipment and systems, related to public and residential recreational water facility operation.

ANSI/NSF 50-2014 (i75r1), Equipment for Swimming Pools, Spas, Hot Tubs and other Recreational Water Facilities
This Standard covers materials, components, products, equipment and systems, related to public and residential recreational water facility operation.

ANSI/NSF 50-2014 (i78r5), Equipment for Swimming pools, spas, hot tubs, and other recreational water facilities
This Standard covers materials, components, products, equipment and systems, related to public and residential recreational water facility operation.

ANSI/NSF 50-2014 (i86r1), Equipment for Swimming pools, spas, hot tubs, and other recreational water facilities
This Standard covers materials, components, products, equipment and systems, related to public and residential recreational water facility operation.

ANSI/NSF 50-2014 (i94r1), Equipment for Swimming pools, spas, hot tubs, and other recreational water facilities
This Standard covers materials, components, products, equipment and systems, related to public and residential recreational water facility operation.

ANSI/NSF 50-2014 (i95r1)), Equipment for Swimming pools, spas, hot tubs, and other recreational water facilities
This Standard covers materials, components, products, equipment and systems, related to public and residential recreational water facility operation.

ANSI/NSF 50-2014 (i97r1), Equipment for Swimming Pools, Spas, Hot Tubs and Other Recreational Water Facilities
This Standard covers materials, components, products, equipment and systems, related to public and residential recreational water facility operation.

ANSI/NSF 50-2015 (i100r1), Equipment for Swimming Pools, Spas, Hot Tubs and Other Recreational Water Facilities
This Standard covers materials, components, products, equipment and systems, related to public and residential recreational water facility operation.

ANSI/NSF 50-2015 (i107r1), Equipment for Swimming Pools, Spas, Hot Tubs and Other Recreational Water Facilities
This Standard covers materials, components, products, equipment and systems, related to public and residential recreational water facility operation.

ANSI/NSF 50-2015 (i74r5), Equipment for Swimming Pools, Spas, Hot Tubs and Other Recreational Water Facilities
This Standard covers materials, components, products, equipment and systems, related to public and residential recreational water facility operation.
ANSI/NSF 50-2015 (i91r1), Equipment for Swimming Pools, Spas, Hot Tubs and Other Recreational Water Facilities
This Standard covers materials, components, products, equipment and systems, related to public and residential recreational water facility operation.

ANSI/NSF 50-2015 (i92r1), Equipment for Swimming Pools, Spas, Hot Tubs and Other Recreational Water Facilities
This Standard covers materials, components, products, equipment and systems, related to public and residential recreational water facility operation.

ANSI/NSF 50-2016 (i99r1), Equipment for Swimming Pools, Spas, Hot Tubs and Other Recreational Water Facilities
This Standard covers materials, components, products, equipment and systems, related to public and residential recreational water facility operation.

ANSI/NSF 50-2016 (i102r1), Equipment for Swimming Pools, Spas, Hot Tubs and Other Recreational Water Facilities
This Standard covers materials, components, products, equipment and systems, related to public and residential recreational water facility operation.

ANSI/NSF 50-2016 (i109r1), NSF/ANSI 50-2015: Equipment for Swimming Pools, Spas, Hot Tubs and Other Recreational Water Facilities
This Standard covers materials, components, products, equipment and systems, related to public and residential recreational water facility operation.

ANSI/NSF 50-2016 (i112), NSF/ANSI 50: Equipment for Swimming Pools, Spas, Hot Tubs and Other Recreational Water Facilities
This Standard covers materials, components, products, equipment and systems, related to public and residential recreational water facility operation.

ANSI/NSF 50-2016 (i113r2), Equipment for Swimming Pools, Spas, Hot Tubs and Other Recreational Water Facilities
This Standard covers materials, components, products, equipment and systems, related to public and residential recreational water facility operation.

ANSI/NSF 50-2016 (i114r1), NSF/ANSI 50-2015: Equipment for Swimming Pools, Spas, Hot Tubs and Other Recreational Water Facilities
This Standard covers materials, components, products, equipment and systems, related to public and residential recreational water facility operation.

ANSI/NSF 50-2016 (i118r1), Equipment for Swimming Pools, Spas, Hot Tubs and Other Recreational Water Facilities
This Standard covers materials, components, products, equipment and systems, related to public and residential recreational water facility operation.

ANSI/NSF 50-2016 (i89r1), Equipment for Swimming Pools, Spas, Hot Tubs and Other Recreational Water Facilities
This Standard covers materials, components, products, equipment and systems, related to public and residential recreational water facility operation.

ANSI/NSF 50-2016 (i119r1), Equipment for Swimming Pools, Spas, Hot Tubs and Other Recreational Water Facilities
This Standard covers materials, components, products, equipment and systems, related to public and residential recreational water facility operation.

ANSI/NSF 50-2016 (i112), NSF/ANSI 50: Equipment for Swimming Pools, Spas, Hot Tubs and Other Recreational Water Facilities
This Standard covers materials, components, products, equipment and systems, related to public and residential recreational water facility operation.

ANSI/NSF 50-2017 (i110), Equipment for Swimming Pools, Spas, Hot Tubs and Other Recreational Water Facilities
This Standard covers materials, components, products, equipment and systems, related to public and residential recreational water facility operation.

ANSI/NSF 50-2017 (i111), Equipment for Swimming Pools, Spas, Hot Tubs and Other Recreational Water Facilities
This Standard covers materials, components, products, equipment and systems, related to public and residential recreational water facility operation.

ANSI/NSF 50-2017 (i119r1), Equipment for Swimming Pools, Spas, Hot Tubs and Other Recreational Water Facilities
This Standard covers materials, components, products, equipment and systems, related to public and residential recreational water facility operation.

ANSI/NSF 50-2017 (i123r1), Equipment for Swimming Pools, Spas, Hot Tubs and Other Recreational Water Facilities
This Standard covers materials, components, products, equipment and systems, related to public and residential recreational water facility operation.

ANSI/NSF 50-2017 (i125r1), Equipment for Swimming Pools, Spas, Hot Tubs and Other Recreational Water Facilities
This Standard covers materials, components, products, equipment and systems, related to public and residential recreational water facility operation.

ANSI/NSF 50-2017 (i125r2), Equipment for Swimming Pools, Spas, Hot Tubs and Other Recreational Water Facilities
This Standard covers materials, components, products, equipment and systems, related to public and residential recreational water facility operation.

ANSI/NSF 50-2017 (i125r1), Equipment for Swimming Pools, Spas, Hot Tubs and Other Recreational Water Facilities
This Standard covers materials, components, products, equipment and systems, related to public and residential recreational water facility operation.

ANSI/NSF 51-2009 (i8r2), Food Equipment Materials
Issue 8 - To update the boilerplate changes in the family of food equipment standards. Additionally, changes to organic coatings were made relating to direct and non-direct food contact surfaces and an editorial correction. Revision 1 had comments on the organic coating issue presented. A task group meeting was held where the comments on the ballot were discussed. Those changes include adding a category for non-direct food contact surfaces and changing the test requirements for splash zones. A rationale statement was added to the ballot supporting these changes.

ANSI/NSF 51-2012 (i10), Food equipment materials
Issue 10: Updates boilerplate and normative references; clarifies the requirements for brass and bronze, glass and glass-like materials, and storage shelving intended for wet environments; relocates the lead requirement and test method from ANSI/NSF 4 and the glass materials requirement in the food equipment standards to ANSI/NSF 51; and expands the Fluoropolymer coatings requirements.

ANSI/NSF 51-2014 (i11r1), Food Equipment Materials
This Standard establishes minimum public health and sanitation requirements for materials used in the construction of commercial food equipment. The requirements of this Standard are intended to ensure that the composition and surface finish of food equipment materials are such that a material will not adulterate food nor render food equipment difficult to clean and sanitize.

ANSI/NSF 52-2007 (i3), Supplemental flooring
Issue 3 - To update the Normative References and boilerplate language in the Food Equipment family of Standards.

ANSI/NSF 52-2009 (i5), Supplemental Flooring
Issue 5 - Revise the normative references in NSF/ANSI 52.

ANSI/NSF 52-2012 (i6), Supplemental flooring
Issue 6 - The purpose of this ballot is to update the Normative References and boilerplate language in the Food Equipment family of Standards.

ANSI/NSF 52-2017 (i7r1), Supplemental Flooring
Supplemental flooring covered by this Standard includes, but is not limited to, supplemental flooring for use in food preparation, dry storage, and warewashing areas.

ANSI/NSF 53-2007 (i59), Drinking water treatment units - Health effects
Issue 59: To establish sample sizes for mechanical reduction tests other than cyst reduction.

ANSI/NSF 53-2007 (i62), Drinking Water Treatment Units - Health Effects
Issue 62 - To resolve the testing differences observed between laboratories by developing and validating a test method that includes the ability to produce particulate lead consistently between laboratories.
ANSI/NSF 53-2007 (i68), Drinking water treatment units - Health effects

Issue 68: The proposed revision is to lower the maximum contaminant concentration (MCC) for lead for material extraction testing from 0.015 mg/L to 0.010 mg/L in Table 1 of the Drinking Water Treatment Unit Standards.

ANSI/NSF 53-2007a (i61), Drinking Water Treatment Units - Health Effects

Issue 61 - The purpose of this proposal is to update the pass/fail criteria levels in Tables 1 and 2 for cyclohexane, methyl ethyl ketone, carbon disulfide, diethyl phthalate, di-n-butyl phthalate, butyl benzyl phthalate, naphthalene, acetone, and 1,4-dioxane to match the levels in NSF/ANSI 61.

ANSI/NSF 53-2007a (i57), Drinking water treatment units – Health Effects

Issue 57 - To enable point-of-entry (POE) drinking water treatment systems to be covered by NSF/ANSI 61 and to use this universal materials safety standard for POE drinking water treatment units

ANSI/NSF 53-2007a (i58), Drinking water treatment units - Health Effects

Issue 58 - To revise requirements for filter media.

ANSI/NSF 53-2007a (i64), Drinking Water Treatment Units - Health Effects

Issue 64 - To clarify that the active agent levels from two units will be evaluated against levels of toxicological significance in 6.12 - Active agents and additives, and will not be evaluated during extraction testing.

ANSI/NSF 53-2007a (i67), Drinking water treatment units - Health effects

Issue 67 - To include USEPA methods 524.2 & 52S.2 in Tables 1 and 2 and include language to ensure when using the GC/MS (method 625) an adequate analytical library has been developed.

ANSI/NSF 53-2008 (i66), Drinking water treatment units - Health effects

Issue 66 - The purpose of this ballot is to add language to clarify the usage of the word “#8216; removes’ along with the percentage of removal is acceptable when describing the cyst reduction claim (DWTU-2004-29), the inclusion of a variance for the inlet pressure in the rated service flow test, a clarification in 6.13.1 - Media test and to correct a publishing error for heptachlor to maintain consistency between the tables for VOC surrogate testing in NSF DWTU Standards.

ANSI/NSF 53-2008 (i69), Drinking water treatment units - Health effects

Issue 69 - To clarify the formulation review requirements and provide consistency between the Drinking Water Treatment Unit Standards and NSF/ANSI 60 and NSF/ANSI 61.

ANSI/NSF 53-2009 (i72), Drinking Water Treatment Units - Health effects

Issue 72 - The proposed revision is to revise the criteria for laboratory evaluation of filter media.

ANSI/NSF 53-2009 (i74), Drinking Water Treatment Units - Health effects

Issue 74 - The proposed revision is to revise the procedure for collection of effluent samples when conducting mechanical reduction tests.

ANSI/NSF 53-2009 (i75), Drinking Water Treatment Units - Health effects

Issue 75 - The proposed revision is to clarify the PID requirements.

ANSI/NSF 53-2010 (i76), NSF/ANSI 53 - Drinking water treatment units - Health effects

Issue 76: The purpose of this ballot is to include the results of an inactivation method study for live cyst, the use of a surfactant in cyst test challenge preparation and the specification of cycling valves for the mechanical reduction tests.

ANSI/NSF 53-2011 (i78), Drinking Water Treatment Units - Health effects

Issue 78 - The purpose of this ballot is to include EPA methods 524.2 & 524.3 for VOC analysis to Table 7.

ANSI/NSF 53-2011 (i80), Drinking water treatment units - Health effects

The proposed revision is to remove the filter media test from the minimum performance requirements (section 6).

ANSI/NSF 53-2012 (i83), Drinking water treatment units - Health effects

Issue 83: The proposed revision is to remove the component burst pressure test requirement from section 5 of the family of DWTU Standards.

ANSI/NSF 53-2012 (i84), Drinking water treatment units - Health effects

The proposed revision will remove the retesting requirement for contaminants that exceed the non-health based advisory concentration under section 4.2.3.6.

ANSI/NSF 53-2012 (i86), Drinking water treatment units - Health effects

The proposed revision is to clarify the syringe filtration method used in the determination of particulate lead in pH 8.5 testing, and to add a corrosion warning note under the test equipment cleaning and conditioning instructions for that analysis.

ANSI/NSF 53-2012 (i88), Drinking water treatment units - health effects

The proposed revision is to clarify the syringe filtration method used in the determination of particulate lead in pH 8.5 testing, and to add a corrosion warning note under the test equipment cleaning and conditioning instructions for that analysis.

ANSI/NSF 53-2013 (i79), Drinking Water Treatment Units - Health Effects

The point-of-use and point-of-entry systems addressed by this Standard are designed to be used for the reduction of specific substances that may be present in drinking water (public or private). These substances are considered potential or established health hazards.

ANSI/NSF 53-2013 (i90r2), Drinking Water Treatment Units - Health Effects

Issue 90: The point-of-use and point-of-entry systems addressed by this Standard are designed to be used for the reduction of specific substances that may be present in drinking water (public or private). These substances are considered potential or established health hazards. They may be microbiological, chemical, or particulate (including filterable cysts) in nature.

ANSI/NSF 53-2013 (i91), Drinking Water Treatment Units - Health Effects

It is the purpose of this Standard to establish minimum requirements for materials, design and construction, and performance of point-of-use and point-of-entry drinking water treatment systems that are designed to reduce specific health-related contaminants in public or private water supplies.

ANSI/NSF 53-2013 (i93r1), Drinking Water Treatment Units - Health Effects

It is the purpose of this Standard to establish minimum requirements for materials, design and construction, and performance of point-of-use and point-of-entry drinking water treatment systems that are designed to reduce specific health-related contaminants in public or private water supplies. Such systems include point-of-entry drinking water treatment systems used to treat all or part of the water at the inlet to a residential facility or a bottled water production facility, and includes the material and components used in these systems.

ANSI/NSF 53-2014 (i51r16), Drinking Water Treatment Units - Health Effects

The point-of-use and point-of-entry systems addressed by this Standard are designed to be used for the reduction of specific substances that may be present in drinking water (public or private). These substances are considered potential or established health hazards. They may be microbiological, chemical, or particulate [including filterable cysts] in nature. It is recognized that a system may be effective in controlling one or more of these contaminants, but systems are not required to control all.

ANSI/NSF 53-2014 (i92), Drinking Water Treatment Units - Health Effects

It is the purpose of this Standard to establish minimum requirements for materials, design and construction, and performance of point-of-use and point-of-entry drinking water treatment systems that are designed to reduce specific health-related contaminants in public or private water supplies. Such systems include point-of-entry drinking water treatment systems used to treat all or part of the water at the inlet to a residential facility or a bottled water production facility, and includes the material and components used in these systems.

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ANSI/NSF 53-2014 (i94r1), Drinking Water Treatment Units - Health Effects

It is the purpose of this Standard to establish minimum requirements for materials, design and construction, and performance of point-of-use and point-of-entry drinking water treatment systems that are designed to reduce specific health-related contaminants in public or private water supplies. Such systems include point-of-entry drinking water treatment systems used to treat all or part of the water at the inlet to a residential facility or a bottled water production facility, and includes the material and components used in these systems.

ANSI/NSF 53-2014 (i95r1), Drinking Water Treatment Units - Health Effects

It is the purpose of this Standard to establish minimum requirements for materials, design and construction, and performance of point-of-use and point-of-entry drinking water treatment systems that are designed to reduce specific health-related contaminants in public or private water supplies. Such systems include point-of-entry drinking water treatment systems used to treat all or part of the water at the inlet to a residential facility or a bottled water production facility, and includes the material and components used in these systems.

ANSI/NSF 53-2014 (i96r1), Drinking Water Treatment Units - Health Effects

It is the purpose of this Standard to establish minimum requirements for materials, design and construction, and performance of point-of-use and point-of-entry drinking water treatment systems that are designed to reduce specific health-related contaminants in public or private water supplies. Such systems include point-of-entry drinking water treatment systems used to treat all or part of the water at the inlet to a residential facility or a bottled water production facility, and includes the material and components used in these systems.

ANSI/NSF 53-2014 (i97), Drinking Water Treatment Units - Health Effects

It is the purpose of this Standard to establish minimum requirements for materials, design and construction, and performance of point-of-use and point-of-entry drinking water treatment systems that are designed to reduce specific health-related contaminants in public or private water supplies. Such systems include point-of-entry drinking water treatment systems used to treat all or part of the water at the inlet to a residential facility or a bottled water production facility, and includes the material and components used in these systems.

ANSI/NSF 53-2015 (i100), Drinking Water Treatment Systems - Health Effects

It is the purpose of this Standard to establish minimum requirements for materials, design and construction, and performance of point-of-use and point-of-entry drinking water treatment systems that are designed to reduce specific health-related contaminants in public or private water supplies. Such systems include point-of-entry drinking water treatment systems used to treat all or part of the water at the inlet to a residential facility or a bottled water production facility, and includes the material and components used in these systems.

ANSI/NSF 53-2015 (i101), Drinking Water Treatment Systems - Health Effects

It is the purpose of this Standard to establish minimum requirements for materials, design and construction, and performance of point-of-use and point-of-entry drinking water treatment systems that are designed to reduce specific health-related contaminants in public or private water supplies. Such systems include point-of-entry drinking water treatment systems used to treat all or part of the water at the inlet to a residential facility or a bottled water production facility, and includes the material and components used in these systems.

ANSI/NSF 53-2015 (i85r5), Drinking Water Treatment Units - Health Effects

It is the purpose of this Standard to establish minimum requirements for materials, design and construction, and performance of point-of-use and point-of-entry drinking water treatment systems that are designed to reduce specific health-related contaminants in public or private water supplies. Such systems include point-of-entry drinking water treatment systems used to treat all or part of the water at the inlet to a residential facility or a bottled water production facility, and includes the material and components used in these systems.

ANSI/NSF 53-2015 (i98r1), Drinking water treatment units - Health effects

It is the purpose of this Standard to establish minimum requirements for materials, design and construction, and performance of point-of-use and point-of-entry drinking water treatment systems that are designed to reduce specific health-related contaminants in public or private water supplies. Such systems include point-of-entry drinking water treatment systems used to treat all or part of the water at the inlet to a residential facility or a bottled water production facility, and includes the material and components used in these systems.

ANSI/NSF 53-2015 (i99r2), Drinking water treatment units - Health effects

It is the purpose of this Standard to establish minimum requirements for materials, design and construction, and performance of point-of-use and point-of-entry drinking water treatment systems that are designed to reduce specific health-related contaminants in public or private water supplies. Such systems include point-of-entry drinking water treatment systems used to treat all or part of the water at the inlet to a residential facility or a bottled water production facility, and includes the material and components used in these systems.

ANSI/NSF 53-2016 (i104r1), NSF 53-2016 - Drinking Water Treatment Units - Health Effects

It is the purpose of this Standard to establish minimum requirements for materials, design and construction, and performance of point-of-use and point-of-entry drinking water treatment systems that are designed to reduce specific health-related contaminants in public or private water supplies. Such systems include point-of-entry drinking water treatment systems used to treat all or part of the water at the inlet to a residential facility or a bottled water production facility, and includes the material and components used in these systems.
The purpose of this Standard is to establish minimum requirements for the reduction of microorganisms using ultraviolet radiation (UV). UV water treatment systems covered by this Standard are intended for water that may be either microbiologically safe or microbiologically unsafe. This Standard also specifies the minimum product literature and labeling information that a manufacturer shall supply to authorized representatives and system owners, as well as the minimum service-related obligations that the manufacturer shall extend to system owners.

ANSI/NSF 55-2016 (i4r2), Ultraviolet Microbiological Water Treatment Systems

The purpose of this Standard is to establish minimum requirements for the reduction of microorganisms using ultraviolet radiation (UV). UV water treatment systems covered by this Standard are intended for water that may be either microbiologically safe or microbiologically unsafe. This Standard also specifies the minimum product literature and labeling information that a manufacturer shall supply to authorized representatives and system owners, as well as the minimum service-related obligations that the manufacturer shall extend to system owners.

ANSI/NSF 55-2015 (i40r2), Ultraviolet Microbiological Water Treatment System

The purpose of this Standard is to establish minimum requirements for the reduction of microorganisms using ultraviolet radiation (UV). UV water treatment systems covered by this Standard are intended for water that may be either microbiologically safe or microbiologically unsafe. This Standard also specifies the minimum product literature and labeling information that a manufacturer shall supply to authorized representatives and system owners, as well as the minimum service-related obligations that the manufacturer shall extend to system owners.

ANSI/NSF 55-2007 (i52), Reverse osmosis drinking water treatment systems

Issue 52: The proposed revision is to lower the maximum contaminant concentration (MCC) for lead for material extraction testing from 0.015 mg/L to 0.010 mg/L in Table 1 of the Drinking Water Treatment Unit Standards.

ANSI/NSF 55-2007 (i53), Reverse osmosis drinking water treatment systems

Issue 53 - To clarify the formulation review requirements and provide consistency between the Drinking Water treatment Unit Standards and NSF/ANSI 60 and NSF/ANSI 61.

ANSI/NSF 58-2008 (i50), Reverse osmosis drinking water treatment systems

Issue 50 - To add language to clarify the usage of the word “&” in Table 1 to reflect that the words “along with” are acceptable when describing the cyst reduction claim and to correct an error that occurred during the reformatting for the sampling - systems without storage tanks sections of 7.1.2.7, 7.1.3.5.3, 7.2.1.6, 7.2.2.6, & 7.2.3.6.

ANSI/NSF 58-2011 (i56), Reverse osmosis drinking water treatment systems

Issue 56 - Perchlorate levels in Section 7, Table 8 have been updated to correct an error published in NSF/ANSI 58-2009.

ANSI/NSF 58-2012 (i58), Reverse osmosis drinking water treatment systems

Issue 58: The proposed revision is to remove the component burst pressure test requirement from section 5 of the family of DWTU Standards.

ANSI/NSF 58-2012 (i59), Reverse osmosis drinking water treatment systems

The proposed revision will remove the retesting requirement for contaminants that exceed the non-health based advisory concentration under section 4.2.3.6.

ANSI/NSF 58-2012 (i61), Reverse osmosis drinking water treatment systems

The proposed revision is to clarify under section 8 of NSF/ANSI 42 and NSF/ANSI 53, and section 7.1.1 of NSF/ANSI 58 (VOC reduction claims) that each certified system may only make a single capacity claim based on the lowest reduction capacity in any standard to which the model is certified.

ANSI/NSF 58-2013 (i62), Reverse osmosis drinking water treatment systems

This proposed revision addresses the number of samples taken on Days 2 - 4 of testing under NSF/ANSI 58.
ANSI/NSF 58-2013 (i63), Reverse Osmosis Drinking Water Treatment Systems
The point-of-use reverse osmosis drinking water treatment systems addressed by this Standard are designed to be used for the reduction of specific substances that may be present in drinking water supplies (public or private) considered to be microbiologically safe and of known quality (except that claims for the reduction of filterable cysts may be permitted). Systems covered by this Standard are intended for reduction of total dissolved solids (TDS) and other contaminants specified herein.

ANSI/NSF 58-2013 (i64), Reverse Osmosis Drinking Water Treatment Systems
The purpose of this Standard is to establish minimum requirements for materials, design and construction, and performance of reverse osmosis drinking water treatment systems. This Standard also specifies the minimum product literature that manufacturers shall supply to authorized representatives and owners, as well as the minimum service-related obligations that manufacturers shall extend to system owners.

ANSI/NSF 58-2014 (i65), Reverse Osmosis Drinking Water Treatment Systems
The purpose of this Standard is to establish minimum requirements for materials, design and construction, and performance of reverse osmosis drinking water treatment systems. This Standard also specifies the minimum product literature that manufacturers shall supply to authorized representatives and owners, as well as the minimum service-related obligations that manufacturers shall extend to system owners.

ANSI/NSF 58-2014 (i66r1), Reverse Osmosis Drinking Water Treatment Systems
The purpose of this Standard is to establish minimum requirements for materials, design and construction, and performance of reverse osmosis drinking water treatment systems. This Standard also specifies the minimum product literature that manufacturers shall supply to authorized representatives and owners, as well as the minimum service-related obligations that manufacturers shall extend to system owners.

ANSI/NSF 58-2014 (i67r2), Reverse Osmosis Drinking Water Treatment Systems
The purpose of this Standard is to establish minimum requirements for materials, design and construction, and performance of reverse osmosis drinking water treatment systems. This Standard also specifies the minimum product literature that manufacturers shall supply to authorized representatives and owners, as well as the minimum service-related obligations that manufacturers shall extend to system owners.

ANSI/NSF 58-2015 (i68r2), Reverse Osmosis Drinking Water Treatment Systems
The purpose of this Standard is to establish minimum requirements for materials, design and construction, and performance of reverse osmosis drinking water treatment systems. This Standard also specifies the minimum product literature that manufacturers shall supply to authorized representatives and owners, as well as the minimum service-related obligations that manufacturers shall extend to system owners.

ANSI/NSF 58-2015 (i69r1), Reverse Osmosis Drinking Water Treatment Systems
The purpose of this Standard is to establish minimum requirements for materials, design and construction, and performance of reverse osmosis drinking water treatment systems. This Standard also specifies the minimum product literature that manufacturers shall supply to authorized representatives and owners, as well as the minimum service-related obligations that manufacturers shall extend to system owners.

ANSI/NSF 58-2015 (i70), Reverse Osmosis Drinking Water Treatment Systems
The purpose of this Standard is to establish minimum requirements for materials, design and construction, and performance of reverse osmosis drinking water treatment systems. This Standard also specifies the minimum product literature that manufacturers shall supply to authorized representatives and owners, as well as the minimum service-related obligations that manufacturers shall extend to system owners.

ANSI/NSF 58-2015 (i71), Reverse Osmosis Drinking Water Treatment Systems
The purpose of this Standard is to establish minimum requirements for materials, design and construction, and performance of reverse osmosis drinking water treatment systems. This Standard also specifies the minimum product literature that manufacturers shall supply to authorized representatives and owners, as well as the minimum service-related obligations that manufacturers shall extend to system owners.

ANSI/NSF 58-2016 (i72r2), Reverse Osmosis Drinking Water Treatment Systems
The purpose of this Standard is to establish minimum requirements for materials, design and construction, and performance of reverse osmosis drinking water treatment systems. This Standard also specifies the minimum product literature that manufacturers shall supply to authorized representatives and owners, as well as the minimum service-related obligations that manufacturers shall extend to system owners.

ANSI/NSF 58-2016 (i76r1), NSF 58-2016 - Reverse Osmosis Drinking Water Treatment Systems
The purpose of this Standard is to establish minimum requirements for materials, design and construction, and performance of reverse osmosis drinking water treatment systems. This Standard also specifies the minimum product literature that manufacturers shall supply to authorized representatives and owners, as well as the minimum service-related obligations that manufacturers shall extend to system owners.

ANSI/NSF 58-2016 (i77r1), Reverse Osmosis Drinking Water Treatment Systems
The purpose of this Standard is to establish minimum requirements for materials, design and construction, and performance of reverse osmosis drinking water treatment systems. This Standard also specifies the minimum product literature that manufacturers shall supply to authorized representatives and owners, as well as the minimum service-related obligations that manufacturers shall extend to system owners.

ANSI/NSF 59-2012 (i6), Mobile Food Carts
Issue 6 - The purpose of this ballot is to update the Normative References and boilerplate language in the Food Equipment family of Standards.

ANSI/NSF 59-2017 (i7r1), NSF 59-2012 Mobile Food Carts
This Standard contains requirements for mobile food carts and their related components and materials. This Standard applies to mobile food carts intended for the preparation and service of food, as well those intended for service of prepackaged food only.

ANSI/NSF 6-2006 (i4), Dispensing Freezers
Issue 4 - To update normative references, incorporate revised boilerplate language from NSF/ANSI 2, and correct an error in 6.1 - Cleaning and sanitization procedures.

ANSI/NSF 6-2007 (i5), Dispensing freezers
Issue 5: Update 5.2 to specify that its requirements apply only to food zones.

ANSI/NSF 6-2007 (i6), Dispensing freezers
Issue 6 - To update the Normative References and boilerplate language in the Food Equipment family of Standards.

ANSI/NSF 6-2008 (i7), Dispensing freezers
Issue 7 - To include and modify language to be consistent with the boilerplate language in NSF/ANSI 2 Food equipment. The test method on Heat treatment cycle - product heating is being modified to reflect the format used in NSF/ANSI 7 - Dispensing freezers - 6.10 Performance - storage refrigerators and refrigerated food transport cabinets.

ANSI/NSF 6-2009 (i8), Dispensing Freezers
Issue 8 - Boilerplate updates in the family of food equipment standards including normative references.

ANSI/NSF 6-2012 (i9), Dispensing freezers
Issue 9 - The purpose of this ballot is to update the Normative References and boilerplate language in the Food Equipment family of Standards.
ANSI/NSF 6-2014 (i10r1), Dispensing Freezers
This Standard contains requirements for the following equipment: dispensing freezers that process and freeze previously pasteurized product (e.g., soft ice cream, ice milk, yogurt, malts, custards) and dispense it directly into the consumer's container; dispensing freezers that dispense premanufactured frozen product (e.g., ice cream) directly into the consumer's container; and batch dispensing freezers. The materials, design, and construction requirements of this Standard may also apply to items that are manufactured as a component of a dispensing freezer.

ANSI/NSF 6-2014 (i10r2), Dispensing Freezers
This Standard contains requirements for the following equipment: dispensing freezers that process and freeze previously pasteurized product (e.g., soft ice cream, ice milk, yogurt, malts, custards) and dispense it directly into the consumer's container; dispensing freezers that dispense premanufactured frozen product (e.g., ice cream) directly into the consumer's container; and batch dispensing freezers. The materials, design, and construction requirements of this Standard may also apply to items that are manufactured as a component of a dispensing freezer.

ANSI/NSF 6-2016 (i11r3), Dispensing Freezers
This Standard contains requirements for the following equipment: dispensing freezers that process and freeze previously pasteurized product (e.g., soft ice cream, ice milk, yogurt, malts, custards) and dispense it directly into the consumer's container; dispensing freezers that dispense premanufactured frozen product (e.g., ice cream) directly into the consumer's container; and batch dispensing freezers. The materials, design, and construction requirements of this Standard may also apply to items that are manufactured as a component of a dispensing freezer.

ANSI/NSF 60-2005 Addendum 1 (i35), Drinking Water Treatment Chemicals - Health Effects
Issue 35: To provide guidance regarding the rounding method that should be used when evaluating analytical results.

ANSI/NSF 60-2005 Addendum 1 (i41), Drinking Water Treatment Chemicals - Health Effects
Issue 41: To incorporate recent additions of Organics/Pesticides considered contaminants by the U.S. Environmental Protection Agency and Health Canada.

ANSI/NSF 60-2006 (i40), Drinking water treatment chemicals - Health effects
Issue 40: The purpose of this revision is to streamline the sampling procedures in Annex B.

ANSI/NSF 60-2008 (i42), Drinking water treatment chemicals - Health effects
Issue 42: To modify the minimum recorded weight in the method for Preparation K (B.3.12) to provide practical limitations for weights recorded during the estimation of chemical tested on a dry weight basis.

ANSI/NSF 60-2009 (i45), Drinking Water Treatment Chemicals - Health Effects
Issue 45: The Task Group on Annual Recertification Requirements for NSF 60 is submitting a ballot to add annual certification requirements to NSF/ANSI Standard 60.

ANSI/NSF 60-2011 (i39), Drinking water treatment chemicals - Health effects
Issue 39 - 1. Establishes that the Single Product Allowable Concentration (SPAC) for bromate will be lowered from 0.005 mg/L to 0.003 mg/L on 1/1/2013. 2. Creation of Annex G to hold that requirement until 1/1/2013. 3. Immediately raises the bromate acceptance criteria for low-bromate hypochlorites from 0.001 mg/L to 0.003 mg/L.

ANSI/NSF 60-2011 (i46), Drinking Water Treatment Chemicals - Health Effects
Issue 46: This proposed revision to NSF/ANSI Standard 60 contains requirements for the evaluation of perchlorate in hypochlorites. This includes establishment of SPACs, criteria for analytical methods, sample requirements, and requirements to inform the user of production date and provide references to recommended handling and storage requirements.

ANSI/NSF 60-2011 (i47), NSF/ANSI 60 - Drinking Water Treatment Chemicals - Health Effects
Issue 47: This issue will amend Standard 60 to require tamper resistant/tamper evident seals on all containers of water treatment chemicals sold to water suppliers.

ANSI/NSF 60-2011 (i49), Drinking Water Treatment Chemicals: Health Effects
Issue 49: Covers the: (1) Proposal to update sections of ANSI/NSF 60, Annex B (B.3.6 and B.4.2.3), which refer to sampling and preparation of elemental chlorine and other gaseous products; (2) Proposal to revise ANSI/NSF 60, Section 3.2.1. Current requirement in NSF 60, Section 3.2.1 can be interpreted to require submittal of toxicology studies for each product submission. However, this is not required if SPACs are established for each chemical contaminant of concern (Annex A); and (3) Proposal to revise ANSI/NSF 60, Section 2.19 to clarify the definitions of Typical Use Level and Maximum Use Level.

ANSI/NSF 60-2012 (i48), Drinking Water Treatment Chemicals - Health Effects
The proposed ballot revises ANSI/NSF 60, Table 6.2, Maximum Use Level (MUL) of hydrogen peroxide from 3 mg/L to 23 mg/L, and removes the chlorination footnote.

ANSI/NSF 60-2012 (i50), Drinking Water Treatment Chemicals: Health Effects
Contains requirements for the evaluation of chlorate in hypochlorites, as well as some editorial changes to the previous perchlorate requirements that were successfully balloted in issue 46, revision 2. This includes establishment of a SPAC based on the Health Canada MAC, criteria for analytical methods, sample requirements.

ANSI/NSF 60-2012 (i51), Drinking Water Treatment Chemicals - Health Effects
Issue 51: This revision specifies an exemption for mineral oils from the microbial growth potential test.

ANSI/NSF 60-2012 (i52), Drinking Water Treatment Chemicals: Health Effects
Updates the normative drinking water criteria listed under Tables D1-D4 of ANSI/NSF 60.

ANSI/NSF 60-2012 (i54), Drinking Water Treatment Chemicals - Health Effects
Includes the following proposed revisions to section 3 of NSF/ANSI 60: 1)Section 3.5 - Product labeling The product labeling requirements will be revised to contain the maximum use level on a product container or literature that it is shipped with the product, such as product technical data sheets. Any applicable certification markings shall also be required. 2)Section 3.9 - Product Security Tamper-evident packaging requirements will be revised to clarify that they apply for drinking water applications in 3.9, and to specify the requirements for bulk shipments in railcars in 3.9.3.

ANSI/NSF 60-2012 (i55), Drinking Water Treatment Chemicals - Health Effects
The proposed revision adds a precipitation step to Method C under Annex B.3.4 of NSF/ANSI 60, which addresses the preparation of calcium carbonate, calcium hydroxide, calcium oxide, magnesium carbonate hydroxide and magnesium oxide. The method has been revised to better reflect actual use conditions of these chemicals in the field.

ANSI/NSF 60-2012 (i58), Drinking water treatment chemicals - Health effects
Issue 58: The proposed revision adds language to exclude the intentional use of microorganisms under the scope of NSF/ANSI 60.

ANSI/NSF 60-2013 (i53), Drinking Water Treatment Chemicals - Health Effects
The proposed revision will specify requirements regarding the use of non-potable water in the production of drinking water treatment chemicals in NSF/ANSI 60.

ANSI/NSF 60-2013 (i58), Drinking Water Treatment Chemicals- Health Effects
This Standard establishes minimum health effects requirements for the chemicals, the chemical contaminants, and the impurities that are directly added to drinking water from drinking water treatment chemicals. This Standard does not establish performance or taste and odor requirements for drinking water treatment chemicals.

ANSI/NSF 60-2013 (i59r1), Drinking Water Treatment Chemicals - Health Effects
This Standard establishes minimum health effects requirements for the chemicals, the chemical contaminants, and the impurities that are directly added to drinking water from drinking water treatment chemicals. This Standard does not establish performance or taste and odor requirements for drinking water treatment chemicals.
ANSI/NSF 60-2014 (i60r1), Drinking Water Treatment Chemicals - Health Effects
This Standard establishes minimum health effects requirements for the chemicals, the chemical contaminants, and the impurities that are directly added to drinking water from drinking water treatment chemicals. This Standard does not establish performance or taste and odor requirements for drinking water treatment chemicals.

ANSI/NSF 60-2014 (i61r2), NSF/ANSI 60: Drinking Water Treatment Chemicals - Health Effects
This Standard establishes minimum health effects requirements for the chemicals, the chemical contaminants, and the impurities that are directly added to drinking water from drinking water treatment chemicals. This Standard does not establish performance or taste and odor requirements for drinking water treatment chemicals.

ANSI/NSF 60-2014 (i63), Drinking Water Treatment Chemicals - Health Effects
This Standard establishes minimum health effects requirements for the chemicals, the chemical contaminants, and the impurities that are directly added to drinking water from drinking water treatment chemicals. This Standard does not establish performance or taste and odor requirements for drinking water treatment chemicals.

ANSI/NSF 60-2014 (i64r1), Drinking Water Treatment Chemicals - Health Effects
This Standard establishes minimum health effects requirements for the chemicals, the chemical contaminants, and the impurities that are directly added to drinking water from drinking water treatment chemicals. This Standard does not establish performance or taste and odor requirements for drinking water treatment chemicals.

ANSI/NSF 60-2014 (i65r1), Drinking Water Treatment Chemicals - Health Effects
This Standard establishes minimum health effects requirements for the chemicals, the chemical contaminants, and the impurities that are directly added to drinking water from drinking water treatment chemicals. This Standard does not establish performance or taste and odor requirements for drinking water treatment chemicals.

ANSI/NSF 60-2015 (i68r1), Drinking Water Treatment Chemicals - Health Effects
This Standard establishes minimum health effects requirements for the chemicals, the chemical contaminants, and the impurities that are directly added to drinking water from drinking water treatment chemicals. This Standard does not establish performance or taste and odor requirements for drinking water treatment chemicals.

ANSI/NSF 60-2015 (i69), Drinking Water Treatment Chemicals: Health Effects
This Standard establishes minimum health effects requirements for the chemicals, the chemical contaminants, and the impurities that are directly added to drinking water from drinking water treatment chemicals. This Standard does not establish performance or taste and odor requirements for drinking water treatment chemicals.

ANSI/NSF 60-2016 (i66r1), Drinking Water Treatment Chemicals
This Standard establishes minimum health effects requirements for the chemicals, the chemical contaminants, and the impurities that are directly added to drinking water from drinking water treatment chemicals. This Standard does not establish performance or taste and odor requirements for drinking water treatment chemicals.

ANSI/NSF 60-2016 (i70r1), Drinking Water Treatment Chemicals
This Standard establishes minimum health effects requirements for the chemicals, the chemical contaminants, and the impurities that are directly added to drinking water from drinking water treatment chemicals. This Standard does not establish performance or taste and odor requirements for drinking water treatment chemicals.

ANSI/NSF 60-2016 (i71r1), Drinking Water Treatment Chemicals
This Standard establishes minimum health effects requirements for the chemicals, the chemical contaminants, and the impurities that are directly added to drinking water from drinking water treatment chemicals. This Standard does not establish performance or taste and odor requirements for drinking water treatment chemicals.

ANSI/NSF 60-2016 (i72r1), Drinking Water Treatment Chemicals
This Standard establishes minimum health effects requirements for the chemicals, the chemical contaminants, and the impurities that are directly added to drinking water from drinking water treatment chemicals. This Standard does not establish performance or taste and odor requirements for drinking water treatment chemicals.

ANSI/NSF 60-2016 (i73r1), Drinking Water Treatment Chemicals
This Standard establishes minimum health effects requirements for the chemicals, the chemical contaminants, and the impurities that are directly added to drinking water from drinking water treatment chemicals. This Standard does not establish performance or taste and odor requirements for drinking water treatment chemicals.

ANSI/NSF 60-2016 (i74r1), Drinking Water Treatment Chemicals
This Standard establishes minimum health effects requirements for the chemicals, the chemical contaminants, and the impurities that are directly added to drinking water from drinking water treatment chemicals. This Standard does not establish performance or taste and odor requirements for drinking water treatment chemicals.

ANSI/NSF 60-2016 (i75r1), NSF 60-2015 - Drinking Water Treatment Chemicals
This Standard establishes minimum health effects requirements for the chemicals, the chemical contaminants, and the impurities that are directly added to drinking water from drinking water treatment chemicals. This Standard does not establish performance or taste and odor requirements for drinking water treatment chemicals.

ANSI/NSF 61-2007 (i55), Drinking Water System Components - Health Effects
Issue 55: To incorporate POE drinking water treatment unit systems into Standard 61.

ANSI/NSF 61-2007 (i56), Drinking Water System Components - Health Effects
Issue 56: Add a required labeling distinction for POE systems only that NSF/ANSI 61 does not cover performance and structural integrity certifications.

ANSI/NSF 61-2007 (i57), Drinking Water System Components - Health Effects
Issue 57: Allow a toxicology assessment to determine the most appropriate exposure water for “all other process media” to be consistent with the other test procedures throughout Standard 61.

ANSI/NSF 61-2007 (i59), Drinking Water System Components - Health Effects
Issue 59: To provide guidance regarding the rounding method that should be used when evaluating analytical results.

ANSI/NSF 61-2007 (i68), Drinking Water System Components - Health Effects
Issue 68: To incorporate recent additions of Organics/Pesticides considered contaminants by the U.S. Environmental Protection Agency and Health Canada.

ANSI/NSF 61-2007 (i69), Drinking water system components - Health effects
Issue 69: To amend Section 3.2 clarifying the need to examine process performance and the necessary controls required to provide continued compliance of products.

ANSI/NSF 61-2007 (i70r2), Drinking water system components - Health effects
Issue 70r2: To increase the level of protection provided by Standard 61 by lowering the drinking water acceptance criteria for lead.

ANSI/NSF 61-2007 (i72r2), Drinking water system components - Health effects
Issue 72, r2: To include explicit and uniform guidance for overtime testing protocols into sections 4 (4.5.4.3), 5 (5.5.5.5), 6 (B.3.7), 8 (B.4.5) and 9 (B.5.6) on Multiple Time Point Protocols.

ANSI/NSF 61-2007 (i75), Drinking water system components - Health effects
Issue 75: Update to Section 5, adding immediate return to service paint/coating systems to the definition section, and adding language providing transparency regarding product testing and certification.
ANSI/NSF 61-2007, Addendum 1 (i74), Drinking water system components - Health effects

Issue 74: To specifically identify flexible plumbing connectors in the scope of section 9 and transfer the evaluation of riser tubing to section 9, rather than section 4.

ANSI/NSF 61-2008 (i76), Drinking water system components - Health effects

Issue 76: Update to standardize the testing of metallic products and components for Section 4 and Section 8.

ANSI/NSF 61-2008 (i77), Drinking water system components - Health effects

Issue 77: To clarify the minimum requirements for information and formulation (Section 3).

ANSI/NSF 61-2008 (i79), Drinking water system components - Health effects

Issue 79, r2: To establish an evaluation procedure for use when a lead content requirement needs to be met in addition to current chemical extraction requirements of the standard.

ANSI/NSF 61-2008 (i80), Drinking water system components - Health effects

Issue 80: 1) To revise the tolerance for percent relative humidity during mortar cube preparation. 2) To provide definitions of different manifold types and clarification on the testing of different manifold types.

ANSI/NSF 61-2009 (i81), Drinking water system components - Health effects

Issue 81 - To clarify the minimum requirements for information and formulation (Section 3) by specifying for which products a formulation review is not necessary and setting a de minimus level below which products do not require the same review.

ANSI/NSF 61-2009 (i82), Drinking Water System Components - Health Effects

Issue 82 - To revert the exposure water used on non-adsorptive, non-POE process media back to reagent water.

ANSI/NSF 61-2009 (i83), Drinking Water System Components - Health Effects

Issue 83 - Sample storage temperatures do not specify an acceptable temperature range. Currently in Table B10 in NSF 61, the sample storage column specifies 4°C (39°F) for those samples required to be kept cool.

ANSI/NSF 61-2009 (i84), Drinking Water System Components - Health Effects

Issue 84 - Add remote chillers and electronically activated faucets to sections 9.1.1 and 9.1.2 so they will be properly evaluated as end point devices. Also, a few minor formatting issues will be addressed.

ANSI/NSF 61-2009 (i85), Drinking Water System Components - Health Effects

Issue 85 - Currently there are various temperature tolerances within the standard. This ballot is being proposed to make all tolerances on temperature a consistent ± 4°F.

ANSI/NSF 61-2010 (i90), NSF/ANSI 61 - Drinking Water System Components - Health Effects

Issue 90: The purpose of this ballot is to alter Annex G of Standard 61 to reference the new standard 372. The new standard 372 is currently out for ballot at the Joint Committee (372i1r1). These two ballots are hinged and must proceed in the process together.

ANSI/NSF 61-2011 (i91), Drinking Water System Components - Health Effects

Issue 91: The NSF 61 Joint Committee considered a proposal that solid chemical feeders be evaluated with manufacturer’s recommended use chemicals that also comply with the requirements of NSF/ANSI 60: Drinking Water Treatment Chemicals - Health Effects (DWA JC annual meeting, December 2009). Draft 2 of this ballot addresses comments received by Joint Committee members that requiring specific warning language in Std. 61 is not appropriate. Therefore, the language has been revised to specify that the manufacturer shall include this type of information, but will allow the manufacturer to determine the specific language used for warning and warranty disclaimers of its products.

ANSI/NSF 61-2011 (i92), NSF/ANSI 61 - Drinking Water System Components - Health Effects

Issue 92 - Clarify evaluation requirements for coatings covered under Section 5 of NSF 61 for pipes, tanks and other products.

ANSI/NSF 61-2011 (i95), Drinking Water System Components - Health Effects

Issue 95 - The following revisions are being proposed to section 7, process media: 1. clarification of 7.3.1 to state that only media requiring conditioning, dosing, use of filtration aids or specific recommended use concentrations, shall be required to contain manufacturer use instructions; 2. clarification that ‘reagent’ water is to be used in 7.5.2, and 3. the inclusion of an additional normalization calculation in section 7.7 for process media with a manufacturer’s recommended use concentration.

ANSI/NSF 61-2011 (i96), Drinking Water System Components - Health Effects

Issue 96: The following revisions are being proposed to NSF/ANSI 61: 1. The definition of ‘unit void volume’ was added to section 2, Definitions; 2. Section 7.5.4.2 was revised to clarify exposure water requirements of adsorptive and non-adsorptive media; and 3. Section 7.5.5.4.2 was updated to reference collecting the unit void volume of the vessel rather than the 2 L or more referenced in 7.5.5.4.3. Section 7.5.5.4.2 was also revised to eliminate the collection of the first two exposure water samples.

ANSI/NSF 61-2012 (i100), Drinking Water System Components - Health Effects

Clarifying language is proposed for describing the coating manufacturer’s instructions for lab testing, and the relationship to manufacturer’s published use instructions for field and factory use. A tolerance of +/- 48°C ± 1°C for cure temperature is established. Require airless plural component systems to be operated at the midpoint of the coating manufacturer’s recommended pressure and temperature range.

ANSI/NSF 61-2012 (i101), Drinking Water System Components - Health Effects

The proposed revision shall remove the exclusion of fire hydrants under NSF/ANSI 61.

ANSI/NSF 61-2012 (i102), Drinking Water System Components - Health Effects

The proposed revision will update Table 3.1 to require nitrosamine analysis.

ANSI/NSF 61-2012 (i103), Drinking water system components - Health effects

The proposed revision is to provide a normalization example of a 1/2’ ball valve following exposure in a 1-L test assembly under Annex B of NSF/ANSI 61.

ANSI/NSF 61-2012 (i94), NSF/ANSI 61 - Drinking Water System Components: Health Effects

The following modifications are being proposed to NSF/ANSI 61: 1. the inclusion of additional materials to Table 3.1 - Material-specific analyses; 2. the inclusion of additional language to clarify what defines a piping system as flexible or rigid in Section 4, Pipes and Related Products; and 3. the removal of the option of exposing in-line devices for 16 hours and normalizing to 12 hours, in Section 8.4 - Mechanical Devices, and Table B8 - In-line device exposure sequence.

ANSI/NSF 61-2012 (i97), Drinking Water System Components: Health Effects

The proposed ballot reduces the formulation information required for components of mechanical devices and mechanical plumbing devices that are composed from materials that are less than or equal to 2.0 sq inches per liter and listed in Table 3.1 Material-specific analyses.

ANSI/NSF 61-2012 (i98), Drinking Water System Components: Health Effects

Updates the normative drinking water criteria listed under Tables D1-D4 of ANSI/NSF 61.

ANSI/NSF 61-2012 (i99), Drinking Water System Components: Health Effects

The proposed revision is to specify the evaluation criterion for fire sprinklers and associated fittings that are used in piping systems intended to serve both drinking water and fire protection needs under section 4 of NSF/ANSI 61.

ANSI/NSF 61-2013 (i104), Drinking water system components - Health effects

The proposed revision will remove the limitation of 1, 2-dibromo-3-chloropropane (DBCP) in activated carbon under the additional requirements for reactivated/regenerated media under NSF/ANSI 61.

ANSI/NSF 61-2013 (i105), Drinking Water System Components - Health Effects

Issue 105: This Standard establishes minimum health effects requirements for the chemical contaminants and impurities that are indirectly imparted to drinking water from products, components, and materials used in drinking water systems. This Standard does not establish performance, taste and odor, or microbial growth support requirements for drinking water system products, components, or materials.
ANSI/NSF 61-2013 (i106r1), Drinking Water System Components - Health Effects
This Standard establishes minimum health effects requirements for the chemical contaminants and impurities that are indirectly imparted to drinking water from products, components, and materials used in drinking water systems. This Standard does not establish performance, taste and odor, or microbial growth support requirements for drinking water system products, components, or materials.

ANSI/NSF 61-2014 (i109r2), Drinking Water System Components - Health Effects
This Standard establishes minimum health effects requirements for the chemical contaminants and impurities that are indirectly imparted to drinking water from products, components, and materials used in drinking water systems. This Standard does not establish performance, taste and odor, or microbial growth support requirements for drinking water system products, components, or materials.

ANSI/NSF 61-2014 (i111r1), Drinking Water System Components - Health Effects
This Standard establishes minimum health effects requirements for the chemical contaminants and impurities that are indirectly imparted to drinking water from products, components, and materials used in drinking water systems. This Standard does not establish performance, taste and odor, or microbial growth support requirements for drinking water system products, components, or materials.

ANSI/NSF 61-2014 (i113r1), NSF/ANSI 61: Drinking Water System Components - Health Effects
This Standard establishes minimum health effects requirements for the chemical contaminants and impurities that are indirectly imparted to drinking water from products, components, and materials used in drinking water systems. This Standard does not establish performance, taste and odor, or microbial growth support requirements for drinking water system products, components, or materials.

ANSI/NSF 61-2014 (i114r1), Drinking Water System Components - Health Effects
This Standard establishes minimum health effects requirements for the chemical contaminants and impurities that are indirectly imparted to drinking water from products, components, and materials used in drinking water systems. This Standard does not establish performance, taste and odor, or microbial growth support requirements for drinking water system products, components, or materials.

ANSI/NSF 61-2014 (i115r1), Drinking Water System Components - Health Effects
This Standard establishes minimum health effects requirements for the chemical contaminants and impurities that are indirectly imparted to drinking water from products, components, and materials used in drinking water systems. This Standard does not establish performance, taste and odor, or microbial growth support requirements for drinking water system products, components, or materials.

ANSI/NSF 61-2014a (i119r1), Drinking Water System Components - Health Effects
This Standard establishes minimum health effects requirements for the chemical contaminants and impurities that are indirectly imparted to drinking water from products, components, and materials used in drinking water systems. This Standard does not establish performance, taste and odor, or microbial growth support requirements for drinking water system products, components, or materials.

ANSI/NSF 61-2015 (i118), Drinking Water System Components: Health Effects
This Standard establishes minimum health effects requirements for the chemical contaminants and impurities that are indirectly imparted to drinking water from products, components, and materials used in drinking water systems. This Standard does not establish performance, taste and odor, or microbial growth support requirements for drinking water system products, components, or materials.

ANSI/NSF 61-2015 (i120r1), Drinking Water System Components - Health Effects
This Standard establishes minimum health effects requirements for the chemical contaminants and impurities that are indirectly imparted to drinking water from products, components, and materials used in drinking water systems. This Standard does not establish performance, taste and odor, or microbial growth support requirements for drinking water system products, components, or materials.

ANSI/NSF 61-2015 (i121), Drinking Water System Components: Health Effects
This Standard establishes minimum health effects requirements for the chemical contaminants and impurities that are indirectly imparted to drinking water from products, components, and materials used in drinking water systems. This Standard does not establish performance, taste and odor, or microbial growth support requirements for drinking water system products, components, or materials.

ANSI/NSF 61-2015 (i123r1), Drinking Water System Components - Health Effects
This Standard establishes minimum health effects requirements for the chemical contaminants and impurities that are indirectly imparted to drinking water from products, components, and materials used in drinking water systems. This Standard does not establish performance, taste and odor, or microbial growth support requirements for drinking water system products, components, or materials.

ANSI/NSF 61-2016 (i124), Drinking Water System Components: Health Effects
This Standard establishes minimum health effects requirements for the chemical contaminants and impurities that are indirectly imparted to drinking water from products, components, and materials used in drinking water systems. This Standard does not establish performance, taste and odor, or microbial growth support requirements for drinking water system products, components, or materials.

ANSI/NSF 61-2016 (i126), Drinking Water System Components: Health Effects
This Standard establishes minimum health effects requirements for the chemical contaminants and impurities that are indirectly imparted to drinking water from products, components, and materials used in drinking water systems. This Standard does not establish performance, taste and odor, or microbial growth support requirements for drinking water system products, components, or materials.

ANSI/NSF 61-2016 (i128), Drinking Water System Components: Health Effects
This Standard establishes minimum health effects requirements for the chemical contaminants and impurities that are indirectly imparted to drinking water from products, components, and materials used in drinking water systems. This Standard does not establish performance, taste and odor, or microbial growth support requirements for drinking water system products, components, or materials.

ANSI/NSF 61-2015 (i125), Drinking Water System Components: Health Effects
This Standard establishes minimum health effects requirements for the chemical contaminants and impurities that are indirectly imparted to drinking water from products, components, and materials used in drinking water systems. This Standard does not establish performance, taste and odor, or microbial growth support requirements for drinking water system products, components, or materials.
ANSI/ NSF 61-2016 (i129), Drinking Water System Components - Health Effects
This Standard establishes minimum health effects requirements for the chemical contaminants and impurities that are indirectly imparted to drinking water from products, components, and materials used in drinking water systems. This Standard does not establish performance, taste and odor, or microbial growth support requirements for drinking water system products, components, or materials.

ANSI/ NSF 61-2016 (i130), Drinking Water System Components - Health Effects
This Standard establishes minimum health effects requirements for the chemical contaminants and impurities that are indirectly imparted to drinking water from products, components, and materials used in drinking water systems. This Standard does not establish performance, taste and odor, or microbial growth support requirements for drinking water system products, components, or materials.

ANSI/ NSF 61-2016 (i131r1), Drinking Water System Components - Health Effects
This Standard establishes minimum health effects requirements for the chemical contaminants and impurities that are indirectly imparted to drinking water from products, components, and materials used in drinking water systems. This Standard does not establish performance, taste and odor, or microbial growth support requirements for drinking water system products, components, or materials.

ANSI/ NSF 61-2016 (i132r1), Drinking Water System Components - Health Effects
This Standard establishes minimum health effects requirements for the chemical contaminants and impurities that are indirectly imparted to drinking water from products, components, and materials used in drinking water systems. This Standard does not establish performance, taste and odor, or microbial growth support requirements for drinking water system products, components, or materials.

ANSI/ NSF 61-2016 (i133r1), NSF 61-2015 - Drinking Water System Components - Health effects
This Standard establishes minimum health effects requirements for the chemical contaminants and impurities that are indirectly imparted to drinking water from products, components, and materials used in drinking water systems. This Standard does not establish performance, taste and odor, or microbial growth support requirements for drinking water system products, components, or materials.

ANSI/ NSF 61-2017 (i134r1), Drinking Water System Components - Health Effects
This Standard establishes minimum health effects requirements for the chemical contaminants and impurities that are indirectly imparted to drinking water from products, components, and materials used in drinking water systems. This Standard does not establish performance, taste and odor, or microbial growth support requirements for drinking water system products, components, or materials.

ANSI/ NSF 62-2009 (i1), Drinking water distillation systems
Issue 1 - The proposed revision updates the scope, normative references, structural integrity requirements, performance indication devices (PID), test waters and instruction and information. Requirements not pertaining to distillers are being removed. The document has also been restructured to be consistent with the Drinking Water Treatment Unit family of Standards.

ANSI/ NSF 62-2009 (i15), Drinking water distillation systems
Issue 15 - To include a perchlorate claim and update maximum product water concentration for arsenic.

ANSI/ NSF 62-2012 (i22), Drinking water distillation systems
Issue 22: The proposed revision is to remove the component burst pressure test requirement from section 5 of the family of DWTU Standards.

ANSI/ NSF 62-2012 (i23), Drinking water distillation systems
The proposed revision will remove the retesting requirement for contaminants that exceed the non-health based advisory concentration under section 4.2.3.6.

ANSI/ NSF 62-2014 (i24), Drinking Water Distillation Systems
This standard establishes minimum materials, design and construction, and performance requirements for point-of-use and point-of-entry drinking water distillation systems and the components used in these systems. Distillation systems covered by this standard are designed to reduce specific chemical contaminants from potable drinking water supplies. Systems covered under this standard may also be designed to reduce microbiological contaminants, including bacteria, viruses, and cysts, from potable drinking water supplies. It is recognized that a system may be effective in controlling one or more of these contaminants, but systems are not required to control all.

ANSI/ NSF 62-2015 (i26r2), Drinking Water Distillation Systems
This standard establishes minimum materials, design and construction, and performance requirements for point-of-use and point-of-entry drinking water distillation systems and the components used in these systems. Distillation systems covered by this standard are designed to reduce specific chemical contaminants from potable drinking water supplies. Systems covered under this standard may also be designed to reduce microbiological contaminants, including bacteria, viruses, and cysts, from potable drinking water supplies. It is recognized that a system may be effective in controlling one or more of these contaminants, but systems are not required to control all.

ANSI/ NSF 62-2015 (i27), Drinking Water Distillation Systems
This standard establishes minimum materials, design and construction, and performance requirements for point-of-use and point-of-entry drinking water distillation systems and the components used in these systems. Distillation systems covered by this standard are designed to reduce specific chemical contaminants from potable drinking water supplies. Systems covered under this standard may also be designed to reduce microbiological contaminants, including bacteria, viruses, and cysts, from potable drinking water supplies. It is recognized that a system may be effective in controlling one or more of these contaminants, but systems are not required to control all.

ANSI/ NSF 62-2016 (i28r1), Drinking Water Distillation Systems
This standard establishes minimum materials, design and construction, and performance requirements for point-of-use and point-of-entry drinking water distillation systems and the components used in these systems. Distillation systems covered by this standard are designed to reduce specific chemical contaminants from potable drinking water supplies. Systems covered under this standard may also be designed to reduce microbiological contaminants, including bacteria, viruses, and cysts, from potable drinking water supplies. It is recognized that a system may be effective in controlling one or more of these contaminants, but systems are not required to control all.
ANSI/NSF 62-2016 (i30r1), NSF 62-2016 - Drinking Water Distillation Systems

This standard establishes minimum materials, design and construction, and performance requirements for point-of-use and point-of-entry drinking water distillation systems and the components used in these systems. Distillation systems covered by this standard are designed to reduce specific chemical contaminants from potable drinking water supplies. Systems covered under this standard may also be designed to reduce microbiological contaminants, including bacteria, viruses, and cysts, from potable drinking water supplies. It is recognized that a system may be effective in controlling one or more of these contaminants, but systems are not required to control all.

ANSI/NSF 62-2016 (i31r1), Drinking Water Distillation Systems

This standard establishes minimum materials, design and construction, and performance requirements for point-of-use and point-of-entry drinking water distillation systems and the components used in these systems. Distillation systems covered by this standard are designed to reduce specific chemical contaminants from potable drinking water supplies. Systems covered under this standard may also be designed to reduce microbiological contaminants, including bacteria, viruses, and cysts, from potable drinking water supplies. It is recognized that a system may be effective in controlling one or more of these contaminants, but systems are not required to control all.

ANSI/NSF 62-2017 (i32r1), Drinking Water Distillation Systems

This standard establishes minimum materials, design and construction, and performance requirements for point-of-use and point-of-entry drinking water distillation systems and the components used in these systems. Distillation systems covered by this standard are designed to reduce specific chemical contaminants from potable drinking water supplies. Systems covered under this standard may also be designed to reduce microbiological contaminants, including bacteria, viruses, and cysts, from potable drinking water supplies. It is recognized that a system may be effective in controlling one or more of these contaminants, but systems are not required to control all.

ANSI/NSF 7-2009 (i7), Commercial Refrigerators and freezers

Issue 7 - boilerplate updates in the family of food equipment standards; reference to NSF/ANSI 51 update; and addition of thermometer language in section 9.

ANSI/NSF 7-2009 (i7r2), Commercial Refrigerators and Freezers

Issue 7 - Boilerplate modifications and thermometer language update. Revision 2 includes changes proposed in 215r2 boilerplate modifications to the family of food equipment standards.

ANSI/NSF 7-2014 (i11r1), Commercial Refrigerators and Freezers

This Standard contains requirements for refrigerators and freezers used to store and/or display cold food. The types of refrigerators and freezers covered by this Standard include, but are not limited to: storage refrigerators (e.g., reach-in, under counter, walk-in, roll-in); storage freezers (e.g., reach-in, under counter, walk-in, roll-in); rapid pull-down refrigerators and freezers; refrigerated food transport cabinets; refrigerated buffet units; refrigerated food preparation units; display refrigerators; beverage coolers; and ice cream cabinets.

ANSI/NSF 7-2016 (i13r1), Commercial Refrigerators and Freezers

This Standard contains requirements for refrigerators and freezers used to store and/or display cold food. The types of refrigerators and freezers covered by this Standard include, but are not limited to: storage refrigerators (e.g., reach-in, under counter, walk-in, roll-in); storage freezers (e.g., reach-in, under counter, walk-in, roll-in); rapid pull-down refrigerators and freezers; refrigerated food transport cabinets; refrigerated buffet units; refrigerated food preparation units; display refrigerators; beverage coolers; and ice cream cabinets.

ANSI/NSF 7-2016 (i9r1), Commercial Refrigerators and Freezers

This Standard contains requirements for refrigerators and freezers used to store and/or display cold food. The types of refrigerators and freezers covered by this Standard include, but are not limited to: storage refrigerators (e.g., reach-in, under counter, walk-in, roll-in); storage freezers (e.g., reach-in, under counter, walk-in, roll-in); rapid pull-down refrigerators and freezers; refrigerated food transport cabinets; refrigerated buffet units; refrigerated food preparation units; display refrigerators; beverage coolers; and ice cream cabinets.

ANSI/NSF 8-2007 (i6), Commercial powered food preparation equipment

Issue 6 - To update the Normative References and boilerplate language in the Food Equipment family of Standards.

ANSI/NSF 8-2009 (i8), Commercial powered food preparation equipment

Issue 8 - Boilerplate revisions in the family of food equipment standards including normative references.

ANSI/NSF 8-2010 (i9), Commercial powered food preparation equipment

Issue 9 - The purpose of this ballot is to update the design and construction requirements for food slicers.

ANSI/NSF 8-2012 (i10), Commercial powered food preparation equipment

Issue 10 - The purpose of this ballot is to update the Normative References and boilerplate language in the Food Equipment family of Standards.

ANSI/NSF 8-2017 (i12r1), Commercial Powered Food Preparation Equipment

Equipment covered by this Standard includes, but is not limited to, coffee grinders, grinders, mixers, pasta makers, peelers, saws, slicers, tenders, and similar equipment.

ANSI/NSF BIFMA e3-2014 (i16r2), Sustainable Furniture

This sustainability standard is applicable to all business and institutional furniture; this includes but is not limited to moveable walls, systems furniture, desking systems, casegoods, tables, seating, and accessories. The Standard is also applicable to materials and components manufactured by suppliers to furniture manufacturers.

ANSI/NSF e3-2014 (i15r2), ANSI/BIFMA e3 Furniture Sustainability

This sustainability standard is applicable to all business and institutional furniture; this includes but is not limited to moveable walls, systems furniture, desking systems, casegoods, tables, seating, and accessories. The Standard is also applicable to materials and components manufactured by suppliers to furniture manufacturers.

Issue 2 - This ballot is proposed to reaffirm the Water Systems Council PST-2000 Pressurized Water Storage Tank Standard as required every five years by American National Standards Institute (ANSI). At this time, no revisions are being recommended to the Standard.

ANSI/NSF/BIFMA e3-2013 (i18r2), Furniture Sustainability

This sustainability standard is applicable to all business and institutional furniture; this includes but is not limited to moveable walls, systems furniture, desking systems, casegoods, tables, seating, and accessories. The Standard is also applicable to materials and components manufactured by suppliers to furniture manufacturers.

ANSI/NSF/GCI 355-2011, Greener Chemicals and Processes Information Standard

Issue 1 - Revision 2: The purpose of this ballot is to create a new standard to provide the chemical enterprise with a voluntary and standardized way to define and report the primary categories of information, their respective data elements, and data quality objectives. This information will be provided by suppliers to communicate clearly, with transparency and consistency, to help customers evaluate the relative greenness of a chemical product and process over its life cycle.

ANSI/NSF/IPEC 363-2014 (i1), Good Manufacturing Practices (GMP) for Pharmaceutical Excipients

This Standard is intended to define Good Manufacturing Practices (GMP) for excipient manufacture and distribution for use in drug products. It sets minimum requirements for GMP applicable to all commercially available excipients.


Establishes guiding principles for the development and use of environmental labels and declarations.

ANSI/NSF/ISO 14021-2001, Environmental Labels and Declarations - Self-Declared Environmental Claims (Type II Environmental Labelling)

Specifies requirements for self-declared environmental claims, including statements, symbols and graphics, regarding products. It further describes selected terms commonly used in environmental claims and gives qualifications for their use. This standard also describes a general evaluation and verification methodology for self-declared environmental claims and specific evaluation and verification methods for the selected claims in this standard.

ANSI/NSF/ISO 14024-2001, Environmental Labels and Declarations - Type I Environmental Labelling - Principles and Procedures

Establishes the principles and procedures for developing Type I environmental labelling programmes, including the selection of product categories, product environmental criteria and product function characteristics; and for assessing and demonstrating compliance. This standard also establishes the certification procedures for awarding the label. A Type I environmental labelling programme is a voluntary, multiple-criteria-based third party programme that awards a license which authorizes the use of environmental labels on products indicating overall environmental preferablety of a product within a particular product category based on life cycle considerations.

ANSI/WSC PST 2000-2016 , WSC Standard for Pressurized Water Storage Tank

This standard prescribes minimum performance and construction requirements for pressurized storage tanks for service in water well systems with a maximum factory pre-charge pressure of 40 psig (280 kPa), to be operated in ambient air temperatures up to 120 °F (49 °C), with maximum working pressures not less than 75 psig (520 kPa) and not greater than 150 psig (1000 kPa) and tank volumes not exceeding 120 gallons (450 L).

BSR/NSF 40-201X (i29r1), NSF/ANSI 40

Residential Wastewater Treatment Systems

This Standard contains minimum requirements for residential wastewater treatment systems having rated treatment capacities between 1514 L/day (400 gal/day) and 5678 L/day (1500 gal/day). Management methods for the treated effluent discharged from residential wastewater treatment systems are not addressed by this Standard.

NW&RA (ASC Z245) (National Waste & Recycling Association)


The scope of this revision is to clarify some aspects related to the stand up drive position.

ANSI Z245.2-2013, Stationary Compactors - Safety Requirements for Installation, Maintenance, Operation, Modification and Repair

Standard revises ANSI Z245.2-2008 safety requirements for the installation, operation, maintenance, service, repair, modification and reconstruction of stationary compacting equipment. The requirements of this standard apply to stationary compactors rated at 600 volts or less, for outdoor or indoor use, and are employed in accordance with the manufacturer's written installation, operation, and maintenance instructions and procedures. This standard does not apply to compactors intended for use in private homes. This standard does not apply to mobile landfill compactors and compactor-type equipment that is operational when permanently mounted on trucks or other vehicles.

ANSI Z245.21-2013, Equipment Technology and Operations for Wastes and Recyclable Materials - Stationary Compactors -- Safety Requirements for Installation, Maintenance and Operation

Provides safety requirements with respect to the design and construction of stationary compacting equipment. Provides requirements to minimize the risk of fire, electrical shock and injury to persons during operation and maintenance of stationary compacting equipment for use with wastes and recyclable materials by commercial businesses, apartment buildings, industrial plants, waste processing facilities, waste disposal and transfer industries, and recycling facilities.


Establishes safety requirements with respect to the manufacture, reconstruction, use, modification, maintenance, service, operation, and installation (where applicable) of containers, two-wheeled carts, and two-wheeled cart lifters use for the collection, transportation and recycling of solid wastes.


Establishes safety requirements with respect to the design, manufacture, installation, reconstruction, modification, maintenance, and operation of facilities for the processing of commingled recyclable materials. It does not cover other types of facilities such as, waste-to-energy plants, scrap processing facilities, transfer stations, or mixed waste processing facilities, unless there is a commingled processing operation as part of these facilities.

Establishes safety requirements for the design, manufacture, construction, modification, maintenance and operation of waste transfer stations used in the collection, storage, and the eventual transportation of commingled wastes and recyclable materials.

ANSI Z245.5-2013, Equipment Technology and Operations for Wastes and Recyclable Materials - Baling Equipment -- Safety Requirements for Installation, Maintenance and Operation

Provides safety requirements with respect to the installation, operation, maintenance, service, repair, modification, and reconstruction (where applicable) of baling equipment. Applies to baling equipment rated at 600 volts or less, for outdoor or indoor use, and are employed in accordance with the manufacturer’s installation, operation, and maintenance instructions and procedures.


Provides safety requirements with respect to the design and construction of baling equipment. Provides requirements to minimize the risk of fire, electrical shock and injury to persons during operation and maintenance of baling equipment for use with wastes and recyclable materials by commercial businesses, apartment buildings, industrial plants, waste processing facilities, waste disposal and transfer industries, and recycling facilities. Requirements apply to balers rated at 600 volts or less, for outdoor or indoor use, and are employed in accordance with the manufacturer’s installation, operation, and maintenance instructions and procedures.


Establishes dimensional requirements for all waste containers commonly used in the collection, compaction and transportation of solid waste and recyclables in residential, commercial and industrial applications. Specified labeling will assist the users of such equipment in identifying that a container so marked is compatible with a lifting device designed to accommodate containers of the same type. The revision includes dimensions for Type L (hook-lift) and Type S (front loader) containers.

NWRA (National Windshield Repair Association)

ANSI/NWRA/ROLAGS 001-2013, Repair of Laminated Automotive Glass Standard

Updates the Standard for Repair of Auto Glass (previously known as ANSI NGA R.1 - 2007) and redesignates it. Adds product performance specifications.

OEOSC (ASC OP) (Optics and Electro-Optics Standards Council)

ANSI OEOSC OP1.002-2017, for Optics and Electro-Optical Instruments - Optical Elements and Assemblies - Surface Imperfections

(30-Day Public Comment Period: Announcement of Limited Substantive Changes to an Approved American National Standard) This page replaces Page 4 in ANSI/OEOSC OP1.002-2016. The standard establishes uniform practices for stating and interpreting tolerances and for conducting inspections of transmissive and reflective optical elements and cemented components for scratch, dig, edge, coating, and optical cement imperfections. Default specifications for bubbles and inclusions are also included.

ANSI/OEOSC OP1.0110-1-2011, Optics and Electro-Optical Instruments - Preparation of drawings for optical elements and systems - Part 1: General

ISO&160:10110 specifies the presentation of design and functional requirements for optical elements and systems in technical drawings used for manufacturing and inspection. This part of ISO&160:10110 specifies the presentation in drawings of the characteristics, especially the tolerances, of optical elements and systems. Rules for preparation of technical drawings as well as for dimensioning and tolerancing are given in various International Standards. These general standards apply to optical elements and systems only if the necessary rules are not given in the various parts of ISO&160:10110.

ANSI/OEOSC OP1.0110-10-2014, Standard for Optics and Electro-Optical Instruments - Preparation of drawings for optical elements and systems - Part:10 Table representing data of optical elements and cemented assemblies

OP1.0110-10 is a national standard which establishes uniform practices for drawing notations in tabular form for optical elements and assemblies. It is based entirely on ISO 10110-10, but modified to accommodate standard practice in the United States.

ANSI/OEOSC OP1.0110-12-2014, Optics and Electro-Optical Instruments - Preparation of Drawings for Optical Elements and Systems - Part 12: Aspheric Surfaces

This national standard establishes uniform practices for indications on drawings of aspheric optical surfaces. It is based entirely on ISO 10110-12, with the addition of a notation to allow the specification of Forbes aspheres, commonly called Qcon and Qbfs.

ANSI/OEOSC OP1.0110-5:2015, Standard for Optics and Photonics - Preparation of Drawings for Optical Elements and Systems - Part 5: Surface Form Tolerances

This Standard specifies terms, definitions, and methods necessary to specify the properties of optical surface and wavefront errors by statistical methods. This standard applies to surfaces that are intrinsically very smooth, that have few isolated asperities with amplitudes beyond several standard deviations from the average that can be excluded from the analysis. It departs from previous surface texture specifications in that it describes surface properties primarily in Fourier frequency space rather than in coordinate space.

ANSI/OEOSC OP1.0110-8:2014, American National Standard for Optics and Electro-Optical Instruments - Preparation of Drawings for Optical Elements and Systems - Part 8: Surface Texture; Roughness and Waviness

The ISO 10110 series specifies the presentation of design and functional requirements for optical elements in technical drawings used for manufacturing and inspection. This part of ISO 10110 specifies rules for specifying and tolerancing surface roughness and waviness on optical elements. This part of ISO 10110 does not specify the method by which compliance with the specifications is to be tested.

ANSI/OEOSC OP1.0110-9:2015, Standard For Optics and Photonics - Preparation of Drawings for Optical Elements and Systems - Part 9: Surface treatment and coatings

OP1.0110 specifies the presentation of design and functional requirements for optical elements and systems in technical drawings used for manufacturing and inspection. This part of OP1.0110 specifies rules for indicating the treatments and coatings applied to optical surfaces for functional and/or protective purposes.

ANSI/OEOSC OP1.9211-4-2014, Standard For Optics and Photonics - Optical Coatings - Part 4: Specific Test Methods

ISO 9211 identifies surface treatments of components and substrates excluding ophthalmic optics (spectacles) by the application of optical coatings and gives a standard form for their specification. It defines the general characteristics and the test and measurement methods whenever necessary, but is not intended to define the process method. This part of ISO 9211 provides specific test methods for optical coatings.

ANSI/OEOSC OP3.001-2001 (R2014), Standard For Optics and Electro-Optical Instruments - Optical Glass

This Standard establishes uniform practices for stating and interpreting specifications, tolerances, and functional requirements for optical glass that is used to fabricate lenses and other optical elements, such as prisms, windows, light pipes, etc., used in optical assemblies, systems, instruments, or other related uses.
OPEI (Outdoor Power Equipment Institute)

ANSI/OPEI B175.1-2012, Outdoor Power Equipment - Internal Combustion Engine-Powered Hand-Held Chain Saws - Safety and Environmental Requirements

To establish safety and environmental requirements for internal combustion engine-powered chain saws and replacement saw chains for use primarily in cutting wood.

ANSI/OPEI B175.1-2012/A1-2014, Internal Combustion Engine-Powered Handheld Chain Saws - Safety and Environmental Requirements - Amendment 1

Addenda to address revisions to implementation terms in Scope, clarify section 3.31 Table 1 regarding guide bars definition, clarify section 5.11.2.5 regarding guide bars for kickback testing and clarifying sections 8.8.4.1 and D.2.2 intent.

ANSI/OPEI B175.2-2012, Outdoor Power Equipment - Internal Combustion Engine-Powered Hand-Held and Backpack Blowers and Blower-Vacuums - Safety Requirements and Performance Testing Procedures

To establish manufacturer requirements to reduce the risk of injury associated with the use of hand-held and backpack internal combustion engine-powered blowers and blower-vacuums and to measure bystander sound pressure levels at 15 meters (50 feet). This standard does not apply to ride-on, towed, walk-behind units, or electrically powered units.

ANSI/OPEI B175.2-2012/A1-2013, Internal Combustion Engine-Powered Handled and Backpack Blowers and Blower-Vacuums - Safety Requirements and Performance Testing Procedures - Amendment 1

Addenda to address revisions to Implementation Terms and Standard identification in Scope. Probe Test for Power Driven Components, Probe Test for Hot Surfaces, UV Resistance, Equivalent Vibration Equation and Performance Testing Procedures of ANSI/OPEI B175.2-2012

ANSI/OPEI B175.3-2013, Outdoor Power Equipment - Internal Combustion Engine-Powered Hand-Held Grass Trimmers and Brushcutters - Safety and Environmental Requirements

Re-balloting of standard to accommodate changes made after the initial round of comments and balloting.

ANSI/OPEI B175.4-2013, Outdoor Power Equipment - Portable, Hand-Held, Internal Combustion Engine-Powered Cut-Off Machines - Safety and Environmental Requirements

Re-balloting of standard to accommodate changes made after the initial round of comments and balloting.


The safety specifications given in this standard are for powered a) reel and rotary pedestrian-controlled lawn mowers, b) reel and rotary ride-on lawn mowers, c) ride-on lawn tractors with mower attachments, d) ride-on lawn and garden tractors with mower attachments, e) lever-steer and zero-turn ride-on mowers.

ANSI/OPEI B175.10-2013, Off-Road Ground-Supported Outdoor Power Equipment - Gasoline Fuel Systems - Performance Specifications and Test Procedures

Re-balloting of standard to accommodate changes made after the initial round of comments and balloting.

ANSI/OPEI B175.3-2014, Snow Throwers - Safety Specifications

The specifications in this standard apply to (a) walk-behind power snow throwers, (b) ride-on power snow throwers, (c) lawn ride-on tractors with snow thrower attachments, (d) lawn and garden tractors with snow thrower attachments, and (e) lever-steer ride-on machines with snow thrower attachments. These specifications are not intended to apply to hand-held snow throwers nor to airport, highway, and agricultural types of snow removal machines and equipment. This standard does not cover all of the specifications that apply to electrically-powered snow throwers.

ANSI/OPEI B175.4-2017, Commercial Turf Care Equipment - Safety Specifications

The safety specifications given in this standard are for powered (a) pedestrian-controlled machines, (b) ride-on machines and (c) implements for use with pedestrian and ride-on machines intended for marketing as commercial turf care equipment and that are customarily used by hired operators.

ANSI/OPEI B71.8-2016, Powered Walk-Behind Rotary Tillers and Hand-Supported Cultivators - Safety Specifications

The requirements provided in this standard are for powered walk-behind rotary tillers and hand-supported cultivators. This standard is intended to provide safety and design requirements to help ensure uniform operator environments, exclusive of the power source. This standard shall apply to machines specifically marketed for consumer / personal use.

ANSI/OPEI B71.9-2016, Multipurpose Off-Highway Utility Vehicles

This standard establishes requirements for equipment, configuration, and performance of Multipurpose Off-Highway Utility Vehicles (MOHUVs). MOHUVs are vehicles having features specifically intended for utility use and having the following characteristics: (a) intended to transport a person(s) and/or cargo, with a top speed in excess of 25 mph (40.2 km/h); (b) 2030 mm (80 in) or less in overall width; (c) designed to travel on four or more wheels; (d) using a steering wheel for steering control; (e) with a non-straddle seat; (f) with a Gross Vehicle Weight Rating of no more than 1814 kg (4000 lb), and (g) a minimum cargo capacity of 159 kg (350 lb).

PGMA (Portable Generator Manufacturers Association)

ANSI/PGMA G300-2015, Safety and Performance of Portable Generators

This standard applies to 15 kW or smaller; single phase; 300 V or lower; 60 hertz; gasoline, liquefied petroleum gas (LPG) and diesel engine driven portable generators intended for multiple use and intended to be moved, though not necessarily with wheels. Permanent stationary generators, 50 hertz generators, marine generators, trailer mounted generators, generators in motor homes, generators intended to be pulled by vehicles, engine driven welding power sources and portable generators with AC output circuits that are not compatible with NEMA receptacles are not covered.

PLASTICS (Plastics Industry Association)

ANSI/PLASTICS B151.1-2017, Safety Requirements for Plastics Injection Molding Machines

The requirements of this standard apply to Horizontal and Vertical Clamp Injection Molding Machines (HCIMMs and VCIMMs) that process plastic materials and inject said material into a mold(s) held closed by the acting clamp.

ANSI/SPi B151.20-2013, Safety Requirements for Plastic Sheet Production Machinery

The requirements of this standard shall apply to plastic sheet production machinery. This standard also specifies safety requirements relating to the design and construction of multi-roll calenders intended for the processing of plastics and concerns the calender including all components fixed to its frame. Safety requirements of ancillary equipment used with plastic sheet production machinery are not covered by this standard.

ANSI/SPi B151.27-2013, Safety Requirements for the Integration of Robots with Injection Molding Machines

The requirements of this standard apply to all robots used on or in conjunction with horizontal and vertical injection molding machines (IMMs). The purpose of this standard is to establish recommended safe practices and procedures for the integration, care, and use of robots entering the mold area of horizontal and vertical IMM(s). Procedures for automatic mold changers and other ancillary equipment are not included in this standard.
ANSI/SPI B151.31-2014, Safety Requirements for the Manufacture and Use of Blow Molding Machines

The requirements of this standard shall apply to the manufacture and use of all Blow Molding Machines (BMMs) that process plastic materials to: - blow a parison; - blow a preform (including injection blow, injection stretch blow, and reheat & blow) into the shape of a mold cavity held together by a vertically or horizontally acting clamp(s), and includes: - Extrusion Blow Molding Machines; - Injection Stretch Blow Molding Machines; - Injection Blow Molding Machines; - Reheat & Blow Molding Machines. Safety requirements for the manufacture or use of ancillary equipment for Blow Molding Machines is not covered by this standard.

ANSI/SPI B151.7-2013, Safety Requirements for Extrusion Machines

The requirements of this standard shall apply to extrusion machines that are used in the plastics industry. Extrusion machinery suppliers and users shall use the risk assessment process in the manufacture, care, and use of the machinery. Deviations from the requirements of this standard shall be based on a documented risk assessment. Safety requirements of ancillary equipment used with extrusion machines are not covered by this standard.

PLATO (Portable Lights American Trade Organization)

ANSI/PLATO FL 1-2016, Flashlight Basic Performance Standard

This Standards Publication covers basic performance characteristics of hand-held/portable flashlights, spotlights, and headlamps providing directional lighting.

PMMI (Organization) (Project Management Institute)

ANSI/PMMI B155.1-2016, Safety Requirements for Packaging and Processing Machinery

The standard specifies basic principles and methodology for achieving safety in the design and the use of machinery based on risk assessment. The requirements of this standard apply to new, modified or rebuilt industrial and commercial: - processing machinery used to produce food, beverage and pharmaceutical products; - packaging machinery that performs packaging functions for primary, secondary, and tertiary (transport / distribution) packaging; - coordination of the packaging functions that take place on the production line; and - packaging-related converting machinery.

PRCA (Professional Ropes Course Association)

ANSI/PRCA 1.1-3-2014, Ropes Challenge Course Installation, Operation & Training Standards

Establishes safety requirements for the design, manufacture, performance, construction, inspection, maintenance, removal from service, qualification, instruction, training, use and operation of components, subsystems, systems and courses utilized by the ropes challenge course industry including permanent temporary or mobile portable and fixed low-ropes challenge course elements, high ropes challenge course elements, standalone challenge elements, zip lines, canopy tours, adventure courses and any climbing walls, and climbing structures that are components of a ropes challenge course.

PSAI (Portable Sanitation Association)


Updated and included relevant industry information for consumers, operators and suppliers in the portable sanitation industry. Ready to be reviewed and start canvass surveys.


The Standard for Portfolio Management - Third Edition provides guidelines for managing programs within an organization. It defines program management and related concepts, describes the program management life cycle and outlines related processes.


This new standard replaces the former ANSI Z4.3-2005. Following prior public comment and vote of the consensus body it was determined that a few changes to language pertaining to hand wash station requirements and disposal of wastewater were needed. Other wording changes were made for clarity in the language.

ANSI/PSAI AE-1-2016, Sanitation in Fields and Temporary Labor Camps: Minimum Requirements

This new standard replaces the former ANSI Z4.4-2005. Following prior public comment and vote of the consensus body it was determined that a few changes to language pertaining to hand wash station requirements were needed.

RESNA (Rehabilitation Engineering and Assistive Technology Society of North America)


This standard includes requirements and test methods for adaptive winter sports equipment (sit-skis, mono-skis, and bi-skis). Additional sections pertaining to other types of winter adaptive sports equipment will be developed and incorporated with future revisions.


NGCMA Z130.1-2004 provides Safety and Performance Specifications for Golf Carts. Adaptive golf cars are similar to standard golf cars in many respects but have hand controls, a swivel seat and the golfer swings the golf club while sitting in the adaptive golf car. This creates numerous safety issues not addressed by NGCMA Z130.1-2004 that need to be resolved.


This standard addresses the accessibility of technologies identified as priorities for people with cognitive impairments, which includes cell phones, microwave ovens, and fire extinguishers. The initial focus will be on the accessibility of devices, generally excluding software products, services, or web-page design. This standard is intended to increase access to a variety of products for people with cognitive impairments. This standard reports measureable and functional characteristics of products to assist users in determining if the product will meet their specific needs. Using this standard does not preclude meeting other applicable standards and test methods.

This standard applies to powered wheelchairs, including scooters, and accessories for wheelchairs and scooters. It specifies test methods and requirements for: dynamic stability; brake effectiveness; energy consumption; maximum speed, acceleration and deceleration; obstacle climbing ability; climatic testing; power and control system; and electromagnetic compatibility.

ANSI/RESNA WC-3-2013, RESNA American National Standard for Wheelchairs - Volume 3: Wheelchair Seating

Wheelchair seating as a sub-specialty of rehabilitation services involves the selection and provision of wheelchair seating products to provide improved body support to the wheelchair user. This standard applies to all wheelchair seating and postural devices. It specifies test methods or methods of measurement for: vocabulary; the physical and mechanical characteristics; and static, impact and load strength testing.

RESNET (Residential Energy Services Network, Inc.)

ANSI/RESNET 1201-2016, Standard Method of Test for the Evaluation of Building Energy Analysis Model Calibration Methods

This standard test procedure applies to calibration methods used with computer programs that predict the energy performance of buildings.


The proposed addenda to standard ANSI/RESNET 301-2014 will modify the calculation of domestic hot water heating energy as it affects the Home Energy Rating System Index score of a home.


The proposed addendum to standard ANSI/RESNET 301-2014 will modify section 5.2 on Innovative Design Requests. Editorial changes are made to replace HERS with Energy Rating in the title and throughout the standard.


For residential buildings, the proposed standard will identify the metrics, tolerances, procedures, calculations and the required documentation to: (1) Calculate the standard energy use of a home, (2) Determine the HERS Index score of a home, (3) Define the minimum rated features of a home, (4) Calculate the retrofit savings for existing homes, (5) Calculate the cost effectiveness of energy improvements to a home (6) Label the certified energy performance of a home.


This proposed standard is applicable to all single family dwelling units and all multifamily dwelling units in buildings three stories or less in height above ground. The standard defines procedures for measuring the air leakage of building enclosures, the air leakage of heating and cooling air distribution systems, and the airflow of mechanical ventilation systems and is to be used when evaluating the energy performance of residential buildings. The proposed standard complements and references other American National Standards.

RIA (Robotics Industries Association)

ANSI/RIA R15.06-2012, Industrial Robots and Robot Systems - Safety Requirements

Requirements for the safety of personnel using industrial robots and robot systems. Safety requirements for the manufacture, integration, installation and use of industrial robots and robot systems. Identifies hazards and provides guidance on mitigating them using protective measures and design principles.

RIC (Remanufacturing Industries Council)

ANSI/RIC 001.1-2016, Specifications for the Process of Remanufacturing

This standard defines and provides a benchmark for the process of remanufacturing, and establishes specifications that characterize the remanufacturing process and differentiate remanufacturing from other practices. The specifications in this standard will promote continual improvement in the remanufacturing process and ensure that the products provided to customers by the remanufacturing industry are dependable and of a consistent high quality. This standard is intended to serve as a baseline for additional standards for specific remanufactured products and product groups to be developed in the future.
ROHVA (Recreational Off-Highway Vehicle Association)

ANSI/ROHVA 1-2016, Standard for Recreational Off-Highway Vehicles

This standard establishes minimum requirements for recreational off-highway vehicles (ROVs). These vehicles are intended by the manufacturer for recreational use by one or more persons and may have secondary general utility applications. This standard addresses design, configuration and performance aspects of ROVs, including, among other items, requirements for accelerator, clutch and gearshift controls; engine controls; lighting; tires; service and parking brake/parking mechanism performance; lateral and pitch stability; occupant handholds; Roll Over Protective Structure (ROPS); Occupant Retention System (ORS); and requirements for safety labels and owner’s manual.

RVIA (Recreational Vehicle Industry Association)

ANSI A119.5-2015, Standard for Park Model Recreational Vehicles

This standard covers the fire and life safety criteria and plumbing for Recreational Park Trailers considered necessary to provide a reasonable level of protection from loss of life from fire and explosion. It reflects situations and the state of the art prevalent at the time the Standard was issued.

RVIA EGS-1-2013, Engine Generator Sets for Recreational Vehicle Requirements

This standard sets forth safety requirements and standards for engine generators having a continuous rating of 20 kilowatts or less, intended for installation and operation in recreational vehicles and similar mobile applications. It is not intended to apply to emergency or standby generators (i.e., standby generators, generators with integral fuel tanks), welding generators, farm lighting plants, variable speed generators for railroad car installations, military specification engine generators, marine use, or similar specialized equipment. Included in this standard are recommended safety measures for installations, use and care.

RVIA LV-2017, Standard for Low Voltage Systems in Conversion and Recreational Vehicles

This standard covers the installation of low voltage electrical systems and devices within conversion and recreational vehicles. In the absence of specific instructions from the automotive OEM, this standard also covers any additions, deletions, or modifications to any part of the original equipment chassis manufacturer’s electrical system.

RVIA TSIC-1-2008 (R2013), Recommended Practice Process Controls for Assembly of Wheels on Trailers

This Recommended Practice identifies and defines the significant factors required for trailer wheel assembly process and systematic control. The proper assembly of wheels on trailers is of critical importance to consumer safety. The improper attachment of a wheel to an axle may lead to the loss of the wheel in service. This document provides information on the recommended design and assembly of trailer wheel components and control processes intended to improve trailer reliability and enhance consumer safety.

RVIA UPA-1-2014, Uniform Plan Approval for Recreational Vehicles

This standard covers minimum plan approval requirements to ensure a reasonable degree of safety and health for occupants using recreational vehicles.

SAAMI (Sporting Arms and Ammunition Manufacturers Institute)

ANSI/SAAMI Z299.1-2015, Voluntary Industry Performance Standards for Pressure and Velocity of Centerfire Rifle Sporting Ammunition for Use by Commercial Manufacturers

This standard for Centerfire Rifle Ammunition was first published in 1981. Subsequently it was revised on five year intervals, in keeping with ANSI policy, through 1992. In accordance with ANSI Essential Requirements and to capture the changes in technology, the addition of new load offerings, amendments to process and protocol and recommended equipment sources since the last revision, a new ANSI is being created. The material presented provides the commercial manufacturer of factory loaded ammunition with Pressure and velocity performance and dimensional characteristics. Included are procedures and equipment requirements for determining these criteria.

ANSI/SAAMI Z299.2-2015, Voluntary Industry Performance Standards for Pressure and Velocity of Shotshell Ammunition for Use by Commercial Manufacturers

This standard for Shotshell Ammunition was first published in 1977. Subsequently it was revised on five year intervals, in keeping with ANSI policy, through 1992. In accordance with ANSI Essential Requirements and to capture the changes in technology, the addition of new load offerings, amendments to process and protocol and recommended equipment sources since the last revision, a new ANSI is being created. The material presented provides the commercial manufacturer of factory loaded ammunition with Pressure and velocity performance and dimensional characteristics. Included are procedures and equipment requirements for determining these criteria.

ANSI/SAAMI Z299.3-2015, Voluntary Industry Performance Standards for Pressure and Velocity of Centerfire Pistol and Revolver Ammunition for Use by Commercial Manufacturers

This standard for Centerfire Pistol and Revolver Ammunition was first published in 1979. Subsequently it was revised on five year intervals, in keeping with ANSI policy, through 1993. In accordance with ANSI Essential Requirements and to capture the changes in technology, the addition of new load offerings, amendments to process and protocol and recommended equipment sources since the last revision, a new ANSI is being created. The material presented provides the commercial manufacturer of factory loaded ammunition with Pressure and velocity performance and dimensional characteristics. Included are procedures and equipment requirements for determining these criteria.

ANSI/SAAMI Z299.4-2015, Voluntary Industry Performance Standards for Pressure and Velocity of Centerfire Rifle Sporting Ammunition for Use by Commercial Manufacturers

This standard for Centerfire Rifle Ammunition was first published in 1981. Subsequently it was revised on five year intervals, in keeping with ANSI policy, through 1992. In accordance with ANSI Essential Requirements and to capture the changes in technology, the addition of new load offerings, amendments to process and protocol and recommended equipment sources since the last revision, a new ANSI is being created. The material presented provides the commercial manufacturer of factory loaded ammunition with Pressure and velocity performance and dimensional characteristics. Included are procedures and equipment requirements for determining these criteria.


This Voluntary Industry Performance Standard provides procedures for evaluating new sporting firearms designs and applies to rifle, shotguns, pistols and revolvers. In the interest of safety these tests are structured to demonstrate to the designer of new firearms that the product will be resistant to abusive mishandling. These procedures are specifically understood not to apply to muzzle loading and black powder firearms of any type.

SAE (SAE International)

ANSI/GEIA 859-2009, Data Management

Standard addresses data management, and is principles-based. Includes several annexes of associated information. Since the standard was developed, significant new developments have occurred in DM, advancing it to the information technology realm. Purpose of standard revision is to update the current standard with new information, and to include updated methods and processes.
ANSI/SAE J1388-2009, Personnel Protection - Skid Steer Loaders

Intended to provide personnel protection guidelines for skid steer loaders. This document is intended as a guide towards standards practice, but may be subject to frequent change to keep pace with experience and technical advances. This should be kept in mind when considering its use. This document provides performance criteria for newly manufactured loaders and it is not intended for in-service machines.

ANSI/SAE/ISO 9244-2009, Earth Moving Machinery - Safety Signs - General Principles

This International Standard establishes general principles for the design and application of safety signs permanently affixed to earth-moving machinery as defined in ISO 6165. This International Standard outlines safety sign objectives, describes the basic safety sign formats, specifies colours for safety signs, and provides guidance on developing the various panels that together constitute a safety sign.

ANSI/SAE/ISO 9244-2010, Earth Moving Machinery - Product Safety Labels - General Principles

This International Standard establishes general principles and gives requirements for the design and application of machine safety labels to be permanently affixed to earth-moving machinery as defined in ISO 6165. It outlines the objectives of signage, describes basic formats, specifies colours and provides guidance on developing the various panels that together constitute a label.

SAIA (ASC A92) (Scaffold & Access Industry Association)

ANSI A92.7-2014, Standard for Airline Ground Support Vehicle-Mounted Vertical Lift Devices

This standard applies to airline ground support vehicle mounted vertical lift devices specifically designed for servicing aircraft while outdoors on a paved airport ramp surface. The chassis may be either a commercial type vehicle or one custom designed to accommodate the vertical lift structures.

ANSI/SAIA A92.9-2011 (R2017), Standard for Mast-Climbing Work Platforms

This standard applies to Mast Climbing Work Platforms that are primarily used to position personnel, along with their necessary tools and materials, to perform their work. Platforms may be adjustable by manual or powered means.

ANSI/SAIA A92.10-2009 (R2014), Standard for Transport Platforms

This standard applies to Transport Platforms that are primarily used as a tool of the trade to vertically transport authorized persons, along with materials and necessary tools, to various access levels on a building or structure for construction, renovation, maintenance or other types of work.

ANSI/SIA A92.2-2015, Standard for Vehicle-Mounted Elevating and Rotating Aerial Devices

This standard applies to the establishment of criteria for design, manufacture, testing, inspection, installation, maintenance, use, training, and operation of vehicle-mounted aerial devices, primarily used to position personnel, installed on a chassis to achieve the following objectives: (1) Prevention of personal injuries and accidents. (2) Uniformity in ratings. (3) Understanding by manufacturers, dealers, brokers, installers, lessees, lessors, maintenance personnel, operators, owners, and users of their respective responsibilities.

ANSI/SIA A92.3-2006 (R2014), Standard for Manually Propelled Elevating Aerial Platforms

This standard applies to manually propelled, integral chassis aerial platforms having a platform that cannot be positioned completely beyond the base and are used to position personnel, along with their necessary tools and materials, at work locations. Platforms are adjustable by manual or powered means and shall not be occupied when moved horizontally.

ANSI/SIA A92.5-2006 (R2014), Standard for Boom-Supported Elevating Work Platforms

This standard applies to self-propelled integral chassis aerial platforms having a platform that can be positioned completely beyond the base and are used to position personnel, along with their necessary tools and materials, at work locations. Aerial platforms are power operated with primary functions, including drive, controlled from the platform. Such aerial platforms are intended to be occupied when driven.

ANSI/SIA A92.6-2006 (R2014), Standard for Self-Propelled Elevating Work Platforms

This standard applies to self-propelled integral chassis aerial platforms having a platform that cannot be positioned completely beyond the base and are used to position personnel, along with their necessary tools and materials, at work locations. Aerial platforms are power operated with primary functions including drive controlled from the platform.

ANSI/SIA A92.8-2006 (R2011), Vehicle-Mounted Bridge Inspection and Maintenance Devices

This Standard applies to mobile units capable of positioning a platform alongside or beneath a bridge deck or equivalent structure while being supported from such structure and are used to position personnel, along with their necessary tools and materials, at work locations.

ANSLI/SBCA FS 100-2012, Standard Requirements for Wind Pressure Resistance of Foam Plastic Insulating Sheathing Used in Exterior Wall Covering Assemblies

This standard establishes wind pressure resistance requirements for Foam Plastic Insulating Sheathing (FPIS) products used as exterior wall sheathing, including use as continuous insulation in exterior wall covering assemblies for the purpose of demonstrating wind pressure performance. This includes performance testing, analysis and quality control procedures.

SCITE (Society of Cable Telecommunications Engineers)

ANSI/SCITE 01-2016, Specification for "F" Port, Female, Outdoor

1. Scope The purpose of this document is to specify requirements for female outdoor 'F'&#8221; ports that are used in the 75-ohm RF broadband communications industry and that interface with 'F'&#8221; Male connectors as defined by ANSI/SCITE 123 2011 and ANSI/SCITE 124 2011.

ANSI/SCITE 02-2016, Specification for "F" Port, Female, Indoor

The purpose of this document is to specify requirements for female indoor 'F'&#8221; ports that are used in the 75-ohm RF broadband communications industry and that interface with 'F'&#8221; Male connectors as defined by ANSI/SCITE 123 and ANSI/SCITE 124.

ANSI/SCITE 03-2008, Test Method for Coaxial Cable Structural Return Loss

The purpose of this procedure is to provide instructions to measure cable structural return loss (SRL). There are two test methods presented, as the accuracy, ease-of-use, and required test equipment differs for each test method.

ANSI/SCITE 04-2014, Test Method for "F" Connector Return Loss

The purpose of this standard is to provide a test method for measuring return loss of "F" Male Connectors with Cable in the frequency range of 5 MHz to 1002 MHz by utilizing the time domain-gating feature of the network analyzer.

ANSI/SCITE 05-2014, Test Method for "F" Connector Return Loss In-Line Pair

The purpose of this procedure is to provide instructions to measure the Return Loss characteristics of a pair of type 'F' connectors and the cable interface, inserted in the middle of a cable, from 5 MHz to 1002 MHz. This test method makes use of the time domain gating feature of the network analyzer to remove the near end and far end test set connector effects from a type 'F' pair in the middle of the cable, joined by a type F (female) - type F (female) adapter.
ANSI/SCTE 06-2015, Composite Distortion Measurements (CSO & CTB)
This document describes a test procedure for the laboratory and production measurement of composite distortion products. There are two types of composite distortions considered: Composite Second Order and Composite Triple Beat. In order to obtain a stable, repeatable measurement, this test procedure describes testing performed with continuous wave (CW) carriers.

ANSI/SCTE 07-2013, Digital Transmission Standard for Cable Television
This standard describes the framing structure, channel coding, and channel modulation for a digital multi-service television distribution system that is specific to a cable channel. The system can be used transparently with the distribution from a satellite channel, as many cable systems are fed directly from satellite links.

ANSI/SCTE 09-2016, Test Method for Cold Bend
The purpose of this procedure is to provide instructions on testing the cold bend properties of flexible outdoor polyvinyl chloride (PVC) or polyethylene (PE) cable.

ANSI/SCTE 10-2014, Test Method for Flexible Coaxial Cable Impact
This test is to establish that specified outdoor flexible RF coaxial drop cable jackets are capable of low temperature characteristics.

ANSI/SCTE 100-2010, Specification for 75 Ohm Smooth Aluminum Subscriber Access Cable
This specification applies to the material, electrical and mechanical properties of seventy-five ohm smooth aluminum outer conductor coaxial cables as defined herein. Seventy-five ohm smooth aluminum outer conductor coaxial cables are used to distribute radio frequency (R.F.) signals and power for voice, data, and video applications as applicable.

ANSI/SCTE 101-2011, Hard Line Splice Connector Return Loss
This document describes a procedure to measure the Return Loss characteristics of a single Mainline Splice Connector interfaced between (2) mainline cables. It implements the time domain-gating features of the network analyzers, which removes the interfaces, and far end termination from the DUT (device under test) measurement.

ANSI/SCTE 102-2016, Cable Retention Force Testing of Trunk & Distribution Connectors
The purpose of this document is to define a standard test procedure to prepare, test and document the retention forces of a given connector/cable assembly, as whole or separate components.

ANSI/SCTE 103-2012, Test Method for DC Contact Resistance, Drop cable to “F” connectors and F 81 Barrels
The purpose of this test procedure is to measure the contact resistance or intimacy of contact between an F connector and the drop cable shield (outer conductor contact resistance) or the cable center conductor and the F81 barrel (inner conductor contact resistance.)

ANSI/SCTE 104-2015, Automation System to Compression System Communications Applications Program Interface (API)
This standard defines the Communications API between an Automation System and the associated Compression System that will insert SCTE 35 private sections into the outgoing Transport Stream. This standard serves as a companion to both SCTE 35 and SCTE 30.

ANSI/SCTE 106-2010, DOCSIS Set-Top Gateway (DSG) Specification
The intent of this document is to specify open protocols, with a preference for existing, well-known, and well-accepted standards. This interface specification is written to provide the minimal set of requirements for satisfactory communication between the Set-top Controller and the Set-top Device over the DOCSIS transport.

ANSI/SCTE 107-2009, Embedded Cable Modem Devices
This specification defines additional features that must be added to a DOCSIS Cable Modem for implementations that embed the Cable Modem with another application, such as an IP Cablecom MTA.

ANSI/SCTE 108-2012, Test Method for Dielectric Withstand of Coaxial Cable
The purpose of this document is to provide a test standard for detecting flaws in the insulation (sometimes referred to as the dielectric) of a completed coaxial cable.

ANSI/SCTE 109-2010, Test Procedure for Common Path Distortion (CPD)
The purpose of this document is to establish the standard methodology used to measure Common Path Distortion (CPD) in Cable Telecommunications Systems.

ANSI/SCTE 11-2012, Test Method for Aerial Cable Corrosion Protection Flow
This test is to determine that moisture blocking material used in cables intended for indoor and aerial applications, does not flow or drip out of the cable.

ANSI/SCTE 110-2011, Hybrid Fiber Coax Outside Plant Status Monitoring: Alternative Power Supply to Transponder Interface Bus (PSTIB) For HMs Transponders
Hybrid Fiber Coax Outside Plant Status Monitoring: Alternative Power Supply to Transponder Interface Bus (PSTIB) For HMs Transponders

ANSI/SCTE 111-2010, Specification for 5/8-24 Plug, Male Adapters
The purpose of this specification is to serve as a recommended guideline for the physical dimensions of 5/8 - 24 plug (male) hard-line adapters that are used as interconnects in the 75 ohm RF broadband communications industry. It is not the purpose of this standard to specify the details of manufacturing.

ANSI/SCTE 112-2011, HMS/DOCSIS® Transponder for Open Plant Power Supply
This document contains the requirements for a ‘HMS / DOCSIS’ & #174; Transponder for Outside Plant Power Supply. ‘ The HMS / DOCSIS & #174; transponder is defined to be a device where the DOCSIS component has been developed or modified specifically for the HMS / DOCSIS & #174; application. This requirement leverages various HMS specifications and MIBS, as well as the DOCSIS & #174; 1.1 specifications and MIBS.

ANSI/SCTE 113-2006, HMS Digital Transport Management Information Base SCTE-HMS-HE-DIG-TRANSPORT-MIB
This document provides MIB definitions for HMS Digital Transport equipments present in the headend (or indoor) and is supported by a SNMP agent.

ANSI/SCTE 115-2011, Test Method for Reverse Path (Upstream) Intermodulation Using Two Carriers
This test procedure defines a method of measurement of intermodulation distortion in the reverse ‘upstream’ path of Cable Telecommunications equipment.

The purpose of this specification is to serve as a recommended guideline for the physical dimensions of female 5/8 - 24 port that is used on hard-line adapters for interconnection in the 75 ohm RF broadband communications industry. It is not the purpose of this standard to specify the details of manufacturing.

ANSI/SCTE 117-2010, Specification for Braided 75 ohm, Mini-Series Broadband Coaxial Cable
This specification defines the required performance with regards to electrical and mechanical properties of 75-ohm, Braided, Mini-Series Coaxial Cable for Broadband applications.

ANSI/SCTE 118-1-2012, Program-Specific Ad Insertion - Data Field Definitions, Functional Overview and Application Guidelines
This standard defines the functionality associated with Program-Specific Ad Insertion. Program-Specific Ad Insertion is the scheduling and insertion of a spot into a digital broadcast program based on the program identifier passed in the SCTE 35 cue message.

ANSI/SCTE 118-2-2012, Program-Specific Ad Insertion - Content Provider to Traffic Communication Applications Data Model
This standard describes the information that is required to communicate the program and associated structure from a Network to an Affiliate’s SCTE 35 compliant Traffic System.
ANSI/SCTE 118-3-2012, Program-Specific Ad Insertion - Traffic System to Ad Insertion System File Format Specification

This standard defines the information that shall be passed from an Affiliate’s Traffic System to an Affiliate’s Ad Insertion System for communications of ad insertion schedules, including Unique Program Identifiers where specified. It specifies the required data for Multi-Tiered, Program Specific Insertion, as well as the file format for the data communications.


This procedure defines a method of measurement for Noise Power Ratio (NPR) of active Cable Telecommunications equipment. It is intended for measurement of 75-ohm devices having type “F” or 5/8-24 KS connectors. See the Cable Telecommunications Testing Guidelines document, SCTE 96 2003 (formerly IPS TP 200), for a discussion of proper testing techniques.

ANSI/SCTE 12-2011, Test Method for Center Conductor Bond to Dielectric for Trunk, Feeder and Distribution Coaxial Cables

Provides a test to determine the bond strength between the center conductor and dielectric for specified semi-flexible coaxial cables.

ANSI/SCTE 121-2011, Test Method for Downstream Bit Error Rate

The purpose of this test is to measure Bit Error Rate (BER) of downstream (forward path) broadband telecommunications QAM signals. This procedure will address mainly pre-Forward Error Correction BER results for 64 and 256 QAM.

ANSI/SCTE 122-2012, SCTE Recommended Optical Fiber Cable Types for Outside Plant Drop Applications

The purpose of this document is to provide guidance in selection of a suitable outside plant (OSP) optical drop cable with respect to different application environments.

ANSI/SCTE 123-2011, Specification for “F” Connector, Male, Feed-Through

The purpose of this document is to specify requirements for male “F” feed-through connectors that are used in the 75 ohm RF broadband communications industry. This specification applies to SCTE drop cable specifications ANSI/SCTE 74 2003, ANSI/SCTE 71 2003, ANSI/SCTE 100 2004, IPS SP 005 and IPS SP 006.

ANSI/SCTE 124-2011, Specification for “F” Connector, Male, Pin Type

The purpose of this document is to specify requirements for male “F” pin type connectors that are used in the 75 ohm RF broadband communications industry. This specification applies to SCTE drop cable specifications ANSI/SCTE 74 2003, ANSI/SCTE 71 2003, ANSI/SCTE 100 2004, IPS SP 005 and IPS SP 006.

ANSI/SCTE 125-2011, Hard Line Pin (plug) Connector Return Loss

This standard describes a procedure to measure the Return Loss characteristics of a single Mainline Pin Connector interfaced between (1) mainline cable and a precision airline. It implements the time domain-gating features of the network analyzers, which removes the interfaces, and far end termination from the DUT (device under test) measurement.

ANSI/SCTE 126-2013, Test Method for Distortion of 2-way Amplifier Caused by Insufficient Isolation of Built in Diplex Filter

The purpose of this document is to establish the standard methodology to measure an amplifier’s distortion caused by an upstream signal leaking through the diplex filter that is built inside of the amplifier of a Cable Telecommunications System.

ANSI/SCTE 127-2007, Carriage of VPI Data in North American DTV Bitstreams

A design of the carriage of existing analog Standard Definition (SD) video Vertical Blanking Interval signals that is to be used for carriage of VPI data (the transport path) in North American digital television (DTV) bitstreams.

ANSI/SCTE 128-1-2010, AVC Video Constraints for Cable Television - Part 1: Coding

This standard defines the video coding constraints on ITU-T Rec. H.264 | ISO/IEC 14496-10 [2] video compression (hereafter called “AVC”) for Cable Television. In particular, this document describes the constraints on AVC coded video elementary streams in an MPEG-2 service multiplex (single or multi-program Transport Stream).

ANSI/SCTE 128-2-2010, AVC Video Constraints for Cable Television Part 2: Transport

This standard defines the transport constraints on ITU-T Rec. H.264 | ISO/IEC 14496-10 [5] video compression (hereafter called “AVC”) for Cable Television. In particular, this document describes the transmission of AVC coded video elementary streams constrained per SCTE 128 Part 1 in an MPEG-2 service multiplex (single or multi-program Transport Stream).

ANSI/SCTE 129-2007, Drop Passives: Bonding Blocks (Without Surge Protection)

The purpose of this document is to recommend mechanical and electrical standards for broadband radio frequency (RF) devices whose primary purpose is to provide a transition point.

ANSI/SCTE 13-2011, Dielectric Air Leakage Test Method For Trunk, Feeder and Distribution Coaxial Cable

The purpose of this test is to detect voids in the dielectric and the bond between the dielectric and the center conductor.


This standard presents concepts applicable to all other SCTE 130 parts, leaving most of the normative details to the individual documents.

ANSI/SCTE 130-10-2013, Digital Program Insertion - Advertising Systems Interfaces - Part 10: Stream Restriction Data Model (SRDM)

This standard in conjunction with the SCTE 130 Part 10 Extensible Markup Language (XML) schema document defines the XML data model expressing stream restrictions.

ANSI/SCTE 130-2 2014, Digital Program Insertion-Advertising Systems Interfaces Part 2 Core Data Elements


ANSI/SCTE 130-3-2013, Digital Program Insertion - Advertising Systems Interfaces - Part 3: Ad Management Service (ADM) Interface

This document in conjunction with the SCTE 130 Part 3 Extensible Markup Language (XML) schema document defines the XML messages expressing placement opportunities, placement decisions, and placement related event data typically exchanged between an Ad Management Service (ADM) and an Ad Decision Service (ADS). Additionally, this document and the accompanying schema document describe the auxiliary XML messages, elements, and attributes supporting the primary message exchanges.

ANSI/SCTE 130-4-2015, Digital Program Insertion-Advertising Systems Interfaces - Part 4: Content Information Service (CIS)


ANSI/SCTE 130-5-2016, Digital Program Insertion-Advertising Systems Interfaces Part 5-Placement Opportunity Information Service

This document defines the messaging protocol for the Placement Opportunity Information Service (POIS) consistent with other parts of the SCTE 130 standard. A POIS holds, maintains, and retains descriptions of content Placement Opportunities (typically for advertisements) and the interface supports query and notification operations for those opportunities.

ANSI/SCTE 130-6-2013, Digital Program Insertion-Advertising Systems Interfaces - Part 6: Subscriber Information Service (SIS)

This document, SCTE 130 Part 6, describes the Digital Program Insertion Advertising Systems Interfaces’ SIS (Subscriber Information Service) messaging and data type specification using XML, XML Namespaces, and XML Schema. The 2013 version adds two new appendices, Appendix C - Mutable SIS Interface (Normative) and Appendix D - Mutable SIS Examples (Informative), are added. This new text adds the mutability capability to the SCTE 130 Part 6 standard. This capability is optional; though if chosen to be supported shall be normatively implemented as described herein.
ANSI/SCTE 130-7-2016, Digital Program Insertion-Advertising Systems Interfaces - Part 7: Message Transport
This document describes the Digital Program Insertion Advertising Systems Interfaces’ transport protocols required for the exchange of messages defined in the individual parts of the SCTE 130 specification.

ANSI/SCTE 130-8-2013, Digital Program Insertion-Advertising Systems Interfaces - Part 8: General Information Service (GIS)

The purpose of this procedure is to provide instructions to measure the Return Loss characteristics of a pair of type 'F' connectors and the cable interface, inserted in the middle of a cable, from 5 MHz to 1002 MHz. This test method makes use of the time domain gating feature of the network analyzer to remove the near end and far end test set connector effects from a type 'F' pair in the middle of the cable, joined by a type F (female) - type F (female) adapter.

ANSI/SCTE 131-2007, HMS VoIP Test Management Information Base (MIB)
Definition SCTE-HMS-VOIP-MIB
This document provides MIB definitions for VoIP testing between two endpoints. It allows an HMS/DOCSIS transponder or any other device that implements it to be used as a test point to validate VoIP service in the network and to report a common basic set of measurements.

ANSI/SCTE 132-2012, Test Method for Reverse Path (Upstream) Bit Error Rate
This procedure defines a method of measurement for Bit Error Rate (BER) in the return path of active Cable Telecommunications equipment. It is intended for measurement of 75-ohm devices having type "F" or 5/8-24 KS connectors.

ANSI/SCTE 133-2010, Downstream RF Interface for Cable Modem Termination Systems
This document describes the downstream radio-frequency interface [DRFI] specifications for: an edgeQAM (EQAM) modular device, an integrated Cable Modem Termination System [CMTS] with multiple downstream channels per RF port, or an integrated CMTS beyond DOCSIS 2.0.

ANSI/SCTE 134-2012, Fusion Splicing Equipment and Applications for the Cable/Broadband Industry
This standard defines the equipment, methods, and practices used within the cable/broadband industry to obtain consistent low loss fusion splice connections between optical fibers.

This specification is part of the DOCSIS&®174; family of specifications. In particular, this specification is part of a series of specifications that defines the third generation of high-speed data-over-cable systems. This specification was developed for the benefit of the cable industry, and includes contributions by operators and vendors from North America, Europe, and other regions.

ANSI/SCTE 135-2-2013, DOCSIS 3.0 Part 2: MAC and Upper Layer Protocols
This specification is part of the DOCSIS&®174; family of specifications. In particular, this specification is part of a series of specifications that define the third generation of high-speed data-over-cable systems. This specification was developed for the benefit of the cable industry, and includes contributions by operators and vendors from North America, Europe, and other regions.

ANSI/SCTE 135-3-2013, DOCSIS 3.0 Part 3: Security Services
This specification is part of the DOCSIS&®174; family of specifications. In particular, this specification is part of a series of specifications that define the third generation of high-speed data-over-cable systems. This specification was developed for the benefit of the cable industry, and includes contributions by operators and vendors from North America, Europe, and other regions.

ANSI/SCTE 135-4-2013, DOCSIS 3.0 Part 4: Operations Support Systems Interface
This standard is part of the DOCSIS&®174; family of specifications. In particular, this specification is part of a series of specifications that define the third generation of high-speed data-over-cable systems. This specification was developed for the benefit of the cable industry, and includes contributions by operators and vendors from North America, Europe, and other regions.

ANSI/SCTE 135-5-2009, DOCSIS 3.0 Part 5: Cable Modem to Customer Premise Equipment Interface
This specification defines the interface requirements for data over cable services between a cable modem and the customer premise equipment (CPE). The CPE may include PCs, Macintoshes, workstations, network computers, and other electronic equipment. This specification defines the applicable communications standards and protocols as needed to implement a cable modem interface to the CPE.

ANSI/SCTE 136-1-2013, Layer 2 Virtual Private Networks for IP Cable Modem Systems
This standard describes requirements on both CMTSs and CMs in order to implement a DOCSIS Layer-2 Virtual Private Network (DOCSIS L2VPN) feature.

ANSI/SCTE 136-2-2013, Cable Modem TDM Emulation Interface Standard
TDM Emulation service (TDM-E) is a method for cable operators to deliver T1, E1 and NxDSO emulation services that meet or exceed the quality requirement of applications that use such services. This standard is part of the Cable Modem family of standards and in particular, defines the TDM-E architecture and components.

ANSI/SCTE 137-1-2010, Modular Headend Architecture Part 1: DOCSIS Timing Interface
The DOCSIS Timing Protocol (DTI) defined in this document supports the accurate and robust transport of the DTI server 10.24 MHz master clock, 32-bit DOCSIS timestamp, and Time of Day, to the DTI client within the DOCSIS M-CMTS cable network. The DTI protocol is structured to minimize the complexity and cost of the DTI client clocks, and the per port cost of the shared server function while supporting all S-CDMA and TDMA timing requirements.

ANSI/SCTE 137-2-2017, Modular Head End Architecture Part 2: M-CMTS Downstream External PHY Interface
This specification is part of the DOCSIS® family of specifications, and in particular, is part of a series of specifications that define a Modular Cable Modem Termination System (M-CMTS®) architecture for head-end components that comply with DOCSIS. This specification was developed for the benefit of the cable industry, and includes contributions by operators and vendors from North America, Europe, and other regions.

ANSI/SCTE 137-3-2017, Modular Head End Architecture Part 3: Operations Support System Interface
This specification defines the Network Management requirements to support a Modular Cable Modem Termination System (M-CMTS®) for headend components compliant to DOCSIS®. The purpose of this document is to define the management requirements for the M-CMTS architecture that enables an effective operation of the M-CMTS components.

ANSI/SCTE 137-4-2017, Modular Head End Architecture Part 4: Edge Resource Manager Interface
This document specifies interfaces that are used by Edge QAM devices (EQAMs), Edge Resource Managers (ERMs) and M-CMTS Cores within the context of a Modular Cable Modem Termination System (M CMTS).

ANSI/SCTE 137-5-2017, Modular Head End Architecture Part 5: Edge QAM Provisioning and Management Interface
This specification is a component of the Modular Headend Architecture; in particular it defines the Provisioning and Management requirements for the EQAM device.
ANSI/SCTE 137-6-2017, Modular Head End Architecture Part 6: Edge QAM Video Stream Interface
This specification is a component of the Modular Headend Architecture. In particular, it defines the data plane requirements for receiving, processing, and transmitting MPEG transport streams in EQAMs, compliant with the Video EQAM or Universal EQAM profiles described in the Architectural Overview of the Modular Headend Architecture.

ANSI/SCTE 137-7-2017, Modular Head End Architecture Part 7: EQAM Architectural Overview Technical Report
This Architectural Overview Technical Report is intended to provide an introduction to the Modular Headend Architecture, with particular emphasis on the EQAM as a key component. This document describes the various architectural entities and the interfaces that connect them, provides an overview of the various profiles of EQAM devices and their operations, and discusses the various specifications that contain normative requirements pertaining to the Modular Headend Architecture.

ANSI/SCTE 138-2013, Stream Conditioning for Switching of Addressable Content in Digital Television Receivers
This document describes the stream Conditioning required to enable Client-DPI Receivers to implement switching in a both non-seamless fashion ('Level 0', or 'L0'), and in a seamless fashion ('Level 1', or 'L1').

ANSI/SCTE 140-2016, Test Method for Hex Crimp Tool Verification/Calibration
To determine and verify the actual crimp dimension of hex crimp tools. Provide a calibration technique for adjusting hex crimp tools.

ANSI/SCTE 140-2013, Cable Modem IPv4 and IPv6 eRouter Specification
This standard defines a core set of features that enable multiple subscriber devices to gain access to operator provided high speed data service using DOCSIS. This core set of features allow for both IPv4 and IPv6 enabled devices to gain connectivity to the Internet.

ANSI/SCTE 142-2009, Recommended Practice for Transport Stream Verification
This Recommended Practice provides a common methodology for describing Transport Stream conformance criteria. This document explicitly describes the elements and parameters of SCTE 54 [2], along with ATSC A/53-3 [5] and A/65 [6] that should be verified in an SCTE Transport Stream for it to be considered a proper emission. It does not cover RF, captioning or elementary streams.

ANSI/SCTE 143-2013, Test Method for Salt Spray
This test method provides guidelines for salt spray testing of broadband communications equipment.

ANSI/SCTE 144-2012, Test Procedure for Measuring Transmission and Reflection
The purpose of this test procedure is to determine the reflection at any port, or the transmission between any two ports of a properly terminated device, as measured across a frequency range of interest.

The purpose of this document is to establish the standard methodology to measure second harmonic distortion in a Cable Telecommunication System passive at high signal level conditions (50 - 60 dBmV). Due to the difficulty in acquiring multi-carrier signal generators with both 55 dBmV output and intermod beats at -120 dBc, the test procedure will use a single carrier source test method.

ANSI/SCTE 146-2008, Outdoor "F" Female to "F" Female Inline Splice
The purpose of this document is to recommend mechanical and electrical standards for 75 ohm broadband radio frequency (RF) devices.

ANSI/SCTE 147-2010, Specification for 75 ohm Inline Attenuators
The purpose of this standard is to provide the mechanical, electrical and environmental requirements for 75-ohm "F" type inline attenuators generally used for indoor applications.

ANSI/SCTE 148-2016, Specifications for Male "F" Terminator, 75 ohm
The purpose of this specification is to specify requirements of the Male 'F'&#8221; Terminators that are used on 'F'&#8221; ports as specified in ANSI/SCTE 01 2015 and ANSI/SCTE 02 2015. This specification is not intended to limit or restrict any manufacturers from innovative designs and product improvements.

ANSI/SCTE 149-2013, Test Method for Withstanding Tightening Torque- "F" Female
To measure the 'F' Female interface torque and/or to determine the amount of torque that will cause one or more of the following conditions to occur; stripping of the external threads, or damage to the female interface.

ANSI/SCTE 150-2016, Specification for Trunk, Feeder and Distribution Coaxial Cable
This specification applies to material, electrical and mechanical properties of seventy-five ohm coaxial cables as defined herein. Seventy-five ohm coaxial cables are used to distribute radio frequency (RF), digital signals and power as applicable.

ANSI/SCTE 150-2010, Preparing a Line Extender Specification
This standard provides guidance for preparing a Line Extender requirement specification independent of manufacturer and type.

ANSI/SCTE 151-2015, Mechanical, Electrical, and Environmental Requirements for RF Traps and Filters
The purpose of this specification is to provide the mechanical, electrical and environmental requirements for broadband radio frequency (RF) Trap and Filter devices whose primary purpose is to provide a fixed attenuation of RF signal(s) at user defined frequencies while preserving adjacent topology.

ANSI/SCTE 152-2014, Test Method for Contact Resistance Measurement of Mainline Plug Interface
The purpose of this test procedure is to measure the resistance between the contact of the connector and cable interfaces. High resistance contacts may cause excessive energy losses, overheating and possibly common path distortions. It is most desirable to have contact resistance as low as possible.

ANSI/SCTE 153-2016, Drop Passives: Splitters, Couplers and Power Inserters
The purpose of this document is to recommend mechanical, environmental and electrical standards for broadband radio frequency (RF) devices whose primary purpose is to divide signals presented to an input port among two or more output ports with a fixed division ratio that is nominally independent of frequency within the specified bandwidth limits of the device. Alternately, such devices can be used to combine signals from several input ports into a common output port. Its scope is limited to 75-ohm devices whose ports are provided with type F connectors. The most common use for such devices is on-premises RF signal distribution.

ANSI/SCTE 154-1-2008, Digital Video Common MIB
This document provides the branch object identifiers for each of the MIBs within the SCTE HMS DIGITAL VIDEO COMMON MIB tree. The HMS DIGITAL COMMON MIB provides standard common MIB definitions for all HMS inside plant digital devices.

ANSI/SCTE 154-2-2008, SCTE-HMS-QAM-MIB
This document provides the definition for MIB objects within the SCTE-HMS-QAMMIB Tree.

ANSI/SCTE 154-3-2008, Encoder MIB
This document provides the branch object identifiers for each of the MIBs within the SCTE HMS HEADENDIDENT Tree.

ANSI/SCTE 154-4-2008, MPEG Management Information Base SCTE-HMS-MPEG MIB
This document provides the definition for MIB objects within the SCTE HMS MPEG MIB Tree.

ANSI/SCTE 154-5-2008, SCTE-HMS-HEADENDIDENT Textual Conventions MIB
This document provides the branch object identifiers for each of the MIBs within the SCTE HMS DIGITAL VIDEO MIB’s (DVM) in the heDigital branch of the SCTE mibs. The SCTE HMS HEADENDIDENT-T MIB provides standard common mib text syntax for all HMS devices.
ANSI/SCTE 155-2008, Indoor “F” Female to “F” Female Inline Splice
The purpose of this document is to recommend mechanical and electrical standards for 75 Ohm broadband radio frequency (RF) devices. Whose purpose is to provide an indoor inline connection between two type “F” male connectors that conform to ANSI/SCTE 123 2006; Specification for “F” Connector, Male, Feed- Through or ANSI/SCTE 124 2006; Specification for “F” Connector, Male, Pin Type. The mechanical configuration is designed to accommodate wall plate and bulkhead applications.

ANSI/SCTE 156-2016, Specification for Mainline Plug (Male) to Cable Interface
The primary purpose of this specification is to assure acceptable electrical, mechanical and environmental performance of the cable and connector interface. The scope of this standard will be directed to acceptable performance of impedance, galvanic action, loop resistance, cable retention, intermodulation distortion, signal response, RF shielding, and watertight seals. This specification in no way should limit or restrict any manufacturers from innovative designs and product improvements.

ANSI/SCTE 158-2016, Recommended Environmental Condition Ranges for Broadband Communications Equipment
This document specifies the recommended environmental conditions (temperature, humidity, altitude and vibration) for the operation, storage and shipment of broadband communications equipment.

ANSI/SCTE 159-1-2010, IPCablecom Multimedia - Part 1: Multimedia Application and Service
The intent of this specification is to support the deployment of general Multimedia services by providing a technical definition of several IP-based signaling interfaces that leverage core QoS and policy management capabilities native to DOCSIS Versions 1.1 and greater.

ANSI/SCTE 159-2-2017, Multimedia Application and Service Part 2: IPCablecom Multimedia Web Services
This specification provides a simple, open interface between a generic Application Server (AS) and an IPCablecom Multimedia Application Manager (AM)

ANSI/SCTE 16-2012, Test Procedure for Hum Modulation
The purpose of this standard is to define and measure hum modulation in active and passive broadband RF telecommunications equipment and sub-assemblies. This procedure presents two methods for measuring hum modulation in the time domain, with a sensitivity exceeding -80 dB.

ANSI/SCTE 160-2010, Specification for Mini “F” Connector, Male, Pin Type
The purpose of this document is to specify requirements for indoor male “F” pin type connectors that are used on ANSI/SCTE 117 2006 and SCTE IPS SP 009 mini coaxial cable in the 75 ohm RF broadband communications industry.

ANSI/SCTE 161-2016, Drop Amplifiers
The purpose of this specification is to recommend mechanical and electrical standards for broadband radio frequency (RF) devices whose primary purpose is to amplify signals presented to an input port and deliver the amplified signals to one or more output ports. The devices are also required to pass signals in a different range of frequencies in the return direction and, optionally, may provide amplification of such return signals. The specification’s scope is limited to 75 ohm devices whose ports are provided with F connectors. The most common use for such devices is on-premises RF signal distribution.

ANSI/SCTE 163-2009, SCTE HMS Switched Digital Video MIB
This document provides the definition for MIB objects within the SCTE HMS SDV MIB Tree.

ANSI/SCTE 164-2010, Emergency Alert Metadata Descriptor
This document defines a container usable by cable system operators for the delivery of Emergency Alert (EA) metadata into the consumer domain. This metadata is designed to support cable set-top terminals which function as servers of commercial video services (CVS) into the home network, by providing preformatted XML-based EA data required by such Digital Media Servers (DMS) in the home.

The IPCablecom project defines interface specifications that can be used to develop interoperable equipment capable of providing packet-based voice, video and other high-speed multimedia services over hybrid fiber coax (HFC) cable systems utilizing the DOCSIS#174; protocol. Any reference to DOCSIS in this document is understood to be DOCSIS version 1.1 or later.

ANSI/SCTE 165-10-2009, IPCablecom 1.5 Part 10: Security
The scope of this document is to define the IPCablecom Security architecture, protocols, algorithms, associated functional requirements and any technological requirements that can provide for the security of the system for the IPCablecom network. Authentication, access control, signaling and media content integrity, confidentiality, and nonrepudiation security services must be provided as defined herein for each of the network element interfaces.

ANSI/SCTE 165-11-2009, IPCablecom 1.5 Part 11: Analog Trunking for PBX Specification
This specification defines extensions to the IPCablecom Network-based Call Signaling (NCS) protocol to support the following analog trunking for PBX interfaces on an embedded Voice-Over-Pt client device in an IPCablecom environment: Ground-start lines; PBX one-way and two-way OTMF trunks.

ANSI/SCTE 165-12-2016, IPCablecom 1.5 Part 12: PSTN Gateway Call Signaling Protocol
This document is part of the IPCablecom suite of specifications. The document is based on MGCP 1.0 [1], an IETF informational RFC.

ANSI/SCTE 165-13-2009, IPCablecom 1.5 Part 13; Electronic Surveillance Standard
This specification defines the interface between a telecommunications carrier that provides telecommunications services to the public for hire using IPCablecom capabilities (a ‘PC/TSP’) and a Law Enforcement Agency (LEA) to assist the LEA in conducting lawfully authorized electronic surveillance. Companies using IPCablecom capabilities will not in the normal case be ‘telecommunications carriers.’ Instead they will be providers of information services.

ANSI/SCTE 165-14-2009, IPCablecom 1.5 Part 14; Embedded MTA Analog Interface and Powering
This standard defines the embedded MTA (E-MTA) requirements for the analog interface and powering of the E-MTA. An embedded MTA is a DOCSIS cable modem (CM) integrated with an IPCablecom multimedia terminal adapter (MTA). The purpose of this specification is to define a set of requirements that will enable a service that is sufficiently reliable to meet an assumed consumer expectation of essentially constant availability, including, specifically, availability during power failure at the customer’s premises, and (assuming the service is used to connect to the PSTN), access to emergency services (911, etc.).

This document describes an SNMP MIB in SMv2, to support the management event mechanism as described in [1]. It is intended to be implemented in the MTA and management devices.

ANSI/SCTE 165-16-2016, IPCablecom 1.5 Part 16; Management Event Mechanism
This standard is one of two documents that together define a framework for reporting Management Events in the IPCablecom architecture. This document defines the general event reporting mechanism and framework. The mechanism consists of a set of protocols and interfaces that can be used by individual elements and components in the IPCablecom architecture. This document defines how the SNMPv3 transport protocol, SYSLOG, local log, and the IPCablecom Management Event MIB are used to carry management event information to an event management system.

ANSI/SCTE 165-17-2009, IPCablecom 1.5 Part 17: Audio Server Protocol
This specification describes the architecture and protocols that are required for playing announcements in voiceover-IP (VoIP) IPCablecom networks, and is issued to facilitate design and field-testing leading to the manufacture and interoperability of conforming hardware and software by multiple vendors. The will be referred to as the IPCablecom Audio Server Specification. This specification defines a set of signaling protocols that are used to provide announcement services within a cable network. For one of these protocols, this specification defines two new event packages: A Base Audio Package; An Advanced Audio Package
This specification describes the IPCablecom Call Management Server (CMS) to CMS Signaling protocol intended for use by a CMS to communicate with another CMS in order to support packet-based voice and other real-time multimedia applications.


This document describes a methodology for a client device to request a specific set of resources. In particular, it specifies a comprehensive Device Provisioning Specification (DPS). The DPS defines the interface used between the CMS and Provisioning Server for the exchange of service provisioning information. It is intended to facilitate interoperability of conforming hardware and software from multiple vendors.

ANSI/SCTE 165-2-2016, IPCablecom 1.5 Part 2: Audio/Video Codecs

This document addresses interfaces between IPCablecom client devices for audio and video communication. Specifically, it identifies the audio and video codecs necessary to provide the highest quality and the most resource-efficient service delivery to the customer. This document also specifies the performance required in client devices to support future IPCablecom codecs. Additionally, this document describes a suggested methodology for optimal network support for codecs.

ANSI/SCTE 165-20-2009, IPCablecom 1.5 Part 20: MTA Extension MIB

New objects that are being introduced beyond IPCablecom 1.0 for MTA MIBS are being grouped in this document so that the additional changes made can be tracked easily.

ANSI/SCTE 165-21-2016, IPCablecom 1.5 Part 21: Signaling Extension MIB

New objects that are being introduced beyond IPCablecom 1.0 for Signaling MIBS are being grouped in this document so that the additional changes made can be tracked easily.

ANSI/SCTE 165-3-2016, IPCablecom 1.5 Part 3: Network-Based Call Signaling Protocol

This document is considered part of the IPCablecom standard. The document is based on MGCP 1.0 [1], which is an IETF Informational RFC.

ANSI/SCTE 165-4-2009, IPCablecom 1.5 Part 4: Dynamic Quality-of-Service

This document describes requirements for a client device to obtain access to IPCablecom network resources. In particular, it specifies a comprehensive mechanism for a client device to request a specific Quality of Service from the DOCSIS® network. Extensive examples illustrate the use of the specification.

ANSI/SCTE 165-5-2009, IPCablecom 1.5 Part 5: Media Terminal Adapter (MTA) Device Provisioning

This scope of this document is limited to the provisioning of an IPCablecom 1.5 embedded-MTA device by a single provisioning and network management provider. An attempt has been made to provide enough detail to enable vendors to build an embedded-MTA device that is interoperable in an IPCablecom 1.5 network configuration. This document defines the provisioning of MTA components of the embedded MTA device (unless stated otherwise).

ANSI/SCTE 165-6-2009, IPCablecom 1.5 Part 6: MIBS Framework

This specification describes the framework in which IPCablecom 1.5 MIB (Management Information Base) modules are described. It provides information on the management requirements of IPCablecom-compliant devices and functions and how these requirements are supported in the MIB modules. It is intended to support and complement the actual MIB module documents, which are issued separately.

ANSI/SCTE 165-7-2009, IPCablecom 1.5 Part 7: MTA MIB

This standard describes the IPCablecom 1.5 MTA MIB requirement.

ANSI/SCTE 165-8-2009, IPCablecom 1.5 Part 8: Signaling MIB

This specification describes the IPCablecom Signaling (SIG) MIB requirements.

ANSI/SCTE 165-9-2009, IPCablecom 1.5 Part 9: Event Messaging

This standard describes the concept of Event Messages used to collect usage for the purposes of billing within the IPCablecom architecture. It details a transport protocol independent Event Message attribute TLV format, an Event Message file format, mandatory and optional transport protocols, the various Event Messages, lists the attributes each Event Message contains, and lists the required and optional Event Messages associated with each type of enduser service supported. In order to support vendor interoperability, implementations must minimally support RADIUS as a transport protocol.

ANSI/SCTE 166-2010, Flexure Method for Drop Cable Conditioning

This test procedure provides a method of flex fatigue for accelerating the degradation of coaxial drop cable in the laboratory environment. The degradation observed, as measured by various performance criteria (shield effectiveness, DC resistance, etc.), is not intended to predict life expectancy of the cable under test (CUT). The test data obtained is for relative comparison purposes only.

ANSI/SCTE 167-2010, Recommended Practice for Headend Cable Color Coding

The purpose of this Recommended Practice is to provide a guideline for the color of cables used in headend cabling.

ANSI/SCTE 168-4-2010, Recommended Practice for Transport Stream Verification Metrics

This Recommended Practice provides a common methodology for defining the measurement points and metrics of interest in digital cable networks that impair the compressed multimedia (video/audio/data) quality end to end. Uncompressed content and those metrics not related to 'quality' are not included in this Recommended Practice.

ANSI/SCTE 168-6-2010, Recommended Practice for Monitoring Multimedia

The scope of this Recommended Practice document is to provide background and discussion on Multimedia Management (MMM) system requirements to assist the cable operator with MMM deployment design tradeoffs as well as provide guidance and recommendations on several topics related to the deployment of Multimedia Management systems based on the experiences to date of both the participating committee operators and vendor companies and the directions of ongoing work in the HMS.

ANSI/SCTE 168-7-2010, Recommended Practice for Transport Stream Verification in an IP Transport Network

This document describes the protocols within the IP network and the possible IP layer causes of media impairments but does not provide metrics that correlate specific IP failures to media impairments. Industry accepted metrics have been provided for IP packet loss, delay and jitter.

ANSI/SCTE 17-2007, Test Procedure for Carrier to Noise (C/N, CCN, CIN, CTN)

This procedure defines the measurement procedure for determining the ratio of carrier to thermal noise and 'noise-like' interference for broadband telecommunications system components. The test involves measuring the noise levels, or the combined noise plus 'noise-like' intermodulation product levels, relative to the carrier level of a CW signal. The noise contribution of the test equipment is also measured to allow for correction of readings near the test equipment noise floor. ANSI/SCTE 96 2003, Cable Telecommunications Testing Guidelines, has additional definitions common to this and other SCTE test procedures.

ANSI/SCTE 170-2010, Preparing an MDU Amplifier Extender Specification

This document provides guidance for preparing an MDU Amplifier requirements specification, independent of manufacturer and type.

ANSI/SCTE 171-2016, Passive Network Device (NID) Enclosure Specification

This specification applies to recommended mechanical, electrical and environmental performance of Network Interface Device enclosures for use in broadband deployment. The intended location for this device is on the outside of the customer premise. This specification focuses on non-metallic enclosures.
This document defines the video coding and transport constraints on ITU-T H.264/ISO/IEC 14496-10 ("AVC") video compression for Digital Program Insertion applications using SCTE 35 and SCTE 30 messaging.

The ANSI/SCTE 173-1-2017, Requirements for Preferential Telecommunications over IPCablecom Networks

The objective of this standard is to provide an initial set of requirements for preferential telecommunications within IPCablecom networks. Aspects of preferential telecommunications include provisions for Authentication and Priority (Special Handling).


The objective of this Standard is to provide a framework for the implementation of preferential telecommunications services within cable networks as described in [ANSI/SCTE 24-1] and [ITU-T J.360].

The ANSI/SCTE 173-3-2017, Specification for Authentication in Preferential Telecommunications over IPCablecom2 Networks

This standard is one of a series of standards to enable support for preferential telecommunication services over IPCablecom networks.

The ANSI/SCTE 173-4-2017, Specification for Priority in Preferential Telecommunications over IPCablecom2 Networks

This Standard is one of a series of Standards to enable support for preferential telecommunication services over IPCablecom networks.


This document defines a fiber-to-the-home system optimized for compatibility with hybrid fiber-coax (HFC) plant, using the same end equipment at both the home and at the headend or hub. The RfOG system is defined to begin where the plant becomes passive, extending from that point to the home. This interface is referred to as the Optical Hub. There are many possible variations on the structure of the optical hub, depending on the needs of the system. The RfOG system is defined to terminate at the subscriber-side interface of an RfOG Optical Network Unit (R-ONU) at the home.

The ANSI/SCTE 175-2011, Multimedia Management (MMS) Recommended Practice for Qualifying Network Devices (HMS 168)

The ANSI/SCTE 176 series of Recommended Practices describe IP video networks at MSO Headend, Core, and Hub networks. The recommended baseline tests in this document are intended to represent the operation of network devices in these three applications. These baseline tests provide a common set of reference results that can be used to preliminarily screen equipment and configurations during the selection, configuration, and deployment process.

The ANSI/SCTE 177-2012, Specification for 75 ohm, Mini-Series Quad Shield Coaxial Cable for CMTS and SDI Cables

This specification defines the required performance with regards to electrical and mechanical properties of 75-ohm, braided, mini-series quad shield coaxial cable for CMTS and SDI applications.

The ANSI/SCTE 178-2011, Test Method for Cable Weld Integrity

This test procedure provides methods for evaluating and determining defects along the welded seam of coaxial cables whose outer conductor shield is constructed of a welded, aluminum or copper strip. This procedure may be used to inspect finished coaxial cable's outer conductor; either smooth or corrugated.

The ANSI/SCTE 185-2012, Test Method for Cantilever Force, Female Port

This test procedure is used to evaluate the mechanical strength of female "F" ports when a cantilever force is applied.

The ANSI/SCTE 186-2016, Product Environmental Requirements for Cable Telecommunications

The specification purpose is to define product environmental and sustainability requirements 1) by referencing existing international standards; 2) by using requirements from cable operator specifications; and 3) by adding cable system specific requirements as needed. It is not the intent of this document to replace existing standards or cable operator requirements.

The ANSI/SCTE 187-1-2012, Stereoscopic 3D Formatting and Coding for Cable

This document defines the video-related formatting, and encoding parameters for high-definition frame-compatible stereoscopic 3D content for distribution on cable television systems. Encoding parameters and constraints defined by this specification can be applied to different content types, including broadcast programming, switched digital video (SDV), VOD content, and advertising content to be inserted into broadcast or VOD content.

The ANSI/SCTE 187-2-2012, Stereoscopic 3D PSI Signaling

This document defines the transport and signaling for high-definition frame-compatible stereoscopic 3D content for distribution on cable television systems. Transport parameters and constraints defined by this specification can be applied to different content types, including broadcast programming, switched digital video (SDV), VOD content, and advertising content to be inserted into broadcast or VOD content.

The ANSI/SCTE 187-3-2012, Informative Guidance for Stereoscopic Video

This document provides informative guidance for the construction or production of stereoscopic 3D programming material intended for transmission or distribution using the frame-compatible stereoscopic 3D format defined in part 1 [SCTE 187-1] and part 2 SCTE 187-2] of this standard.

The ANSI/SCTE 19-2013, Methods for Isochronous Data Service Transport

This standard defines transmission format for the carriage of isochronous data services compatible with digital multiplex bitstreams constructed in accordance with ISO/IEC 13818-1 (MPEG-2 Systems). Bit rates for the data services extend from 19.2 kbps to 9.0 Mbps.

The ANSI/SCTE 191-2010, Test Method for Axial Pull Force, Female Port

This test procedure is used to evaluate the mechanical strength of female "F" ports when an axial pull force is applied.

The ANSI/SCTE 193-1-2014, MPEG-4 AAC Family Audio System - Part 1 Coding Constraints for Cable Television

This document defines the coding constraints on MPEG-4 AAC, HE AAC, and HE AAC v2 (referred to collectively in this document as the 'AAC family') profile audio for cable television.

The ANSI/SCTE 193-2-2014, MPEG-4 AAC Family Audio System - Part 2 Constraints for Carriage over MPEG-2 Transport

This document describes the carriage of MPEG-4 AAC, MPEG-4 HE AAC and MPEG-4 HE AAC v2 (referred to collectively in this document as the 'AAC family') profile audio in MPEG-2 transport systems.

The ANSI/SCTE 194-1-2010, DTS-HD Audio System - Coding Constraints for Cable Television

This standard describes the coding constraints of the DTS-HD audio system and identifies the normative references that apply.


This document describes the carriage of DTS-HD audio in MPEG-2 systems. The descriptor necessary to signal DTS-HD audio is defined in this document. Multiplexing and transport for cable using MPEG-2 systems are defined in SCTE 54 [5]. Coding constraints for DTS-HD audio elementary streams are defined in SCTE 194-1 [4].

The ANSI/SCTE 195-2013, XFP-RF: Interface Specifications for an RF-Modulated Small Form Factor Pluggable Optical Module

This specification will focus on the communications, electrical, and mechanical interfaces for the XFP RF optical transmitter module. Requirements held within this specification apply both to the transmitter module and its host.
ANSI/SCTE 196-2013, SFP-RF: Interface Specifications for an RF-Modulated Small Form Factor Pluggable Optical Module
This standard will focus on the communications, electrical, and mechanical interfaces for the SFP RF optical transmitter module. Requirements held within this standard apply both to the transmitter module and its host.

ANSI/SCTE 197-2013, Recommendations for Spot Check Loudness Measurements
This document provides recommendations for measuring content carried in a single programming channel of a program network for 24-hours as part of managing audio loudness.

ANSI/SCTE 199-2010, RF-Modulated Small Form Factor Pluggable Optical Receiver Interface Specification
This standard focuses on the communication, electrical, and mechanical interfaces for the optical receiver module. Requirements held within this standard apply both to the receiver module and its host.

ANSI/SCTE 20-2012, Methods for Carriage of CEA-608 Closed Captions and Non-Real Time Sampled Video
This document defines a standard for the carriage of CEA-608 Closed Captions and certain other Vertical Blanking Interval (VBI) services in MPEG-2 compliant bitstreams constructed in accordance with ISO/IEC 13818-2.

ANSI/SCTE 200-2016, Specification for a 75 ohm ‘MMCX’ Connector (MMCX-75), Male & Female Interface
The purpose of this document is to specify requirements for the male/female interface of a 75 ohm, 3 GHz rated connector series generically known as MMCX-75. This is an indoor connector with applications in controlled environments such as headends and hubsites where high density platform chassis are used. MMCX-75 connectors are not intended to be mated with 50 ohm MMCX design counterparts.

ANSI/SCTE 201-2013, Open Media Security (OMS) Root Key Derivation Profiles and Test Vectors
This cryptographic key ladder standard defines a set of key ladder profiles, additional requirements and test vectors for a key ladder implementation. This standard is an extension of the ETSI TS 103 162 [1] standard for a key ladder, by further defining certain aspects and providing test vectors to enable implementers to verify certain aspects of an implementation.

ANSI/SCTE 203-2014, Product Environmental Requirements for Cable Telecommunications Facilities - Test Methods
This document specifies physical, environmental, electrical, and sustainability test procedures to evaluate equipment compliance with requirements defined in ANSI/SCTE 186 2012.

ANSI/SCTE 21-2012, Standard for Carriage of VBI Data in Cable Digital Transport Streams
This document defines a standard for the carriage of Vertical Blanking Interval (VBI) services in MPEG-2 compliant bitstreams constructed in accordance with ISO/IEC 13818-2. The approach builds upon a data structure defined in ATSC A/53 Part 4 (Digital Television Standard: Part 4 - MPEG-2 Video System Characteristics), and is designed to be backwards-compatible with that method.

Cable operator networks are large expansive networks that involve hundreds if not thousands of miles of coaxial or fiber cable powered by power supplies in the plant and connecting customers to critical infrastructure facilities such as hubs, headends, data centers, regional and national distribution datacenters. In these facilities is a vast array of equipment responsible for the production and support of the cable products - voice, video and data as well as newer products such as home automation and security, and Wi-Fi to name a few.

ANSI/SCTE 211-2015, Energy Metrics for Cable Operator Access Networks
This document contains metrics for measuring the energy efficiency of access networks (ANs) that are utilized to transport information between a service provider and a plurality of users. For the purposes of this document, the AN includes all active and passive equipment between the headend or hub, referred herein as the ‘hub’, &#8221; and the demarcation point at the user premises. This document does not include any equipment inside the hub, nor does it include any customer premises equipment (CPE).

ANSI/SCTE 212-2015, Cable Operator Energy Audit Framework and Establishment of Energy Baseline
Defines how cable operators should audit power consumption and accurately establish an energy baseline for inside and outside plant excluding any customer powered equipment.

ANSI/SCTE 213-2015, Edge and Core Facilities Energy Metrics
This document provides a metric to help operators measure how effective changes in the service impact energy consumption from both a high level and functional work perspective.

ANSI/SCTE 214-1-2016, MPEG DASH for IP-Based Cable Services Part 1: MPD Constraints and Extensions
This standard is part of a suite documenting use of MPEG DASH in cable networks. This part of the standard defines a profile of MPEG DASH which is based on the ISO BMFF Common Profile. It also defines inband carriage of information typically present in cable systems - such as closed captioning and cue messages - in DASH ISO-BMFF media segments. This profile is a combination of generic restrictions in SCTE 214-1 and restrictions specific to ISO-BMFF specified in this standard.

ANSI/SCTE 214-3-2015, MPEG DASH for IP-Based Cable Services Part 3: DASH/FF Profile
This standard is part of a suite documenting use of MPEG DASH in cable networks. This part of the standard defines a profile of MPEG DASH which is based on the ISO BMFF Common Profile. It also defines inband carriage of information typically present in cable systems - such as closed captioning and cue messages - in DASH ISO-BMFF media segments. This profile is a combination of generic restrictions in SCTE 214-1 and restrictions specific to ISO-BMFF specified in this standard.

ANSI/SCTE 215-1-2015, HEVC Video Constraints for Cable Television Part 1: Coding


This document is part of the work being done in SCTE’s Standards Energy Management Subcommittee (EMS). The Adaptive Power System Interface Specification (APSIS) working group under the EMS is responsible for the creation and updates of this document. The document was developed for the benefit of the cable industry and includes contributions by cable operators, vendors and industry support organizations. While the initial intent of this document is to support the cable industry, the process, methodology and results of this effort may be applicable to other telecommunications networks.
ANSI/SCTE 217-2017, MPEG DASH Reference Architecture for IP-based Cable Services
This MPEG DASH Reference Architecture document is to serve as informational background to a suite of specifications that define the usage of MPEG DASH in cable networks. It introduces adaptive bit rate streaming as a general service and defines reference architecture in which content processing components, flows of process, use cases and scope definition of each part of other relevant documents are described.

This generation of the DOCSIS specifications builds upon the previous generations of DOCSIS specifications (commonly referred to as the DOCSIS 3.0 and earlier specifications), leveraging the existing Media Access Control (MAC) and Physical (PHY) layers, but with the addition of a new PHY layer designed to improve spectral efficiency and provide better scaling for larger bandwidths (and appropriate updates to the MAC and management layers to support the new PHY layer). It includes backward compatibility for the existing PHY layers in order to enable a seamless migration to the new technology.

ANSI/SCTE 220-2-2016, DOCSIS 3.1 Part 2: Media Access Control (MAC) and Upper Layer Protocols Interface Specification
This generation of the DOCSIS specifications builds upon the previous generations of DOCSIS specifications (commonly referred to as the DOCSIS 3.0 and earlier specifications), leveraging the existing Media Access Control (MAC) and Physical (PHY) layers, but with the addition of a new PHY layer designed to improve spectral efficiency and provide better scaling for larger bandwidths (and appropriate updates to the MAC and management layers to support the new PHY layer). It includes backward compatibility for the existing PHY layers in order to enable a seamless migration to the new technology.

This standard is part of the DOCSIS® family of specifications. In particular, this standard is part of a series of standards that define the fifth generation of high-speed data-over-cable systems, DOCSIS 3.1. This standard was developed for the benefit of the cable industry, and includes contributions by operators and vendors from North America, Europe, and other regions.

This document defines the requirements necessary for the Configuration, Fault Management, and Performance Management of the Cable Modem Termination System (CMTS) and the Converged Cable Access Platform (CCAP) system. The intent of this standard is to define a common, cross-vendor set of functionality for the configuration and management of CMTSs and CCAPs.

This standard is part of the DOCSIS® family of specifications. In particular, this standard is part of a series of standards that define the fifth generation of high-speed data-over-cable systems. This standard was developed for the benefit of the cable industry, and includes contributions by operators and vendors from North America, Europe, and other regions.

This standard describes the requirements and constraints on a single program transport stream (SPTS) that allow it to be used as an Adaptive Transport Stream, including stream conditioning and signaling of segment boundary points. Typically, multiple ATISs will be generated from a single input and sent to a packager, recorder or other device. The EBP structure can be inserted at the time of encoding or added during the transcoding process.

ANSI/SCTE 224-2016, Event Scheduling and Notification Interface
This document defines the Event Scheduling and Notification Interface (ESNI), which is a web interface facilitating the transmission of event and policy information. ESNI provides a functional method for providers to communicate upcoming schedule or signal-based events and corresponding policy to distributors. This interface allows existing content distribution controls traditionally performed via manual control in IRD’s by providers to be replaced with a programmatic interface (this standard). ESNI policy enables control of content distributed to audiences based on attributes of that audience including (but not limited) geographic location and device type.

ANSI/SCTE 226-2015, Cable Facility Classification Definitions and Requirements
This SCTE standard defines classes of critical facilities along with expected performance availability across five classes of structures thus creating a common nomenclature for critical facilities.

ANSI/SCTE 23-1-2010, DOCSIS 1.1 Part 1: Radio Frequency Interface
This document defines the radio-frequency interface specifications for high-speed data-over-cable systems. They were developed for the benefit of the cable industry, including contributions by operators and vendors from North America, Europe, and other regions.

ANSI/SCTE 23-2-2012, DOCSIS 1.1 Part 2: Baseline Privacy Plus Interface
The intent of this BPI+ specification is to describe MAC layer security services for DOCSIS&174; CMTS - CM communications.

ANSI/SCTE 23-3-2010, DOCSIS 1.1 Part 3: Operations Support System Interface
This standard defines the Network Management requirements for support a DOCSIS® and environment. More specifically, the specification details the SNMP v3 protocol and how it coexists with SNMP v1/v2. The RFCs and Management Information Base (MIB) requirements are detailed as well as interface numbering, filtering, event notifications, etc.

ANSI/SCTE 230-2016, Recommended Practice for Proper Handling of Audio-Video Synchronization in Cable Systems
This Recommended Practice specifies proper procedures for the measurement of and maintenance of Audio-Video Synchronization (commonly known as ‘Lip Sync’&174;) through various aspects of a cable system - including the headend and distribution architecture and devices.

ANSI/SCTE 230-2016, Recommended Practice for Proper Handling of Audio-Video Synchronization in Cable Systems
This Recommended Practice specifies proper procedures for the measurement of and maintenance of Audio-Video Synchronization (commonly known as ‘Lip Sync’&174;) through various aspects of a cable system - including the headend and distribution architecture and devices.

This document covers the general test procedures that are common to all equipment types and specifies the environmental conditions for evaluating cable equipment energy efficiency metrics. Expectations of measurement equipment as well as guidelines on the recording of results are also covered. This standard will be included as a normative reference in each supplemental standard in the series covering metrics and specific test procedures for the various equipment types.

This document defines how to use a standard methodology to measure the density of hardware to meet the needs of optimizing critical space, as well as measuring energy consumption for the various network element classes. This part of the series focuses on the CMTS, CCAP, and other related cable operator critical facility equipment.

ANSI/SCTE 233-2016, Wavelength-Division Multiplex Small Form Factor Pluggable (PXFP-WDM) Optical Transmitter Module Interface Specification
A PON Extender architecture utilizing WDM optics enables 10GEPON to be deployed over limited fibers and distances over 20 km. Figure 1 shows a typical system use case for a PON Extender architecture.
ISO 50001:2011 specifies requirements for establishing, implementing, maintaining and improving an energy management system, whose purpose is to enable an organization to follow a systematic approach in achieving continual improvement of energy performance, including energy efficiency, energy use and consumption.

ANSI/SCTE 24-1-2016, IPCablecom 1.0 Part 1: Architecture Framework for the Delivery of Time-Critical Services over Cable Television Networks Using Cable Modems
This document provides the architectural framework that will enable cable television operators to provide time critical services over their networks that have been enhanced to support cable modems.

ANSI/SCTE 24-10-2016, IPCablecom 1.0 Part 10: Security Specification
The scope of this document is to define the IPCablecom Security architecture, protocols, algorithms, associated functional requirements and any technological requirements that can provide for the security of the system for the IPCablecom network. Authentication, access control, signaling and media content integrity, confidentiality, and non-repudiation security services must be provided as defined herein for each of the network element interfaces.

ANSI/SCTE 24-11-2016, IPCablecom 1.0 Part 11: Internet Signaling Transport Protocol (ISTP)
This document addresses the protocol to implement SS7 signaling interconnection in a distributed IPCablecom PSTN Gateway architecture. Specifically, it defines the messages and procedures for transporting SS7 ISUP, TCAP, and TUP messages between the IPCablecom control functions (Media Gateway Controller and Call Management Server) and the SS7 Signaling Gateway.

ANSI/SCTE 24-12-2016, IPCablecom 1.0 Part 12: Trunking Gateway Control Protocol (TGCP)
This document describes the TGCP profile of an application programming interface (MGCI) and a corresponding protocol (MGCP) for controlling trunking gateways from external call control elements. A trunking gateway is a network element that provides analog, emulated analog, or digital bearer and channel-associated signaling trunk circuit access to a voice-over-IP (VoIP) network.

ANSI/SCTE 24-2-2016, IPCablecom 1.0 Part 2: Audio Codec Requirements for the Provision of Bi-directional Audio Service over Cable Television Networks Using Cable Modems
The quality of audio delivered over the IPCablecom architecture will depend on multiple factors: the end device performance, the network’s inherent quality, and the intelligence of the system resource allocation policy. This document defines mandated codecs and capabilities supporting audio and video applications, with a particular emphasis on the stringent requirements of IP-based voice communications.

ANSI/SCTE 24-21-2012, BV16 Speech Codec Specification for Voice over IP Applications in Cable Telephony
This document contains the description of the BV16 speech codec. BV16 compresses 8 kHz sampled narrowband speech to a bit rate of 16 kb/s by employing a speech coding algorithm called Two-Stage Noise Feedback Coding (TSNFC), developed by Broadcom.

ANSI/SCTE 24-22-2013, iLBCv2.0 Speech Codec Specification for Voice over IP Applications in Cable Telephony
This document contains the description of an algorithm for coding of speech signals sampled at 8 kHz. Some of the applications for which this coder is suitable are real time communications such as telephony and videoconferencing, streaming audio, archival, and messaging.

ANSI/SCTE 24-23-2012, BV32 Speech Codec Specification for Voice over IP Applications in Cable Telephony
This document contains the description of the BV32 speech codec. BV32 compresses 16 kHz sampled wideband speech to a bit rate of 32 kb/s (kilobits per second) by employing a speech coding algorithm called Two-Stage Noise Feedback Coding (TSNFC), developed by Broadcom.

ANSI/SCTE 24-3-2016, IPCablecom 1.0 Part 3: Network Call Signaling Protocol for the Delivery of Time-Critical Services over Cable Television Using Data Modems
This specification describes a profile of the Media Gateway Control Protocol (MGCP) for IPCablecom embedded clients, which we will refer to as the IPCablecom Network-based Call Signaling (NCS) protocol. MGCP is a call signaling protocol for use in a centralized call control architecture, and assumes relatively simple client devices.

ANSI/SCTE 24-4-2016, IPCablecom 1.0 Part 4: Dynamic Quality of Service for the Provision of Real-Time Services over Cable Television Networks Using Data Modems
This document addresses requirements for a client device to obtain access to IPCablecom network resources. In particular, it specifies a comprehensive mechanism for a client device to request a specific Quality of Service from the DOCSIS® network. Extensive examples illustrate the use of the specification.

ANSI/SCTE 24-5-2016, IPCablecom 1.0 Part 5: Media Terminal Adapter (MTA) Device Provisioning Requirements for the Delivery of Real-Time Services over Cable Television Using Cable Modems
The scope of this document is limited to the provisioning of an IPCablecom 1.0 embedded-MTA device by a single provisioning and network management provider. An attempt has been made to provide enough detail to enable vendors to build an embedded-MTA device that is interoperable in an IPCablecom 1.0 network configuration. This document defines the provisioning of MTA components of the embedded MTA device (unless stated otherwise).

ANSI/SCTE 24-6-2016, IPCablecom 1.0 Part 6: Management Information Base (MIB) Framework
This standard describes the framework in which IPCablecom MIB (Management Information Base) modules are described. It provides information on the management requirements of IPCablecom compliant devices and functions and how these requirements are supported in the MIB modules. It is intended to support and complement the actual MIB module documents, which are issued separately.

ANSI/SCTE 24-7-2016, IPCablecom 1.0 Part 7: Media Terminal Adapter (MTA) Management Information Base (MIB) Requirements
This standard describes the IPCablecom MTA MIB requirement.

ANSI/SCTE 24-8-2016, IPCablecom 1.0 Part 8: Signaling Management Information Base (MIB) Requirements
This specification describes the IPCablecom Signaling (SIG) MIB requirements.

ANSI/SCTE 24-9-2016, IPCablecom 1.0 Part 9: Event Message Requirements
IPCablecom identifies and defines specifications for delivery of enhanced communications services using packetized data transmission technology over the cable television hybrid fiber coax (HFC) data network running the DOCSIS® protocol. IPCablecom specifies a network superstructure that overlays the two-way data-ready broadband cable access network.

This specification describes the PHY layer requirements that must be implemented by all Type 2 and Type 3 compliant OSP HMS transponders on the HFC plant and the controlling equipment in the headend. Any exceptions to compliance with this specification will be specifically noted in this document as necessary.

This specification describes the MAC layer protocols that must be implemented between all Type 2 and Type 3 compliant OSP HMS transponders on the HFC plant and the controlling equipment in the headend to support bandwidth management and reliable communications. Any exceptions to compliance with this specification will be specifically noted in this document as necessary.

ANSI/SCTE 25-3-2011, Hybrid Fiber Coax Outside Plant Status Monitoring - Power Supply to Transponder Interface Bus (PSTIB) Specification v1.1
This specification describes the PSTIB PHY and DLL layer requirements and protocols that must be implemented to support reliable communications between all Type 2 and Type 3 compliant OSP HMS transponders on the HFC plant and managed OSP power supplies and related hardware.
ANSI/SCTE 26-2010, Home Digital Network Interface Specification with Copy Protection
The need for interfaces between cable set top boxes and digital television (DTV) receivers is one element of a general movement to interconnect multiple audio/visual (A/V) devices on a common bus or network. The IEEE 1394 interface has emerged as the preferred tool to accomplish this goal. This specification contains requirements and options for an IEEE 1394 digital interface between a cable TV set top box (called a Host Device in this standard because it “hosts” a removable security module), and a DTV receiver.

ANSI/SCTE 27-2016, Subtitling Methods for Broadcast Cable
This document defines a standard for a transmission protocol supporting multilingual subtitling services to augment video and audio within MPEG-2 multiplexes.

ANSI/SCTE 28-2012, HOST-POD Interface Standard
This standard defines the characteristics and normative specifications for the interface between Point of Deployment (POD) security modules owned and distributed by cable operators, and commercially available consumer receivers and set-top terminals ('Host devices') that are used to access multi-channel television programming carried on North American cable systems

ANSI/SCTE 29-2012, Torque Requirements for Bond Wire Penetration of Bonding Set Screw
The purpose of this test procedure is to determine the mechanical force needed to penetrate bonding wire to the appropriate depth. Bonding wire penetration should be 25 +/-1% of wire O.D.

ANSI/SCTE 30-2015, Digital Program Insertion Splicing API
This Application Program Interface (API) creates a standardized method of communication between Servers and Splicers for the insertion of content into any MPEG-2 Output Multiplex in the Splicer. This API is flexible enough to support one or more Servers attached to one or more Splicers. Digital Program Insertion includes content such as spot advertisements of various lengths, program substitution, public service announcements or program material created by splicing portions of the program from a Server.

ANSI/SCTE 31-2016, Test Method for Measuring Diameter Over Core
To document sample preparation, sample testing and test procedure for measurement of min, max, average core diameter of finished goods coaxial cable.

ANSI/SCTE 32-2016, Ampacity of Coaxial Telecommunications Cables
This document provides the current carrying capacity or AMPCAPITY of coaxial cables used in the Telecommunications industry. The method used to calculate the tabulated ampacities is a thermodynamic model of a cable installed indoors in air and considers the heat flow from the inner and outer conductor through the dielectric and jacket materials. It assumes that the conductors carrying current reach an operating temperature of 65°C based on the cables ability to dissipate heat.

ANSI/SCTE 33-2016, Test Method for Diameter of Drop Cable
To determine one or more of the following characteristics relating to flexible coaxial drop cables. This method is intended to make use of relatively inexpensive equipment. For more precise methods using laser micrometers and the like see ANSI/SCTE 31 2007.

ANSI/SCTE 34-2016, Test Method for Cored Depth Verification
The purpose of this test method is to determine the cored depth of Trunk, Feeder and Distribution Coaxial cable. The core depth is the internal measured distance between the dielectric foam and the square-cut end of the outer sheath. This test method will define the suggested method for core depth measurement.

ANSI/SCTE 35-2016, Digital Program Insertion Cueing Message for Cable
This standard supports delivery of events, frame accurate or non-frame accurate, and associated descriptive data in MPEG-2 transport streams, MPEG-DASH and HLS. This standard supports the splicing of content (MPEG-2 transport streams, MPEG-DASH, etc.) for the purpose of Digital Program insertion, which includes advertisement insertion and insertion of other content types. An in-stream messaging mechanism is defined to signal splicing and insertion opportunities and it is not intended to ensure seamless insertion (splicing, playlist, etc.).

ANSI/SCTE 36-2012, SCTE-ROOT Management Information Base (MIB) Definitions
This MIB provides the root object identifier for the Society of Telecommunications Engineers (SCTE) as an enterprise, as assigned by the Internet Assigned Numbers Authority (IANA). Any Management Information Base (MIB) that falls under the auspices of the SCTE must be assigned object identifiers underneath this enterprise object-id.

ANSI/SCTE 37-2010, Hybrid Fiber/Coax Outside Plant Status Monitoring SCTE-HMS-ROOTS Management Information Base (MIB) Definition
This document provides the branch object identifiers for each of the MIBs within the SCTE HMS Tree. This document has been revised; see the Description in the syntax.

ANSI/SCTE 38-1-2009, Hybrid Fiber/Coax Outside Plant Status Monitoring SCTE-HMS-PROPERTY-MIB Management Information Base (MIB) Definition
This document defines the “properties” that may be associated with each parameter in HMS MIBs.

This document defines information about HFC RF Amplifiers.

ANSI/SCTE 38-11-2008, HMS Headend Management Information Base (MIB) SCTE-HMS-HEADENDIDENT-MIB
This document provides the branch object identifiers for each of the MIBs within the SCTE HMS HEADENDIDENT Tree.

ANSI/SCTE 38-2-2011, Hybrid Fiber/Coax Outside Plant Status Monitoring SCTE-HMS-ALARMS-MIB Management Information Base (MIB) Definition
This document defines the historical list of alarms detected by the transponder, as well as the SNMP trap generated for these alarms.

ANSI/SCTE 38-3-2012, Hybrid Fiber/Coax Outside Plant Status Monitoring SCTE-HMS-COMMON-MIB Management Information Base (MIB) Definition
This document defines common information about NEs. This includes administrative information such as name, ID, model number, serial numbers vendor, and location; health indicators such as status and service state; and functional information such as power level and frequency range.

ANSI/SCTE 38-4-2012, Hybrid Fiber/Coax Outside Plant Status Monitoring SCTE-HMS-PS-MIB Management Information Base (MIB) Definition
This document defines information commonly available from HFC power supplies. Its structure permits multiple power supplies to be monitored by a single transponder.

ANSI/SCTE 38-5-2008, Hybrid Fiber/Coax Outside Plant Status Monitoring SCTE-HMS-FIBERNODE-MIB Management Information Base (MIB) Definition
This document defines information about HFC optical fiber nodes. This includes information about the functional parts of a standard HFC optical fiber node, such as optical receivers, optical transmitters, ports, and power supplies.

ANSI/SCTE 38-6-2012, Hybrid Fiber/Coax Outside Plant Status Monitoring - SCTE-HMS-GEN-MIB Management Information Base (MIB) Definition
This document provides the branch object identifiers for each of the MIBs within the SCTE HMS Tree.
ANSI/SCTE 38-7-2008, Hybrid Fiber/Coax Outside Plant Status Monitoring SCTE-HMS-Transponder Interface Bus (TIB)-MIB Management Information Base (MIB) Definition
This document contains information about the communications state of devices connected to the transponder, as well as indicating what device-specific MIB each device supports. These devices are typically connected to the transponder via a serial communications link (bus).

ANSI/SCTE 38-8-2009, Hybrid Fiber/Coax Outside Plant Status Monitoring SCTE-HMS-DOWNLOAD-MIB Management Information Base (MIB) Definition
This document contains the definitions used to maintain one or more loadable firmware images on an HMS transponder.

ANSI/SCTE 39-2013, Test Method for Static Minimum Bending Radius for Coaxial Trunk, Feeder, and Distribution Cables
This test procedure is to be used for initially establishing or alternatively verifying the minimum static bend radius for coaxial distribution cable products. This procedure establishes the methodology to be used in the determination of a minimum bend radius as well as establishing acceptance criteria by which products can be tested or compared.

ANSI/SCTE 40-2016, Digital Cable Network Interface Standard
This standard defines the characteristics and normative specifications for the digital network interface between a cable television system and commercially available digital cable products that are used to access multi-channel television programming.

ANSI/SCTE 41-2016, POD Copy Protection System
This standard defines the characteristics and normative specifications for the system that prevents unrestricted copying of such high value content as it crosses the POD-Host interface.

ANSI/SCTE 42-2008, IP Multicast for Digital MPEG Networks
The document describes two methods to transmit multicast IP datagrams over MPEG 2 digital transport streams. It describes the use of Digital Video Broadcasting (DVB) Multi-Protocol Encapsulation (MPE) Datagram Sections and the Advanced Television Systems

ANSI/SCTE 43-2016, Digital Video Systems Characteristics Standard for Cable Television
This standard contains the constraints and extensions for the use of MPEG-2 video coding in cable television systems.

ANSI/SCTE 44-2010, Test Method for DC Loop Resistance
This method is intended for use in determining the DC Loop Resistance of coaxial cables. Due to low resistances a four-wire test method is used.

ANSI/SCTE 45-2012, Test Method for Group Delay
The purpose of this test is to measure the group delay and group delay variation of a properly terminated device. This procedure is applicable to testing of 75 Ohm components.

ANSI/SCTE 46-2014, Test Method for AC to DC Outdoor Power Supplies
The purpose of this standard is to characterize, document and define test methods for AC to DC outdoor plant power supplies. These tests involve the measurement of AC input parameters and DC output parameters. The application of uniform test methods for power supplies will allow fair performance comparisons to be made between different power supplies.

ANSI/SCTE 47-2007, Test Method for Coaxial Cable Attenuation
Measurement technique for determining attenuation of coaxial cable at various selected frequencies.

The purpose of this test is to determine the shielding effectiveness against Electromagnetic Interference (EMI) of components. This method subjects the component to an electric field of known strength.

This document outlines the procedures for determining the relative Shielding Effectiveness of cable telecommunication system devices employing a combination of Close Field probes and various Scalar Test equipment packages, through the use of defined, repeatable test practices.

ANSI/SCTE 48-3-2011, Test Procedure for Measuring Shielding Effectiveness of Braided Coaxial Drop Cable Using the GTEM Cell
Details the procedure for measuring the Shielding Effectiveness (S.E.) of coaxial cable using the Gigahertz Transverse ElectroMagnetic (GTEM) cell. More particularly, this standard applies to measuring the S.E. of 75 Ohm braided coaxial drop cables presently used within the broadband communications industry. S.E. measurements can be performed with or without the coaxial connectors removed from the measurement.

ANSI/SCTE 49-2011, Test Method for Velocity of Propagation
Provides a means to measure the velocity of propagation (Vp), in coaxial cables. This standard is for use with cables having low-loss dielectrics, as noted in ANSI/SCTE 15 and ANSI/SCTE 74, that have relative permittivity nearly constant with frequency.

ANSI/SCTE 51-2012, Test Method for Determining Drop Cable Braid Coverage
The purpose of this document is to provide instruction on the calculation of braid coverage for braided coaxial drop cables. Braid coverage is expressed as a percentage of optical coverage of the underlying core by the braid wires.

ANSI/SCTE 52-2013, Data Encryption Standard - Cipher Block Chaining Packet Encryption Specification
This document defines a method for encrypting MPEG-2 transport stream packets using the Data Encryption Standard (DES) Cipher Block Chaining (CBC) encryption standard.

ANSI/SCTE 53-2008, Methods for Asynchronous Data Transport
This proposal represents transmission format for the carriage of asynchronous data services, compatible with digital multiplex bitstream constructed in accordance with ISO/IEC 13818-1 (MPEG-2 Systems). Bit rates for the data services extend from 300 bps to 288 kbps including some common high speed modem rates of 115200 bps and 230400 bps. The proposal also covers the entire set of rates specified by the ITU-T Series-V Recommendations (V.22, V.23, V.26, V.27 ter, V.29, V.32, V.32 bis, V.32 ter and V.34).

ANSI/SCTE 54-2015, Digital Video Service Multiplex and Transport System Standard for Cable Television
This document describes the transport subsystem characteristics and normative specifications of the in-band Service Multiplex and Transport Subsystem Standard for Cable Television.

Specifies the physical layer and the data link layer (including the MAC layer) of the Out-Of-Band cable system transport.

Describes the complete physical layer structure, i.e., framing structure, channel coding and modulation (QPSK), for each direction - Downstream and Upstream.

ANSI/SCTE 56-2016, Digital Multiservice Distribution by Satellite
This document analyses the common elements among existing systems, defines and describes the functions of a generic system model and identifies the processes and the minimum set of parameters of the various sub-systems of the universal elements of a Satellite IRD.
ANSI/SCTE 57-2016, System Information for Satellite Distribution of Digital Television for Cable and MMDS

This document defines a Standard for System Information (SI) compatible with MPEG-2 compliant digital multiplex bitstreams constructed in accordance with ISO/IEC 13818-1 (MPEG-2) and transmitted over satellite for distribution on cable and MMDS. The document defines the standard protocol that carries relevant System Information (SI) tables contained within packets carried in the transport multiplex. The term SI will be used to refer to system-wide information in the Network Packet Identifier (PID).

ANSI/SCTE 58-2012, AM Cross Modulation Measurements

This standard describes a test procedure for the laboratory and production measurement of Amplitude Modulation Cross Modulation (or AM-XMOD) that is present in Broadband Systems which carry Frequency Division Multiplexed (FDM), amplitude modulated, analog video channels.

ANSI/SCTE 59-2012, Test Method for Center Conductor Bond to Dielectric

This test is to determine the amount of bond between the center conductor wire to the dielectric (by measuring the force in pounds required to break the bond) for specified flexible RF coaxial drop cables at room temperature.

ANSI/SCTE 60-2016, Test Method for Interface Moisture Migration Double Ended

The purpose of this document is to provide a test method for detecting moisture penetration into the coaxial connector/cable and or the connector/port interface.


The purpose of this test procedure is to provide a test method for measuring the force required to separate webbed or ‘figure-eight’ coaxial cable constructions. These designs are commonly referred to as messenger, dual, or Siamese cables for the two members that are joined by a web and common overall outer jacket.

ANSI/SCTE 62-2012, Measurement Procedure for Noise Figure

This standard defines a method of measurement for Noise Figure of active Cable Telecommunications equipment. It is intended for measurement of 75-ohm devices having type ‘F’ or 5/8-24 KS connectors, and for the measurement of true broadband noise as opposed to broadband disturbances.


This procedure specifies the spark test method to be used in determining if the outer jacket of a coaxial cable will withstand a specified voltage.

ANSI/SCTE 65-2016, Service Information Delivered Out-Of-Band for Digital Cable Television

This document defines a standard for Service Information (SI) delivered out-of-band on cable. This standard is designed to support ‘navigation devices’ and on-cable. The current specification defines the syntax and semantics for a standard set of tables providing the data necessary for such a device to discover and access digital and analog services offered on cable.

ANSI/SCTE 66-2016, Test Method For Coaxial Cable Impedance

The purpose of this procedure is to provide instructions for measuring coaxial cable impedance. The cable impedance as a function of frequency is calculated from a vector (magnitude and phase) return loss. The average of this impedance across the desired frequency range is the cable impedance. This may be automated, but requires a vector network analyzer, and may be subject to errors due to the cable connection.

ANSI/SCTE 67-2014, Recommended Practice for SCTE 35 Digital Program Insertion Cueing Message for Cable

The purpose of this document is to aid splicing equipment designers, ad insertion equipment designers as well as the purchasers and users of such equipment, such as the networks that will originate SCTE 35 Cue Messages from their uplink sites. This document is also expected to aid in the system integration of advertising related equipment, both at the Message origination end and at the Message reception end.

ANSI/SCTE 68-2013, Drop Passives: Matching Transformers 75 Ohm to 300 Ohm

The purpose of this document is to specify recommended mechanical and electrical standards for broadband radio frequency (RF) devices whose primary purpose is to provide impedance and connector match between 75Ω and 300Ω; twin-lead open screw connectorized devices.


This test is designed to measure the corrosion resistance of flooded coaxial drop cables, trunk, feeder, and distribution cables.

ANSI/SCTE 70-2003 (R2007), Insulation Resistance Megohmmeter Method

This method is intended for use in determining the Insulation Resistance of insulated dielectric for coaxial cables by the megohmmeter method.

ANSI/SCTE 71-2008, Specification for Braided, 75 ohm, Coaxial, Multi-Purpose Cable

This specification defines the materials, electrical and mechanical properties of 75 ohm Braided, Low Loss Subscriber Access Cable (Series 15) as defined herein. These cables are used in the transmission of RF signals and power for voice, data and video applications.

ANSI/SCTE 72-2002 (R2007), Test Method for Axial Load Temperature

This test procedure is intended to evaluate the connection between the connector and the coaxial drop cable when it is subjected to a continuously varying environmental cycle. The cable/connector assembly has an axial load of 15 pounds applied to them during the environmental cycling.

ANSI/SCTE 73-2012, Test Method for Insertion Force of Connector to Drop Cable Interface

This test procedure is designed to measure the amount of linear force required to install a drop (‘F’) connector onto a drop cable of the proper size.

ANSI/SCTE 74-2011, Specification for Braided 75 Ohm Flexible RF Coaxial Drop Cable

This specification defines the materials, electrical and mechanical properties of flexible braided 75 ohm coaxial drop cables.

ANSI/SCTE 75-2012, Test Point Accuracy

This document describes a procedure for evaluating the accuracy of internal and external RF test points as used to monitor input and output ports of Cable Telecommunications equipment.

ANSI/SCTE 77-2013, Specification for Underground Enclosure Integrity

This standard covers conformance tests and requirements for the integrity of grade-level enclosures containing telecommunication or other low voltage apparatus that may be exposed to the public.

ANSI/SCTE 78-2012, Test Method for Transfer Impedance

This procedure is for the measurement of transfer impedance of coaxial drop cables from 5 MHz to 1,002 MHz.

ANSI/SCTE 79-1-2016, DOCSIS 2.0 Part 1: Radio Frequency Interface

This document defines the second generation of radio-frequency interface specifications for high-speed data-over-cable systems. They were developed for the benefit of the cable industry, including contributions by operators and vendors from North America, Europe, and other regions.

ANSI/SCTE 79-2-2016, DOCSIS 2.0 Part 2: Operations Support System Interface

This specification defines the Network Management requirements to support a DOCSIS 2.0 environment. More specifically, the specification details the SNMPv3 protocol and how it coexists with SNMP v1/v2. The RFCs and Management Information Base (MIB) requirements are detailed as well as interface numbering, filtering, event notifications, etc. Basic network-management principles such as account, configuration, fault, and performance management are incorporated in this specification for better understanding of managing a high-speed cable modem environment.
ANSI/SCTE 79-3-2011, DOCSIS 2.0 + IPv6 Cable Modem Standard
This standard is an extension to the DOCSIS 2.0 family of specifications, which define high-speed data-over-cable systems. For an overview of DOCSIS 2.0, refer to ANSI/SCTE 79-1. That standard requires the CM to support IP version 4 for provisioning and management. This standard provides IPv6 provisioning and management functionality for DOCSIS 2.0 CMs, connected IPv6 eSAFEs, and external CPE devices. The term DOCSIS 2.0+IPv6 CM is used to represent such Cable Modems.

ANSI/SCTE 81-2012, Surge Withstand Test Procedure
This document describes a procedure for subjecting a broadband device to surge conditions as specified in IEEE C62.41. Ports shall be tested in compliance with IEEE C62.41 Category B3 Combination Waveform or IEEE C62.41 Category A3 Ring Waveform as specified for the Device Under Test.

ANSI/SCTE 82-2012, Test Method for Low Frequency and Spurious Disturbances
The purpose of this standard is to define and measure low frequency and spurious disturbances caused by switched mode power supplies or other active devices in broadband Cable Telecommunications equipment.

The MIB module provides the branch object identifiers for the headend optics MIBs within the SCTE HMS Headend subtree.

ANSI/SCTE 83-3-2009, Hybrid Fiber/Coax Inside Plant Status Monitoring SCTE-HMS-HMTS-MIB Management Information Base (MIB) Definition
This document provides the MIB definitions for management of an HMTS system and defines how to address the HMS transponders connected to the HTMS system.

ANSI/SCTE 83-4-2009, HMS Common Inside Plant Management Information Base (MIB) SCTE-HMS-HE-RF-MIB
This document provides MIB definitions for HMS RF equipments present in the headend (or indoor) and is supported by a SNMP agent.

The MIB module is for representing general information about optical equipment present in the headend (or indoor) and is supported by an SNMP agent.

ANSI/SCTE 84-2-2009, HMS Inside Plant Management Information Base (MIB) SCTE-HMS-HE-POWER-SUPPLY-MIB
This document provides MIB definitions for HMS Indoor Power Supplies present in the headend (or indoor) and supported by a SNMP agent.

ANSI/SCTE 84-3-2009, HMS Inside Plant Management Information Base (MIB) SCTE-HMS-HE-FAN-MIB
This document provides the branch object identifiers for each of the Fan MIBs within the SCTE HMS Tree.

The MIB module is for representing general information about optical equipment present in the headend (or indoor) and is supported by an SNMP agent.

The MIB module is for representing general information about optical equipment present in the headend (or indoor) and is supported by an SNMP agent.

ANSI/SCTE 85-3-2009, HMS Inside Plant Management Information Base (MIB) SCTE-HMS-HE-OPTICAL-AMPLIFIER-MIB
This document provides MIB definitions for HMS optical amplifiers present in the headend (or indoor) and supported by a SNMP agent.

ANSI/SCTE 85-4-2009, HMS Common Inside Plant Management Information Base(MIB) SCTE-HMS-HE-OPTICAL-SWITCH-MIB
This document provides MIB definitions for HMS optical switch equipment present in the headend (or indoor) and is supported by a SNMP agent.

ANSI/SCTE 86-2010, SCTE Recommended Optical Fiber Cable Types for Outside Plant Trunk and Distribution Applications
The purpose of this document is to provide guidance in selection of a suitable outside plant (OSP) optical cable with respect to different application environments.

ANSI/SCTE 87-1-2008, Graphic Symbols for Cable Systems - Part 1: HFC Symbols
The symbols for devices do not indicate types or model numbers of any manufacturer. They represent the function of the device operated within a cable system. The symbols permit easy addition of model or type numbers within or near their outline.

ANSI/SCTE 88-2012, Test Method for Polyethylene Jacket Longitudinal Shrinkage
The purpose of this test is to determine the amount of shrinkage of the jacketing material used on coaxial drop and distribution cables. This test procedure is applicable for use on either drop or distribution coaxial cables employing polyethylene (PE) jacketing material.

ANSI/SCTE 91-2015, Specification for 5/8-24 RF & AC Equipment Port, Female
The purpose of this specification is to serve as a recommended guideline for the physical dimensions of all female 5/8 - 24 plug (male) trunk and distribution connectors that are typically used in the 75 ohm RF broadband communications industry. It is not the purpose of this standard to specify the details of manufacturing.

ANSI/SCTE 92-2012, Specification for 5/8-24 Plug (Male), Trunk & Distribution Connectors
The purpose of this specification is to serve as a recommended guideline for the physical dimensions of all male 5/8 - 24 plug (male) trunk and distribution connectors that are typically used in the 75 ohm RF broadband communications industry. It is not the purpose of this standard to specify the details of manufacturing.

ANSI/SCTE 93-2013, Test Method for Connector/Cable Twist
This standard details the equipment and procedures required to measure the relative degree of twisting imparted to coaxial cables when installed into mainline plug connectors specifically.

This document provides MIB definitions for HMS RF amplifier equipment present in the headend (or indoor) and is supported by a SNMP agent.

This document provides MIB definitions for HMS RF switch equipment present in the headend (or indoor) and is supported by a SNMP agent.

ANSI/SCTE 95-2009, HMS Inside Plant HMTS Theory of Operation
This document contains information about the background of the Hybrid Management Termination System (HMTS). This document is a companion document for the HMTS MIB, and does not replace the MIB. Although this document has been written to be consistent with the HMTS MIB, in case there would be any conflicts between these two documents, the MIB is the reference.

ANSI/SCTE 96-2013, Cable Telecommunications Testing Guidelines
The test procedures that reference this document are intended to allow a competent technician or engineer to perform the tasks of determining, to a reasonable degree of certainty, the level of performance for the various parameters detailed. The procedures are general in nature and with sufficient forethought and preparation, can be adapted to individual devices, cascades or complete systems. The primary focus for these procedures is for bench or laboratory testing, but the principles discussed are equally applicable to field testing.
ANSI A250.6-2015, Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames

It is the intention of this publication to furnish users and prospective users of standard steel doors and frames with practical information regarding accepted design methods for reinforcing and recommended practices for proper field preparation for builders' hardware.

ANSI A250.8-2014, Recommended Specifications for Standard Steel Doors and Frames

This specification for standard swinging steel doors and frames offers a variety of choices suitable for any commercial application. Specific performance levels of doors and frames are defined herein. SDI-108, 'Selection and Usage Guide for Standard Steel Doors' shall be used as a guide. This Standard shall not act as an obstruction to the development of new, modified or improved products that meet the intent of this specification.

SDI (Canvas) (Steel Door Institute)

ANSI A250.1-2011, Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames

Prescribes the procedures to be followed in the selection of material, chemical preparation, painting, testing, and evaluation of prime painted steel surfaces for steel doors and frames.

ANSI A250.11-2012, Recommended Erection Instructions for Steel Frames

Covers recommended methods for the installation of steel frames for swinging doors in a variety of wall conditions, commonly used in commercial buildings.

ANSI A250.13-2014, Testing & Rating of Severe Windstorm Resistant Components for Swinging Door Assemblies for Protection of Building Envelopes (Not Applicable for FEMA 320/361 of ICC-500 Shelters)

This standard provides procedure for testing & establishing load ratings for components of exterior swinging door assemblies for purposes of protection of openings in building envelopes during severe windstorm conditions, such as a hurricane that produces sustained wind speeds or gusts in a range of 110 to 15 mph as defined by ASCE 7.

ANSI A250.3-2007 (R2011), Test Procedure and Acceptance Criteria for Factory-Applied Finish Painted Steel Surfaces for Steel Doors and Frames

These methods prescribe the procedures to be followed in the selection of material, chemical preparation, coating application, testing, and evaluation of factory applied finish coatings for steel doors and frames. Coatings covered by this standard include paints, stains, clear coats, and powder coats.

ANSI A250.4-2011, Test Procedure & Acceptance Criteria for - Physical Endurance for Steel Doors, Frames and Frame Anchors

The primary purpose is to establish a std. method of testing the performance of a steel door mounted in a hollow metal or channel iron frame installed with the appropriate anchors, under conditions that might reasonably be considered an accelerated field operating condition.

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ANSI/SIA OSIPS-01-2008, Open, Systems Integration and Performance Standards - The OSIPS Framework defines how security components may interoperate with other security components. It is used to communicate over any transport mechanism. The transmission of messages across various transport mechanisms permit common messaging with co-operating devices to interoperate. The Framework is six interfaces and additional fundamental elements that define the elements that are shared among all OSIPS interface models. They are Component Connection, Capabilities Exchange, Event Reporting, Authentication and Authorization, IP Point and Schedule Exchange.

ANSI/SIA OSIPS-DVI-01-2008, Open, Systems Integration and Performance Standards - Digital Video Interface Data Model
This document describes an interface for a component. It provides message sets for the information exchange necessary to provision and command the component, as well as request and receive event and status information. This data model does not prescribe what the physical component is, as it abstracts it to a "black box". The Digital Video Interface data model defines an interface for the control of live and recorded video as well as the control of cameras. It also provides for the reporting of video analytic events.

SJI (Steel Joist Institute)
ANSI/SJI CJ-2010, Standard Specifications for Composite Steel Joists, CJ-Series General Revision
This new standard covers the design and use of open web steel joists in composite construction utilizing field applied shear connectors between the top chord and the overlying concrete slab to allow the steel joist and slab to act together as an integral unit after concrete has adequately cured.

This consolidation effort will take three existing standards and make them one. This effort is being made to eliminate contradictions between the series and provide a simplified approach for the specifying professional.

SLAS (Society for Laboratory Automation and Screening)
ANSI/SLAS 1-2004 (R2012), Microplates - Footprint Dimensions (formerly recognized as ANSI/SBS 1-2004)
This standard defines the dimensional requirements of the footprint of a microplate as specified in American National Standards covering these microplates.

ANSI/SLAS 2-2004 (R2012), Microplates - Height Dimensions, (formerly recognized as ANSI/SBS 2-2004)
This standard defines the dimensional requirements of the height of a microplate as specified in American National Standards covering these microplates.

ANSI/SLAS 3-2004 (R2012), Microplates - Bottom Outside Flange Dimensions (formerly recognized as ANSI/SBS 3-2004)
This standard defines the dimensional requirements of the bottom outside flange of a microplate as specified in American National Standards covering these microplates.

ANSI/SLAS 4-2004 (R2012), Microplates - Well Positions (formerly recognized as ANSI/SBS 4 -2004)
This standard defines the well center positional requirements of a microplate as specified in American National Standards covering these microplates.

ANSI/SLAS 6-2012, Standard #6 for Well Bottom Elevation
Defines well bottom elevation of a microplate as specified in American National Standards (ANS) covering microplates with flat well bottoms.

SMACNA (Sheet Metal and Air-Conditioning Contractors' National Association)
This is an updated set of flexible guidelines that shows designers and contractors how to determine the correct restraints for sheet metal ducts, piping, and conduit, so that they are more likely to remain attached to the building during an earthquake. The manual shows how very low- and very high-risk areas of the country can be accommodated. Meets California Building Code, Title 24, Part 2 and International Building Code, 2006 for bracing ductwork, piping and conduit.

ANSI/SMACNA 002-2011, Rectangular Industrial Duct Construction Standards
Covers moderate to high temperature and pressure indoor and more complex outdoor duct systems that are subject to higher and more complex external loading or where anything other than ambient air is conveyed.

ANSI/SMACNA 005-2013, Round Industrial Duct Construction Standards
SMACNA’s Round Industrial Duct Construction Standards offers a standardized, engineered basis for the design and construction of industrial duct of Classes 1 through 5. The standard covers design pressures through negative 30 to positive 50 inch w.g., nominal diameter ranging from 4 to 96 inches and materials including; carbon, galvanized and coated steels, stainless steels, and aluminum alloys. The main revision in the third edition is the incorporation of temperature reduction factors for carbon steel in the design tables.

ANSI/SMACNA 007-2016, Residential Comfort System Installation Standards
The document will provide installation standards for residential heating, ventilating and air conditioning (HVAC) systems. It will include the most current mechanical and control technology so contractors and designers can design, construct, and install from the simplest to state-of-the-art HVAC systems. Forced-air heating, heat pumps, automatic controls and thermostats, flues, vents, sound and vibration, air cleaning, and others subjects and technologies appropriate for this new century will be included.

ANSI/SMACNA 008-2008, IAQ Guidelines for Occupied Buildings Under Construction
The IAQ Guideline provides project management in maintaining satisfactory indoor air quality (IAQ) of occupied buildings undergoing renovation or construction. The Guideline covers how to manage the source of air pollutants, control measures, quality control and documentation, communication with occupants. It includes example projects, tables, references, resources, and checklists.

The Thermostat FRP Duct Construction Manual is an authoritative manual that design engineers, industrial engineering departments, pollution control authorities, FRP manufacturers and installation contractors can rely upon for the proper selection, manufacture, and installation of FRP duct systems.

ANSI/SMACNA 014-2013, HVAC Systems Commissioning Manual
This manual will detail the commissioning process which ensures that a HVAC system meets the owner’s operational requirements. It will be a practical how-to guide for contractors, owners and engineers interested in commissioning new or existing buildings. Different levels of commissioning will be covered including basic, comprehensive and critical systems. Sample HVAC Systems Commissioning Specification from planning to the final execution and sample reports and checklists will be included.

This manual contains duct leakage classification guidance, test procedures, recommendations on test apparatus and test setup and sample leakage analysis.

ANSI/SMACNA 022-2015, Phenolic Duct Construction Standards
The Phenolic Duct Construction Standard is intended to provide basic phenolic duct fabrication and installation standards to the industry. The standard includes model project specifications, duct performance characteristics, specifications and closures, fittings and connections, reinforcement, hangers and support, accessories and an inspection checklist.
ANSI/SPRI (Single Ply Roofing Institute)


This test standard examines the ability of a root protection barrier to prevent root penetration through the waterproofing layer on low-slope (slope \#8804:70) single-ply membrane and coated roofs. This procedure includes testing of penetration barriers including all seams edges and methods of attachment. This test standard excludes any lamination, i.e., a separate layer installed over the penetration barrier. The penetration barrier may be, but is not limited to, the waterproofing layer itself. The findings for any membrane or coating which has been tested shall not apply to plants with strong rhizome growth (e.g., bamboo or Chinese reeds varieties).

**ANSI/SPRI FX-1-2016, Standard Field Test Procedure for Determining the Withdrawal Resistance of Roofing Fasteners**

This standard provides procedures used in the field to test the pullout resistance of all types of fasteners. The data developed from these tests provide the roof system manufacturer, design professional, and other practitioners with pullout resistance values for the specific fastener installed into the load resisting material of the deck.

**ANSI/SPRI GT-1-2016, Test Standard for Gutter Systems**

This standard provides methodology for the testing of Gutters. This standard is applicable to roof Gutters of all material types and installation methods. This standard specifies a laboratory method for static testing external Gutters. Testing of gutters with a circular cross-section is not addressed in this standard. This standard does not address water removal or the water-carrying capability of the Gutter, and does not consider downspouts or leaders.

**ANSI/SPRI IA-1-2015, Standard Field Test Procedure for Determining the Uplift Resistance of Insulation and Insulation Adhesive Combinations over Various Substrates**

This standard specifies a field-testing procedure to determine the uplift resistance of a specific roof insulation/adhesive combination. This testing procedure encompasses various types of insulation adhesives, substrates and insulations.

**ANSI/SPRI RD-1-2014, Performance Standard for Retrofit Drains**

This standard is a reference on retrofit roof drains which are designated for installation in existing drain plumbing on existing roofs. This standard does not address roof design criteria.


The Wind Design Standard for Vegetative Roofing Systems provides design guidelines associated with wind uplift and stone scour defining items such as set backs from the edges of roofs in areas with high winds, use of wind erosion mats as well as edging details. There is a discussion of the various types of materials and their behavior under varying wind conditions.


The standard being revised is a reference for the design, specification and installation of ballasted single-ply roofing systems. This revision will update the standard to include current ASCE 7 requirements and wind maps. It also updates the design requirements consistent with current technical data.


This design standard provides a method for designing external fire resistance for vegetative roofing systems. It is intended to provide a minimum design and installation reference for those individuals who design, specify, and install vegetative roofing systems. It shall be used in conjunction with the installation specifications and requirements of the manufacturer of the specific products used in the vegetative roofing system.

**ANSI/SPRI WD-1-2014, Wind Design Standard Practice for Roofing Assemblies**

This Wind Design Standard Practice provides general building design considerations as well as a methodology for determining rooftop design wind uplift pressures, then selecting an appropriate roofing system assembly to meet those pressures. This Standard Practice is appropriate for non-ballasted Built-Up, Modified Bitumen, and Single-Ply roofing system assemblies installed over any type of roof deck.


The following standard is a reference for those who design, specify, manufacture, test or install edge materials used with low slope roofing systems. This Standard prescribes methodology for testing roof edge assemblies, excluding gutters, to evaluate their resistance to wind loads.


This Standard provides the basic requirements for wind load resistance testing and design for roof edge securement, edge systems and nailers. It also provides minimum material thicknesses that lead to satisfactory flatness, and designs to minimize corrosion. This Standard is intended for use by those that design, specify, and manufacturer roofing materials and edge systems used in the roofing industry. The membrane manufacturer shall be consulted for specific recommendations for making the roof watertight at the edge.

**ANSI/SPRI/RCI NT-1-2012, Detection and Location of Latent Moisture in Building Roofing Systems by Nuclear Radioisotopic Thermalization**

This standard provides a minimum set of procedures for conducting surveys of moisture in membrane roofing systems, and for analyses of the data obtained in such surveys. Included are operating procedures, operator qualifications, verification, and reporting procedures. It addresses the effect of roof construction, material differences and roof conditions on the numerical data output provided by the nuclear equipment; the limitations in the use of radioisotopic thermalization; and the governmental control of the equipment used to conduct nuclear moisture surveys.

**SVIA (Specialty Vehicle Institute of America)**

**ANSI/SVIA 1-2017, Four Wheel All-Terrain Vehicles**

This voluntary standard addresses design, configuration and performance aspects of ATVs, including, among other items, requirements for mechanical suspension; throttle, clutch and gearshift controls; engine and fuel cutoff devices; lighting; tires; operator foot environment; service and parking brake/parking mechanism performance; and pitch stability. Other areas covered in this standard include: defining Type I and Type II ATVs; Youth and T category ATVs; requirements for Type II ATVs; requirements for labels, owner’s manuals, and hang tags; and a compliance certification label.

**TAPPI (Technical Association of the Pulp and Paper Industry)**

**ANSI/TAPPI T 1009 om-2010, Testing of fiber glass mats: use of modified TAPPI procedures for sampling and lot acceptance, stiffness, tear resistance, air permeability, and thickness**

The purpose of this standard practice is to list existing TAPPI test methods which provide procedures for sampling and lot acceptance, stiffness, tear resistance, air permeability, and thickness.

This method covers the determination of the tensile strength of fiber glass mats, and provides methods for testing and reporting procedures. It addresses the effect of root construction, material differences and roof conditions on the numerical data output provided by the nuclear equipment; the limitations in the use of radioisotopic thermalization; and the governmental control of the equipment used to conduct nuclear moisture surveys.

**ANSI/TAPPI T 1007 sp-2015, Sample location for fiber glass mat sheets**

This practice covers the location from which samples are taken from a sheet of fiber glass mat used as a sample test unit for physical property determination.

**ANSI/TAPPI T 1008 sp-2015, Test conditions for fiber glass mat test methods**

This practice defines the preconditioning and test conditions for testing fiber glass mats.

**ANSI/TAPPI T 1009 om-2010, Tensile strength and elongation at break for fiber glass mats**

This method covers the determination of the tensile strength and elongation at break of fiber glass mats.

**ANSI/TAPPI T 1012 om-2015, Moisture content of fiber glass mats**

This method covers the determination of the moisture content of fiber glass mat on a dry basis.
This standard practice provides a general introduction to the use of color differences and a list of the most widely used equations to obtain them. Color differences can be used (1) as a guide to establishing color tolerances in the production of pulp, paper, and paperboard, (2) for the determination of buying and selling tolerances of color, (3) to provide a method of determining the adequacy of color matches.

This Standard Practice deals only with simplified color indices applicable specifically to white colors. There are approximately 5000 distinguishable white colors. As with any other color, three numbers are necessary for the complete identification of any white. All the color and color difference scales regularly used for color specification are applicable to white colors.

This Standard Practice provides a procedure for judging whether suspect test determinations should be investigated further for possible rejection. A suspect determination (apparent outlier) is one that appears to deviate markedly from other determinations on the same sample of material. An outlying determination (outlier) is a suspect determination for which the deviation has, in fact, been found to be significant using an appropriate statistical test.

This Standard Practice establishes acceptance procedures for the listing of organizations as calibration laboratories or providers of standardized materials in the TAPPI Standards. Such organizations are involved with the maintenance of master instruments, calibration of test instruments and the issuance of calibration materials or transfer standards.

This standard practice covers the significance and application of both instrumental and visual light sources for evaluating papers and related materials including those containing fluorescent whitening agents.

This standard practice lists several practices that have been found to be helpful in preserving samples. Measurements may be made on pulp with up to 4% lignin, as defined by TAPPI T 222 'Acid-Insoluble Lignin in Wood and Pulp,' for their strength and other physical properties as well as their light-scattering coefficient. Information derived from handsheet testing is a measure of the potential contribution of the pulp to the strength of the finished paper product.

This procedure describes the testing of pulp handsheets, prepared in accordance with TAPPI T 205 'Forming Handsheets for Physical Tests of Pulp,' for their strength and other physical properties as well as their light-scattering coefficient. Information derived from handsheet testing is a measure of the potential contribution of the pulp to the strength of the finished paper product.

This method is used to define the papermaking quality of pulp, by subjecting it to a controlled mechanical treatment in a laboratory beater; see also TAPPI T 248 ‘Laboratory Beating of Pulp (PFI Mill Method).’

This method for determination of ash can be applied to all types and grades of wood pulp, paper, and paperboard: combustion at 525 degrees C.

This method for determination of 1% sodium hydroxide solubility of wood and pulp can be applied to wood and to unbleached and bleached pulp.

This method is adapted to the numerical estimation of dirt in pulp and recycled pulp in terms of equivalent black area.

This procedure describes the testing of pulp handsheets, prepared in accordance with TAPPI T 205 'Forming Handsheets for Physical Tests of Pulp,' for their strength and other physical properties as well as their light-scattering coefficient. Information derived from handsheet testing is a measure of the potential contribution of the pulp to the strength of the finished paper product.

This method describes a procedure for determining the viscosity of 0.5% cellulose solutions, using 0.5M cupriethylenediamine (CED) as a solvent and a capillary viscometer. Measurements may be made on bleached cotton and wood pulps. Conventional kraft pulps with up to 4% lignin, as defined by TAPPI T 222 'Acid-Insoluble Lignin in Wood and Pulp,' can also be analyzed.

This standard practice provides a procedure for determining the level of lignin remaining in a sample of finished or in-process pulp. It is thus a measure of the completeness of the pulping process for many kinds of chemical and semi-chemical pulps, both bleached and semi-bleached.
ANSI/TAPPI T 240 om-2012, Consistency (concentration) of pulp suspensions

This method describes the measurement of pulp consistency (concentration) of aqueous fiber suspensions. The method applies to most pulps sampled from different process points in a pulp or paper mill. The method is applicable to pulps with up to 25% consistency.

ANSI/TAPPI T 248 sp-2015, Laboratory beating of pulp (PFI mill method)

This standard practice describes the processing of pulp by means of the PFI mill to evaluate pulp quality for papermaking.

ANSI/TAPPI T 252 om-2012, pH and electrical conductivity of hot water extracts of pulp, paper, and paperboard

This procedure provides for the extraction of pulp, paper, and paperboard samples using boiling reagent water followed by determination of the pH and conductivity of the extract.

ANSI/TAPPI T 257 sp-2014, Sampling and preparing wood for analysis

This practice is applicable to the sampling of wood for all chemical tests. The procedures describe the sampling of wood in all forms, i.e., logs, chips, or sawdust. Two sampling plans are described: A probability sampling plan which provides test units from which some property of the wood may be determined within known and controlled limits at a minimum total cost; an economic or engineered sampling plan which minimizes errors due to variations in the raw material or the quality of the lot.

ANSI/TAPPI T 259 om-2015, Species identification of nonwood plant fibers

The fibrous elements of the nonwood plant species, which are commonly encountered in papermaking or that are expected to have the potential of being used for this purpose, may be identified on the basis of their morphology as revealed by the microscope. The purpose of this method is to provide some of the details, which are useful in making an identification of an unknown nonwood plant specimen. This method can be used whether a coarse undefibered specimen is present or samples of pulp, paper or other paper products are provided.

ANSI/TAPPI T 262 sp-2012, Preparation of mechanical pulps for testing

This practice describes a procedure for the preparation of mechanical pulps prior to physical testing.

ANSI/TAPPI T 268 om-2013, Weight-volume measurement of pulpwod

A method is described for determining the weight of pulpwod per unit of volume (a standard-racked cord).

ANSI/TAPPI T 271 om-2012, Fiber length of pulp and paper by automated optical analyzer using polarized light

This is an automated method by which the numerical and weighted average fiber lengths and fiber length distributions of pulp and paper can be measured using light polarizing optics in the range of 0.1 mm to 7.2 mm.

ANSI/TAPPI T 272 sp-2012, Forming handsheets for reflectance testing of pulp (sheet machine procedure)

This practice describes the procedure using the TAPPI sheet machine for preparing reflectance-testing specimen sheets of bleached or unbleached pulp whose fibers are readily dispersed in water. This practice permits the preparation of sheets having a smooth and reproducible surface for reflectance measurements with a minimum of washing or contamination of the sample.

ANSI/TAPPI T 274 sp-2013, Laboratory screening of pulp (MasterScreen-type instrument)

A general purpose practice for screening pulp using a specific screening device is described, which separates from a slurry of pulp fibers a contaminant fraction with size dimensions which are significantly greater than the diameter of a pulp fiber.

ANSI/TAPPI T 277 sp-2014, Macro stickies content in pulp: the "pick-up" method

This standard practice describes removing and preparation of a test specimen that can be analyzed for determining heat-set area and number of macro stickies in a specified amount of pulp screened. The method applies to a wide range of pulps, typically, recycled pulp. The standard practice does not quantify content of micro stickies.

ANSI/TAPPI T 281 sp-2012, Open drum washer mat sampling technique

Provides a means to collect pulp mat and liquor samples from open drum washers.

ANSI/TAPPI T 282 om-2013, Hexeneuronic acid content of chemical pulp

This method describes a procedure to determine hexeneuronic acid groups (HexA) in chemical pulps. HexA affects the kappa number determination by reaction with permanganate, and can react with certain bleaching chemicals, e.g. chlorine dioxide and ozone, but not with some others such as oxygen and peroxide.

ANSI/TAPPI T 400 sp-2011, Sampling and accepting a single lot of paper, paperboard, containerboard, or related product

This method describes procedures for obtaining a representative sample for testing. It should be recognized that in an ideal situation the samples selected should represent a lot of paper or paperboard, container board, or related product, including converted paper products. However, in some situations the sample may be as small as a single sheet of paper that has been provided to the laboratory for testing and may not represent the lot from which it is obtained.

ANSI/TAPPI T 401 om-2015, Fiber analysis of paper and paperboard

This method provides a procedure for the identification of the kinds of fibers present in a sample of paper or paperboard and their quantitative estimation. This method requires the analyst to be skillful and experienced in the field of pulp and paper microscopy.

ANSI/TAPPI T 402 sp-2013, Standard conditioning and testing atmospheres for paper, board, pulp handsheets, and related products

This standard practice defines the standard atmospheres for normal preconditioning, conditioning, and testing of paper and paper products, paperboard, fiberboard, and containers made from them. It also specifies procedures for handling these materials in order that they may reach equilibrium with the respective atmosphere.

ANSI/TAPPI T 403 om-2015, Bursting Strength of Paper

This test method describes the measurement of the bursting strength of paper. This method applies to paper products having a bursting strength of 50 kPa up to 1200 kPa (7 psi up to 175 psi) and in the form of flat sheets with a maximum thickness of 0.6 mm (0.025 in.). Materials that can be tested using this method include newsprint, bag paper, fine paper, packaging paper, and printing papers. It is not intended for use in testing corrugated, fiberboard, linerboard, or hardboards that tend to cut the thin rubber diaphragm of the bursting tester.

ANSI/TAPPI T 406 om-2013, Reducible sulfur in paper and paperboard

This method describes two procedures for the determination of reducible sulfur in paper and paperboard within the context of the given definitions.

ANSI/TAPPI T 409 sp-2015, Machine direction of paper and paperboard

This Standard Practice describes several procedures for determining the machine direction of most grades of paper and paperboard. Most of the procedures embody the principle that fibers tend to be aligned in the machine direction of the sheet; and this alignment produces observable effects. However, the extent of restraint used in drying can be very important in determining machine direction.

ANSI/TAPPI T 410 om-2013, Grammage of paper and paperboard (weight per unit area)

The area of several sheets of the paper or paperboard is determined from linear measurements and the mass (commonly called 'weight') is determined by weighing. The grammage is calculated from the ratio of the mass to the area after conversion to metric units when necessary.

ANSI/TAPPI T 411 om-2015, Thickness (caliper) of paper, paperboard, and combined board

This method describes the procedure for measuring single-sheet thickness and variations in single sheet thickness of paper, paperboard, and combined board. The term 'combined board'& #8221; encompasses both corrugated and solid fiberboard.
Reducible sulfur activity is a common cause of silver. The appearance of the tarnish or stain of silver under standardized conditions.

This method describes a procedure for determining the quantity of water absorbed by nonbibulous paper, and corrugated fiberboard in a specified time.

This method describes the procedure for identifying the wire side of paper.

This method describes procedures for identifying the wire side of paper made on a fourdrinier paper machine with a single wire or forming fabric. The term 'wire side' will be used throughout this method and relates to the side of the sheet made in contact to either the machine wire or forming fabric.

This method describes the procedure for the determination of the tensile strength of paper and paperboard after saturation with water.

This method, applicable to uncoated and coated papers, is designed to measure the surface strength of paper or its resistance to picking. It is not applicable to loosely felted papers such as blotters or roofing felts, nor to papers containing materials that soften with heat such as waxes or latex type additives. Light weight papers that lack stiffness may slip under the block during the wax removal step are not suitable for testing by this procedure.

This method is used to measure the air resistance of approximately 6.45 sq. cm. (4 sq. in.) circular area of paper using a pressure differential of 1.22 kPa. The recommended range of the liquid column instrument is from 5 to 1800 seconds per 100 mL cylinder displacement. For more impermeable papers the time requirements become so excessive that other techniques are preferable.
ANSI/TAPPI T 494 om-2013, Tensile properties of paper and paperboard (using constant rate of elongation apparatus)

This test method describes the procedure, using constant-rate-of-elongation equipment, for determining four tensile breaking properties of paper and paperboard: tensile strength, stretch, tensile energy absorption, and tensile stiffness.

ANSI/TAPPI T 496 sp-2013, Specimen preparation for cross directional internal tearing resistance for paper, paperboard and related materials

This practice is used for the preparation of test specimens for the internal tearing resistance of paper, board, and related materials when a force is applied perpendicular to the machine direction.

ANSI/TAPPI T 511 om-2013, Folding endurance of paper (MIT tester)

This method describes the use of the MIT-type apparatus for the determination of the folding endurance of paper. An exhaust fan arrangement maintains the folding head at room temperature. The MIT tester is suitable for papers of any thickness; however, if the outer fibrous layers of paper thicker than about 0.25 mm (0.01 in.) rupture during the first few folds, the test loses its significance.

ANSI/TAPPI T 512 sp-2012, Creasing of flexible packaging material paper specimens for testing

This standard practice describes a creasing procedure for tests requiring creased specimens of flexible packaging materials made of paper or paper-based materials. In most instances, it is advantageous to compare the results of the creased specimens with those of uncreased specimens. This standard practice is not applicable to board grades (those exceeding 0.25 mm [0.01 in.] in thickness).

ANSI/TAPPI T 515 om-2014, Visual grading and color matching of paper

This method describes the spectral, photometric, and geometric characteristics of a light source, the illuminating and viewing conditions, and the procedures to be used for the visual evaluation of color differences of paper, including those containing fluorescent whitening agents.

ANSI/TAPPI T 519 om-2011, Diffuse opacity of paper (d/0 paper backing)

Provides a measure of diffuse opacity (paper backing) of white and near-white papers, previously known as ‘printing opacity.’ The method may be employed for colored papers on condition that their reflectance (paper backing) is greater than 20% and their diffuse opacity (paper backing) is greater than 45%. The method is not suitable for highly transparent papers such as glassine.

ANSI/TAPPI T 524 om-2013, Color of paper and paperboard (45/0, C/2)

This method specifies a procedure for measuring the color of paper or paperboard with tristimulus filter colorimeters or spectrophotometers incorporating directional (45/0) geometry and CIE (International Commission on Illumination) illuminant C.

ANSI/TAPPI T 525 om-2012, Diffuse brightness of paper, paperboard and pulp (d/0) -- Ultraviolet level C

This method is for the determination of the brightness of white, near-white, and naturally colored pulp, paper, and paperboard. Brightness is a commonly used industry term for the numerical value of the reflectance factor of a sample with respect to blue light of specific spectral and geometrical characteristics. This method requires an instrument employing diffuse illumination and 0 degree viewing geometry.

ANSI/TAPPI T 527 om-2013, Color of paper and paperboard (d/0, C/2)

This method specifies a procedure for measuring the color of paper or paperboard with tristimulus filter colorimeters or spectrophotometers incorporating diffuse/0 geometry and CIE (International Commission on Illumination) illuminant C.

ANSI/TAPPI T 529 om-2014, Surface pH measurement of paper

This non-destructive test may be used to measure the hydrogen ion concentration (pH) on the surface of the paper in books and documents that constitute the collections of libraries and government archives.

ANSI/TAPPI T 530 om-2012, Size test for paper by ink resistance (Hercules-type method)

This method measures the resistance of paper to permeation of an aqueous penetrant and is a useful general purpose test for degree of sizing. It is applicable to most bleached, unbleached, and colored paper or boards which are surface sized and/or internally sized.

ANSI/TAPPI T 546 om-2015, Machine-direction grammage variation measurement (gravimetric method)

This procedure can be used to determine the short term machine-direction variation in mass per unit area. These variations can be caused by defects in the stock approach system, headbox, or consistency control. This test method is not intended to identify the source of the variations, but rather to quantify them. The method has particular application to acceptance testing of both the papermaking process and the product.

ANSI/TAPPI T 547 om-2012, Air permeance of paper and paperboard (Sheffield method)

This method is used to measure the air permeance of a circular area of paper using a pressure differential of approximately 10 kPa (1.5 psig). In order to accommodate a wide range of paper products, rubber clamping plates are available for five commonly used orifice diameters: 9.5 mm (0.375 in.), 19.1 mm (0.75 in.), 38.1 mm (1.50 in.), 57.2 mm (2.25 in.), and 76.2 mm (3.00 in.).
ANSI/TAPPI T 659 om-2014, Internal bond strength (Scott type)

Printing, converting and many product applications subject paper and paperboard to impulses, impacts and shock loads into or out of the plane of the sheet. These can cause structural failures such as surface picks, blistering or delaminations within the interior of the sheet. The common denominators of these failures are a) the high velocity of the impact loads b) the short time period during which the material is stressed, frequently one to a few hundred milliseconds, and c) the planar nature of the resultant sheet failure. Test results from this method may correlate with product failures of this type.

ANSI/TAPPI T 572 sp-2013, Accelerated pollutant aging of printing and writing paper by pollution chamber exposure apparatus

This standard practice describes a laboratory procedure for the exposure of printing and writing paper to the common atmospheric pollutant gas nitrogen dioxide at elevated levels of concentration to permit accelerated aging of such paper.

ANSI/TAPPI T 573 sp-2015, Accelerated temperature aging of printing and writing paper by dry oven exposure apparatus

This standard practice describes a laboratory procedure for accelerating the aging of printing and writing paper within sealed glass tubes through exposure to elevated temperature within an oven.

ANSI/TAPPI T 578 sp-2011, Accelerated light aging of printing and writing paper by xenon-arc exposure apparatus

This standard practice describes a laboratory procedure for the exposure of printing and writing paper to xenon-arc light at elevated levels of light flux to permit accelerated aging of that type of paper.

ANSI/TAPPI T 648 om-2014, Viscosity of coating clay slurry

This method describes a procedure for the determination of the low- and high shear viscosity of coating clays. This is accomplished by the preparation of a completely dispersed 70% solids aqueous clay suspension with incremental introduction of dispersant to obtain the optimum dosage (minimum viscosity) for the low and high shearing rates.

ANSI/TAPPI T 650 om-2015, Solids content of black liquor

This method is designed to measure gravimetrically the solids content of weak and strong black liquors as they exist, or will exist, at the point of injection into the recovery furnace.

ANSI/TAPPI T 657 sp-2012, Sampling of fillers and pigments

This document describes procedures for sampling shipments of fillers, pigments, and other materials in finely divided form for the purpose of securing a sample for analysis. Procedures are given for sampling dry bulk and bagged shipments, as well as high-solids slurries.

ANSI/TAPPI T 692 om-2013, Determination of suspended solids in kraft green and white liquors

This method provides a means of determining the level of suspended solids in kraft green liquor and kraft white liquor.

ANSI/TAPPI T 702 om-2014, Rheological measurements for characterization of polyolefins: Low-density polyethylene (LDPE) for extrusion coating

In optimizing the extrusion coating processing performance it is of utmost importance to balance the rheology of the polymer. This method describes how rheological measurements can be used to characterize LDPE. The storage modulus and zero shear viscosity have been found to be useful parameters to predict the extrusion coating performance of LDPE.

ANSI/TAPPI T 802 om-2012, Drop test for fiberboard shipping containers

Describes procedures for determining the ability of fiberboard containers to protect their contents and/or to withstand impact in free-fall drops. These procedures are specifically designed for controlled drop testing of solid fiber or corrugated shipping containers. They do not apply to cylindrical containers or cans made of fiber. This test is not normally used on packages heavier than 68 kg (150 lb).

ANSI/TAPPI T 804 om-2012, Compression test of fiberboard shipping containers

This method is used for measuring the ability of corrugated or solid fiber shipping containers to resist external compressive forces.

ANSI/TAPPI T 807 om-2011, Bursting strength of linerboard

This method describes a procedure for measuring the bursting strength of linerboard using a disk shaped diaphragm. Basis weights for this method should be 98 g/square meter (20K/MSF) and higher. The minimum burst should be 350 kPa (51 psi). This method may also be used to test paperboard. A specimen is clamped between two platens with circular openings in their centers. An expansible diaphragm is distended through the lower platen by means of hydraulic pressure until the specimen ruptures. The maximum hydraulic pressure when the specimen ruptures is recorded.

ANSI/TAPPI T 809 om-2011, Flat crush of corrugating medium (CMT test)

This method describes a procedure for measuring the crushing resistance of a laboratory fluted strip of corrugating medium, and provides a means of estimating, in the laboratory, the potential flat crush resistance of a corrugated board.

ANSI/TAPPI T 810 om-2011, Bursting strength of corrugated board

This method describes a procedure for measuring the bursting strength of single wall and double wall corrugated board within the range of 690 kPa (100 psi) to 4825 kPa (700 psi) employing an instrument which uses a disk shaped, molded diaphragm. A specimen of board is clamped between two platens with circular opening in their centers. The lower platen is fixed; the upper platen has an adjustable depth but remains stationary for the duration of the test. An expandible diaphragm is distended through the lower platen by means of hydraulic pressure until the specimen bursts. The maximum hydraulic pressure when the specimen ruptures is recorded.

ANSI/TAPPI T 811 om-2011, Edgewise compressive strength of corrugated fiberboard (short column test)

This method describes procedures for determining the edgewise compressive strength (ECT), perpendicular to the axis of the flutes, of a short column of single-, double-, or triple-wall corrugated fiberboard. The method includes procedures for cutting the test specimen, specimen support (waxed edges), and two procedures for applying the compressive force (constant strain rate, or constant load rate).

ANSI/TAPPI T 812 om-2013, Ply separation of solid and corrugated fiberboard (wet)

This method describes a laboratory test for evaluating the resistance to ply separation of solid or corrugated fiberboard after exposure to water. It is intended primarily to distinguish between boards fabricated with weather-resistant adhesives and those with nonweather-resistant adhesives.

ANSI/TAPPI T 815 om-2012, Coefficient of static friction (slide angle) of packaging and packaging materials (including shipping sack papers, corrugated and solid fiberboard) (inclined plane method)

This method determines the coefficient of static friction of most packaging materials by measuring the angle at which one test surface begins to slide against another inclined surface as the incline is increased at a constant and prescribed rate. The test is frequently referred to as slide angle. The coefficient of friction is numerically equivalent to the tangent of that angle.

ANSI/TAPPI T 821 om-2012, Pin adhesion of corrugated board by selective separation

This method is used to measure the force required to separate corrugated board between the flute tips of corrugated medium and its linerboard facings.

ANSI/TAPPI T 822 om-2011, Ring crush of cardboard (rigid support method)

The ring crush test correlates with edgewise compression strength of paperboard. This method is intended for paperboard between 0.28 mm (0.011 in.) and 0.61 mm (0.024 in.) thick. It may be used with less reliability for paperboard as thin as 0.18 mm (0.007 in.) and as thick as 0.76 mm (0.030 in.).
ANSI/TAPPI T 825 om-2014, Flat crush test of corrugated board (rigid support method)
The flat crush test (1) is a measure of the resistance of the flutes in corrugated board to a crushing force applied perpendicular to the surface of the board under prescribed conditions. The test is satisfactory for single-faced or single wall (double-faced) corrugated board, but not for double-wall or triple-wall corrugated board, because of lateral motion of the central facing or facings.

ANSI/TAPPI T 826 om-2013, Short span compressive strength of containerboard
This method describes a procedure for determining the compressive resistance of containerboard.

ANSI/TAPPI T 831 om-2014, Water absorption of corrugating medium: water drop penetration test
The water absorbivity of corrugating medium is measured by dropping a drop of water on the surface of a specimen and determining the time in seconds for the drop to penetrate through the sheet and wet the lower surface.

ANSI/TAPPI T 832 om-2012, Water absorption of corrugating medium: float curl method
The water absorbivity of corrugating medium is measured by floating a specimen on the surface of a vessel of water and determining the time for the specimen to become saturated.

ANSI/TAPPI T 834 om-2012, Determination of containerboard roll hardness
This test method describes a procedure to determine the uniformity in relative hardness of rolls of containerboard. Since several devices are currently available that use significantly differing technologies to determine hardness, this method only addresses the actual measurement process and not the test equipment specifically.

ANSI/TAPPI T 835 om-2014, Water absorption of corrugating medium: water drop absorption test
The water absorbivity of corrugating medium is measured by dropping a drop of water on the surface of a specimen and determining the time in seconds for the drop to be completely absorbed as evidenced by the loss of sheen.

ANSI/TAPPI T 836 om-2013, Bending stiffness, four point method
This procedure specifies the method of determining the bending stiffness, also called flexural rigidity, in the machine and cross directions, of corrugated board using four-point loading. The procedure may also be used for solid boards and paperboard. The method is applicable to boards with a bending stiffness of 0.5 - 200 Nm (4.4 - 1770 lbf - in.).

ANSI/TAPPI T 839 om-2012, Edgewise compressive strength of corrugated fiberboard using the clamp method (short column test)
This method describes procedures for determining the edgewise compressive strength, with flutes vertical, loading perpendicular to the axis of the flutes, of a short column of single-, double-, or triple-wall corrugated fiberboard.

ANSI/TAPPI T 845 om-2014, Wet Pin Adhesion of Corrugated Board by Selective Separation
This method measures the force required to separate the linerboard facings from the medium in corrugated board after the board has been immersed in water for a period of time. It may be used to evaluate the water resistance properties or levels in water resistant adhesive.

**TCATA (Textile Care Allied Trades Association)**

ANSI Z8.1-2016, Standard for Commercial Laundry Equipment and Operations -- Safety Requirements
This standard applies to the safety requirements for the operation and use of commercial and industrial laundry equipment.

**TCAIA (ASC A300) (Tree Care Industry Association)**

ANSI A300 (Part 1)-2017, Tree, Shrub, and Other Woody Plant Management (Pruning)
A300 standards are performance standards for the management of trees, shrubs, and other woody plants. They are also a guide in the crafting of woody plant management specifications for federal, state, municipal, and private authorities including property owners, property managers, and utilities. BSR A300 (Part 1)-201x Pruning will provide standard practices for pruning of trees and other woody plants and pruning specification writing guide.

A300 (Part 10) Integrated Pest Management (IPM) standards are performance standards for implementing and maintaining Integrated Pest Management systems for trees and woody plants. IPM concepts, required program components, and system models are described. It is a guide in the drafting of IPM program specifications for consumers as well as federal, state, municipal, and private authorities including property owners, property managers, and utilities.

A300 (Part 2) Soil Management standards are performance standards for management of soil including soil modification, fertilization, and moisture management (drainage) for trees, shrubs, and other woody plants. It is a guide in the drafting of work project specifications for consumers as well as federal, state, municipal, and private authorities including property owners, property managers, and utilities.

ANSI A300 (Part 3)-2013, Tree Care Operations - Tree, Shrub, and Other Woody Plant Management - Standard Practices (Supplemental Support Systems)
A300 (Part 3) Supplemental Support Systems standards are performance standards for the installation of supplemental support systems for trees. Cabling, bracing, propping, and guying support methods are addressed. It is a guide in the drafting of supplemental support system specifications for consumers as well as federal, state, municipal, and private authorities including property owners, property managers, and utilities.

ANSI A300 (Part 4)-2014, Tree Care Operations - Tree, Shrub, and Other Woody Plant Management - Standard Practices (Lightning Protection Systems)
A300 (Part 3) Lightning Protection Systems standards are performance standards for the installation of lightning protection systems for trees. System design for trees is addressed. It is a guide in the drafting of tree lightning protection system specifications for consumers as well as federal, state, municipal, and private authorities including property owners, property managers, and utilities.

ANSI A300 (Part 5)-2012, Tree Care Operations - Tree, Shrub, and Other Woody Plant Management - Standard Practices (Management of Trees and Shrubs During Site Planning, Site Development, and Construction)
A300 (Part 5) Management of Trees and Shrubs During Site Planning, Site Development, and Construction standards are performance standards for management of trees, shrubs, and other woody plants before, during, and after the development process, including the project planning phase and post-project after care. It is a guide in the drafting of work project specifications for consumers as well as federal, state, municipal, and private authorities including property owners, property managers, and utilities.
TCNA (ASC A108) (Tile Council of North America)

ANSI A108.01-2016, General Requirements: Subsurfaces and Preparations by Other Trades
This specification is intended to describe the general requirements for substrates and subsurfaces and general guidelines for preparation by other trades as it relates to the installation of ceramic tile.

ANSI A108.02-2016, General Requirements: Materials, Environmental, and Workmanship
This standard outlines the requirements for delivery, storage and handling of materials at the jobsite. Also included are requirements for the installer to inspect the site prior to installation of the tile and preparation of the floor, curing the mortar bed, etc. prior to installing tile. This is the section which contains the requirements for acceptable workmanship such as consistent width of grout joints, acceptable lippage, and the types of things that are under control of the installer.

ANSI A108.10-1999 (R2010), Installation of Grout in Tilework
This standard outlines the requirements for installation of different types of grout including preparation of the grout joints and techniques for grouting, etc.

ANSI A108.11-2010 (R2016), Interior Installation of Cementitious Backer Units
This standard describes the specifications for interior installation of cementitious backer units.

ANSI A108.12-1999 (R2010), Installation of Ceramic Tile with EGP (Exterior Glue Plywood) Latex-portland Cement Mortar
This standard includes instructions on the installation of ceramic tile on Exterior or Exposure 1 plywood under different applications using EGP Latex-portland cement mortar. The standard identifies the types of substrates (wood) which may be used in which applications, etc.

ANSI A108.13-2005 (R2016), Installation of Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone
This specification is a guideline for installing waterproof membrane that comply with ANSI A118.10.

ANSI A108.14-2010, Installation of Paper-Faced Glass Mosaic Tile
This standard outlines the process using the wet-set method with mosaic glass tiles (typically 2’X2’ or smaller but may vary). There are no standards yet for large format tiles. The guidelines for installing the mosaics using the wet-set method with Portland cement mortar are given. The mix ratios for mortars are given.

This specification is a guideline for installing paper-faced glass mosaic tile over portland cement mortar beds, cured a minimum of seven days, and cementitious backer units using manufacturer recommended ANSI A118.4 thin-sets combined with back buttering the sheets with grout during the installation process.

ANSI A108.16-2005 (R2016), Installation of Paper-Faced, Back-Mounted, Edge-Mounted, or Clear Film Face-Mounted Glass Mosaic Tile
This specification is a guideline for installing paper-faced, back-mounted, edge-mounted, or clear film face-mounted glass mosaic tile, 3/16 in. or thicker, using the direct bond method over portland cement mortar beds, cured seven days minimum, and cementitious backer units.

ANSI A108.17-2005 (R2016), Installation of Crack Isolation Membranes for Thin-Set Ceramic Tile and Dimension Stone
This specification is a guideline for installing crack isolation membranes that comply with ANSI A118.12.

ANSI A108.19-2017, Interior Installation of Gauged Porcelain Tiles and Gauged Porcelain Tile Panels/Slabs by the Thin-Bed Method bonded with Modified Dry-Sheet Cement Mortar or Improved Modified Dry-Sheet Cement Mortar
This specification provides interior installation procedures and requirements for installing gauged porcelain tiles and gauged porcelain tile panels/slabs that meet ANSI A137.3 tables 4 and 5.

ANSI A108.1A-2014, Installation of Ceramic Tile in the Wet-Set Method, with Portland Cements Mortar
This specification is intended to describe the requirements for installation of ceramic tile in the wet-set method.

ANSI A108.1b-1999 (R2010), Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex-Portland Cement Mortar
This standard explains the requirements of installing tile on the mortar bed once it has been cured. There is not much detail; it refers to the flatness of the cured mortar bed.

ANSI A108.1C-1999 (R2016), Contractor’s Option: Installation of Ceramic Tile in the Wet-Set Method with Portland Cement Mortar or Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex-Portland Cement Mortar
This standard gives the contractor the ability to select either A108.1A or A108.1B for installation of ceramic tile.
ANSI A108.4-2009, Installation of Ceramic Tile with Organic Adhesives or Water Cleanable Tile-Setting Epoxy Adhesive

This standard includes the guideline for installing tile using organic adhesives such as mastic. The guidelines include everything from where these types of products may be used, surface preparation, how thick to apply the adhesive, and how to grout tile which has been installed using the adhesive.

ANSI A108.5-1999 (R2010), Installation of Ceramic Tile with Dry-set Portland Cement Mortar or Latex-portland Cement Mortar

This standard explains the guidelines for dry-set portland cement mortars, including the proper method for using the trowel, mixing the mortar, and setting the tiles into the mortar. It also provides guidelines for adequate coverage for different applications.

ANSI A108.6-1999 (R2010), Installation of Ceramic Tile with Chemical Resistant, Water Cleanable Tile-setting and -Grouting Epoxy

This standard explains the guidelines for dry-set portland cement mortars, including the proper method for using the trowel, mixing the mortar, and setting the tiles into the mortar. It also provides guidelines for adequate coverage for different applications.

ANSI A108.8-1999 (R2010), Installation of Ceramic Tile with Chemical Resistant Furan Resin Mortar and Grout

This standard describes the minimum requirements for installing ceramic tile using furan resin mortar and grout including special preparation requirements needed for furan mortars. In addition to special tools, there are instructions regarding the need to protect the face of the tile from the furan grout.

ANSI A108.9-1999 (R2010), Installation of Ceramic Tile with Modified Epoxy Emulsion Mortar/Grout

This standard gives the requirements for installing tile using epoxy emulsion mortar and grout and includes some details about epoxies such as cleaning the tile right away if mortar gets on the face of the tile, instructions about the 48 hour wait prior to grouting tiles set with epoxy, and that this method is not designed for chemical resistance.

ANSI A118.1-2012, Standard Specification for Dry-Set Cement Mortar

This specification describes the test methods and the minimum requirements for standard dry-set cement mortar.

ANSI A118.10-2014, Specifications for Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone Installation

This specification describes the test methods and minimum requirements for load bearing, bonded, waterproof membranes, including fungus resistance, seam strength, breaking strength, waterproofness, etc. Several of the tests are long-term as well as several other specifications; for example the 110-day water immersion shear strength test.

ANSI A118.11-1999 (R2010), Specifications for EGP (Exterior Glue Plywood) Latex-portland Cement Mortar

This specification provides the test methods and minimum physical property requirements for EGP mortar with latex. Properties include shear strength at various stages, and the types of plywood for testing are also described. The latex may be added to the mortar as an additive and doesn’t have to be in powder form.

ANSI A118.12-2014, Specifications for Bonded Sound Reduction Membranes for Thin-Set Ceramic Tile Installation

Membranes covered by this specification are bonded to a variety of manufacturer-approved substrates covered by ANSI specifications. Products within the scope of this specification are applied below ceramic tiles by traditional methods and materials. This standard applies to trowel applied, liquid, and flexible sheet membranes.

ANSI A118.15-2012, Standard Specifications for Improved Modified Dry-Set Cement Mortar

This specification describes the test methods and the minimum requirements for improved modified dry-set cement mortar.


This standard describes the test methods and physical properties for chemical resistant epoxy adhesives. These are tests for bond strength, water cleanability, sag, shrinkage, thermal shock, etc.

ANSI A118.4-2012, Standard Specifications for Modified Dry-Set Cement Mortar

This specification describes the test methods and the minimum requirements for modified dry-set cement mortar.

ANSI A118.5-1999 (R2016), Standard Specifications for Chemical Resistant Furan Mortars and Grouts for Tile Installation

This specification covers the requirements for chemical resistant furan resin mortars and grouts for the installation of ceramic units when tested in accordance with the methods designated herein.

ANSI A118.6-2010 (R2016), Standard Specifications for Standard Cement Grouts for Tile Installation

This specification describes the test methods and minimum requirements for standard cementitious grouts.

ANSI A118.7-2010 (R2016), Standard Specifications for High Performance Cement Grouts for Tile Installation

This specification describes the test methods and minimum requirements for high performance cement grouts.

ANSI A118.8-1999 (R2016), Standard Specifications for Modified Epoxy Emulsion Mortar/Grout

This specification describes the test methods and the minimum requirements for modified epoxy emulsion mortar/grout.

ANSI A118.9-1999 (R2016), Standard Specifications for Test Methods and Specifications for Cementitious Backer Units

This specification describes the test methods and the minimum requirements and values for cementitious backer units.

ANSI A136.1-2008 (R2013), Standard Specifications for Organic Adhesives for Installation of Ceramic Tile

This standard is for the use of manufacturers of organic adhesives, tile producers, architects, installing mechanics, and testing laboratories in producing, specifying, and testing organic adhesives for installation of ceramic tile.

ANSI A137.1-2017, National Specifications for Ceramic Tile

These specifications serve as a reference standard for buyers and specifiers of standard grade and second grade ceramic tile, decorative tile, and specialty tile. These specifications are also a guide to producers in maintaining quality control of the manufacture of such ceramic tile.

ANSI A137.2-2013, National Specifications for Glass Tile

These specifications describe manufacturing styles, body types, sizes and physical properties for standard grade glass tile; the basis for acceptance and methods of testing before installation; the marking of packaging and certification of tile; and definition of terms employed in these specifications.

ANSI A137.3-2017, Standard Specifications for Gauged Porcelain Tiles and Gauged Porcelain Tile Panels/Slabs

These specifications describe the minimum physical properties of Gauged Porcelain Tiles and Gauged Porcelain Tile Panels/Slabs and back-layered Gauged Porcelain Tiles and Gauged Porcelain Tile Panels/Slabs manufactured to a specific nominal thickness.
This standard establishes a consistent approach to the evaluation and determination of environmentally preferable and sustainable ceramic tiles, glass tiles and tile installation materials. The standard includes relevant criteria across product life cycle from raw material extraction through manufacturing, use, and end-of-life management.

This standard describes the test method for measuring dynamic coefficient of friction (DCOF) of hard surface flooring materials.

TIA (Telecommunications Industry Association)
ANSI J-STD-036-C-1-2013, Enhanced Wireless 9-1-1 Phase II
This addendum is being created to assign two POSOUR codes to be used in association with two new CoS indicators for support text to 911 and small fixed cells.

This modification to the industry’s E 9-1-1 (Emergency Services) Phase 2 standard will add 6 handset and 5 hybrid position source codes for geodetic position reporting and 3 Class of Service codes for civic address reporting (e.g. street address).

ANSI J-STD-036-C-2011, Enhanced Wireless 9-1-1 Phase II
This standard provides a solution for the handling of Wireless Enhanced Emergency Call for the FCC E911 phase II mandate by defining the messaging required to support information transfer to identify and locate wireless emergency services callers. This revision incorporates Femtoldentity parameter definition, and has added the parameter identifiers for the new Femtoldentity, MacroCellID, and MacroMSCID parameters.

ANSI/EIA/TIA 455-62-B-2003, Optical Fiber MacroBend Attenuation
Establishes uniform requirements for measuring macrobending sensitivity.

ANSI/TIA 1005-A-1-2015, Telecommunications Infrastructure Standard for Industrial Premises Addendum 1, M12-8 X-coding Connector
This addendum is to provide necessary information. The industry is adopting higher data rates that require new connectors that are small form factor and sealed. The M12-8 X coding connector has been adopted by many international standards organizations and national consortia for use in the industrial areas.

This default ballot is a result of the comment resolution held regarding SP-3-4822-RV1 and is limited to one (1) specific technical change. Other comments submitted to SP-3-4822-RV1 were resolved editorially. The results of the SP 3 4822 RV1 ballot consisted of 13 'abstain', 19 'approve' votes, 6 'approve with comments' votes, and 1 with "disapprove with comments".

ANSI/TIA 1019-A-2012 (R2016), Standard for Installation, Alteration and Maintenance of Antenna Supporting Structures and Antennas
The standard was prepared by TR-14 Committee on Structural Standards for Steel Antenna Towers and Antenna Supporting Structures to provide guidance on Installation, Alteration and Maintenance of Antenna Supporting Structures and Antennas.

ANSI/TIA 102-AABC-B-2-2007, Project 25 Trunking Control Channel Messages Addendum- ISSI
This addendum enhances trunking control channel messages to support: (1) identification of SUs using their full SUIDs in Supplementary Data messages; (2) assignment of a WGID and an AGID during affiliation to an SG whose home is in another WACN or System; (3) absence of valid target WUID when queuing or denying individual audience services involving an SU whose home is in another WACN or System; (4) inclusion of Twuid_validity in SYS_SRV_BCST messages; (5) ISSI-related deny reason codes.

This addendum introduces a high level functional and architectural overview of the security and key management architecture for TIA-102 system configurations. It provides an overview along with the functional and key management architectural models and descriptions.

This document provides an overview of the security services available in Land Mobile Radio systems. It provides the context in which to understand why security services are required and gives a general high level description of how they are provided.

The TIA-102 AADA-A standard describes the encryption protocol for land-mobile radios meeting the Project 25 requirements. This project will accept and consider contributions proposing editorial or technical changes to the published version.

This document provides an overview of the essential attributes of the trunking mode of operation for trunked voice and data services that operate in accordance with the TIA-102 standards. This document establishes general principles for a trunked air interface, designed for the family of Project 25 systems. Clause 1 defines new terms, definitions, and acronyms. Clause 2 provides a general overview of Project 25 trunking operation. Clause 3 provides an overview of trunked system Services. Clause 4 addresses the composite control channel.

ANSI/TIA 102-AABC-B-3-2008, Trunking Control Channel Messages Addendum for Supplementary Data ISSI
This addendum enhances trunking control channel messages to support: (1) identification of SUs using their full SUIDs in Supplementary Data messages; (2) assignment of a WGID and an AGID during affiliation to an SG whose home is in another WACN or System; (3) absence of valid target WUID when queuing or denying individual audience services involving an SU whose home is in another WACN or System; (4) inclusion of Twuid_validity in SYS_SRV_BCST messages; (5) ISSI-related deny reason codes.

The purpose of this addendum is to update information contained in TIA-102.AAAB "Trunking Control Channel Messages" that allow the operation of TDMA 2-slot traffic channels over a Project 25 compliant trunking system.

ANSI/TIA 102-AABC-B-5-2008, Trunking Control Channel Messages - Radio Unit Monitor Enhancements
As an addendum to TIA-102.AABC, this document only includes information relevant to the abovementioned enhancements. The reader is referred to TIA-102.AABC for all other pertinent information. The next complete revision of TIA-102.AABC will incorporate all of the data contained in this addendum.

ANSI/TIA 102-AABC-C-1-2011, Trunking Control Channel Messages Addendum
The purpose of this addendum is to update information contained in TIA-102.AAABC-C, "Trunking Control Channel Messages". This addendum defines the trunking control channel message changes required to support Project 25 Phase 2 Two-slot TDMA air interface for digital trunked radio systems. (Any other items?)

ANSI/TIA 102-AABC-D-1-2016, Trunking Control Channel Messages Addendum 1
This addendum adds enhancements to the Emergency Alert Request message to indicate an emergency generated internally or externally to the subscriber unit.
ANSI/TIA 102.AABC-D-2015, Trunking Control Channel Messages
This revision to the Trunking Control Channel Messages standard will incorporate several enhancements. It will absorb the existing Conventional Fallback addendum (ANSI/TIA-102.AABC-C-1) and provide additional clarifications to various aspects of wide area operation.

ANSI/TIA 102.AABF-A-2-2007, Project 25 Identity Extensions to link control word formats
The purpose of this addendum is to update ANSI/TIA 102.AABF-A-2004, Link Control Word Formats and Messages; (Ref. [1]). These enhancements provide for extended identification of the source of a call, status update, message update or call alert in cases where implicit identification of the source is insufficient.

ANSI/TIA 102.AABF-C-1-2012, Link Control Word Formats and Messages Addendum 1 - Conventional Fallback
This addendum adds a message for Conventional Fallback Operation.

ANSI/TIA 102.AABF-D-2015, Project 25 Link Control Word Formats and Messages
This revision to the Link Control Word Formats and Messages standard incorporates several enhancements. It will absorb the existing Conventional Fallback addendum (ANSI/TIA-102.AABF-C-1) and provide additional clarifications to various aspects of wide area operation.

Merge of OTAR Protocol document (TIA-102.AACA) with OTAR Operational Description document (TIA-102.AACB) to form OTAR Messages and Procedures document (TIA-102.AACA-A)

ANSI/TIA 102.BAED-2013, Packet Data Digital Link Control Procedures
This document specifies the Logical Link Control (LLC) procedures that permit the conveyance of Common Air Interface (CAI) data packets between air interface endpoints for all packet data configurations. The information necessary to enable interoperable LLC procedures for Packet Data is provided in this document or referenced in other documents as appropriate.

The objective of this document is to provide a specification of the Radio Management Protocols for the A Interface. The information necessary to enable interoperable radio management services and functionality over this interface is provided in this document or referenced in other documents as appropriate. The radio management protocols support the following three functions: (a) signaling used by the MDP to configure the SU (b) signaling to request information from the SU and (c) signaling related to alarm reporting or other unsolicited event reports generated by the SU.

ANSI/TIA 102.BAEG-2010, Mobile Data Peripheral Interface
This document specifies the protocols utilized on the Mobile Data Peripheral Interface which is designated as the A Interface in the TIA-102 Open System Interface Model. The information necessary to enable interoperable services and functionality on this interface is provided in this document or referenced in other documents as appropriate.

ANSI/TIA 102.BAEJ-2013, Conventional Management Service Specification for Packet Data
This document specifies the following Conventional Management Service (CMS) functions for the Conventional FDE data configuration: Packet Data Registration, Packet Data Scan, and Packet Data Supplementary Information. The messages and procedures necessary to enable interoperable CMS functionality for Packet Data is provided in this document or referenced in other documents as appropriate.

ANSI/TIA 102.BAJB-A-2014, Project 25 Tier 1 Location Services
The Tier 1 Location Service provides a simple SU-to-SU interface for the Direct Data and Repeated Data configurations. It utilizes a dedicated Service Access Point over the Common Air Interface to transport location information formatted as described in NMEA 0183, a commonly used location protocol. This service is appropriate for real-time field incident applications where the Location Service Host is resident on a portable device. It does not provide a mechanism to give location information to a host device on a fixed network and does not support more advanced configuration of triggering and reporting.

The Tier 2 Location Service provides a location request/response protocol that allows a Location Service Host to make a request for location information from an SU or MDP, providing parameters that control the transmission of location information. Immediate or periodic reports can be requested, and reports can be requested base on triggering events. The service can be used between SUs in the Direct Data or Repeated Data configurations, or between an SU and a DH in the Conventional FDE Data or Trunked FDE Data configurations. The location information is provided in an XML-based protocol and is compressed using the W3C EXI recommendation.

ANSI/TIA 102.CAAA-C-1-2010, Digital CAFM/CQPSK Transceiver Measurement Methods - Addendum 1 - Faded Channel Simulator
This addendum specifies the requirements for the faded channel simulator and will be used to replace the information that is given in TIA-102.CAAA-C. It is intended that upon future revision of document TIA-102.CAAA-C, the requirements of this addendum will be incorporated into that next revision.
The scope of the project is to revise the existing document to add methods of measurement for receivers that employ class D audio power amplifiers.

This project scope is to revise standard limit values affected by changes in measurement methods and to correct errors in Rev C. These changes will be necessary due to revision of Standard TIA-102.CAAA-C.

ANSI/TIA 102.CCAA-B-2016, Project 25, Phase 2 Two-Slot Time Division Multiple Access, Transceiver Measurement Methods
The scope of the project is to revise the existing document to correct for an error in the formulas in section 2.2.17.3 of the document, and to add a procedure for testing performance of receivers with class D audio power amplifiers.

ANSI/TIA 102.CCAB-A-2014, Project 25, Two Slot TDMA, Transceiver Performance Recommendations
This revision to the Two-Slot Time Division Multiple Access Transceiver Performance Recommendations standard will incorporate new equipment performance recommendation limits to address new measurement methods that will be implemented in the revision of the Two-Slot Time Division Multiple Access Transceiver Measurement Methods standard upgrade. Additionally, the TIA standard will be upgraded to an American National Standard.

This document applies to the accommodation and compensation of dispersion in fibre optic communication systems.

ANSI/TIA 1048-2005 (R2013), IEC 62005-7: Reliability of Fibre Optic Interconnecting Devices and Passive Components - Part 7: Life Stress Modeling
This document describes the life stress modeling for the reliability of fibre optic interconnecting devices and passive components.

ANSI/TIA 1057-2006 (R2011), Telecommunications - IP Telephony Infrastructure - Link Layer Discovery Protocol for Media Endpoint Devices
This Standard defines a set of organizationally-specific IEEE 802.1AB TLV extensions and a related MIAB module, for the purpose of improved deployment properties and multi-vendor interoperability between VoIP endpoint devices and IEEE 802 networking infrastructure elements. Where required for correct multi-vendor interoperation, specific constraints on IEEE 802.1AB protocol behavior, application-level interaction with the protocol elements, as well as constraints on existing IEEE 802.1AB TLVs and related MIAB module, are also defined.

The TIA-1063 standard is being revised to address several technical issues identified for performance requirements and testability. In addition, new proposals related to the digital signaling side of the ATA are expected to be reviewed and considered as part of the revision project.

TR-41.3 is developing guidelines in the area defined by the following scope: This standard defines measurement procedures and performance requirements for the handset generated audio band magnetic noise of wireline telephones. It can be used to evaluate devices with analog interfaces and digital interfaces that will reproduce sine waves in the telephone’s receiver.

ANSI/TIA 1152-A-2016, Requirements for Field Test Instruments and Measurements for Balanced Twisted-Pair Cabling
Revise ANSI/TIA-1152-2009 as determined in TIA TR-42.7, incorporating new specifications and other information as required to support field testing of cabling described in ANSI/TIA-568-C.2-1.

ANSI/TIA 1179-2010, Healthcare Facility Telecommunications Infrastructure Standard
This Standard specifies requirements for telecommunications infrastructure for healthcare facilities (e.g. hospitals, clinics). It specifies cabling, cabling topologies, and cabling distances. Additionally, pathways and spaces and ancillary requirements are addressed. Telecommunications cabling specified by this standard is intended to support a wide range of healthcare facilities and systems.

ANSI/TIA 1183-1-2016, Measurement Methods and Test Fixtures for Balun-Less Measurements of Balanced Components and Systems, Extending Frequency Capabilities to 2 GHz
The scope is to provide necessary information to extend measurement capabilities to 2 GHz with sufficient accuracy to support category 8 cabling standards: ANSI/TIA-568-C.2-1 (when published).

This Standard will supersede ANSI/TIA-1183 and its addendum 1183-1. It is intended to incorporate and revise as necessary the content of those Standards.

ANSI/TIA 1194-R1-2011 (R2017), Telecommunications - User Premises Equipment - Surge Resistibility of Smart Grid Equipment Connected to either DC or 120/240 V Single Phase AC and Metallic Communication Lines
Surge Resistibility of Smart Grid Equipment Connected to either DC or 120/240 V Single Phase AC and Metallic Communication Lines

ANSI/TIA 124-E-2006 (R2011), Wireless Radio Telecommunications Intersystem Non-Signaling Data Communication, DMH (Data Message Handler)
This document describes the messages and procedures required to perform call detail record data trans&#8211;mission between systems.

ANSI/TIA 222-G-1-2007 (R2016), Structural Standards for Steel Antenna Towers and Antenna Supporting Structures - Addendum 1
This section relates to the strength design of structural steel angles, solid rounds and tubular members used in latticed towers, poles and guyed masts. The following clauses are based on the AISC-LRFD-99. When the requirements in AISC-LRFD-99 differ from this Standard, this Standard shall govern. If other shapes or types of structures are utilized, the requirements of AISC-LRFD-99 shall be used.

ANSI/TIA 222-G-2-2009 (R2014), Structural Standards for Steel Antenna Towers and Antenna Supporting Structures- Addendum 2
This section defines: (i) the minimum acceptable analysis models and techniques, and (ii) the requirements to account for the dynamic effects of wind gusts.

ANSI/TIA 222-G-2-2005 (R2016), Structural Standard for Antenna Supporting Structures and Antennas
The objective of this document is to provide minimum criteria for specifying and designing steel antenna towers and antenna supporting structures. This Standard is not intended to supersede applicable codes. The information contained in this Standard was obtained from sources as referenced and noted herein and represents, in the judgement of the subcommittee, the accepted industry practices for minimum standards for the design of steel antenna supporting structures. This document contains a county by county listing of minimum basic wind speeds, as well as, a commentary on ice and other design criteria. It is for general information only.
ANSI/TIA 222-G-3-2014, Structural Standards for Steel Antenna Towers and Antenna Supporting Structures- Addendum 3

The intent of this Addenda is to provide a method of design and analysis for rigid base plate behavior resulting in insignificant anchor rod bending and insignificant secondary pole wall stresses under factored reactions from limit state strength loading conditions.

ANSI/TIA 222-G-4-2014, Structural Standards for Steel Antenna Towers and Antenna Supporting Structures- Addendum 4

This Design Supplement is intended to apply to self-supporting or braced lattice towers, guyed masts and pole structures that support single or multiple SWTs that may also support antennas and other appurtenances.

ANSI/TIA 322-2016, Loading, Analysis, and Design Criteria Related to the Installation, Alteration and Maintenance of Communication Structures

The scope of this Standard is intended to provide engineering criteria to evaluate a communication structure subjected to construction loads and to provide the design criteria for gin poles and the generation of their load charts. The means and methods for construction are not within the scope of this Standard

ANSI/TIA 41.000-E-9-2012, Mobile Application Part (MAP) Introduction

This part defines the range of application of the current issue of the series. It focuses on overall objectives and basic assumptions. Procedural details are presented in the other recommendations.

ANSI/TIA 41.200-E-2007 (R2012), Mobile Application Part (MAP) - Intersystem Handoff

This specification presents the recommendation for the handoff sequence between two different Mobile Switching Centers (MSCs). This is often called intersystem handoff. To perform an intersystem handoff means to switch a Mobile Station (MS) telephone call that is in progress on one MSC to a different MSC. In other words, an MS is assigned to a voice/traffic channel that is controlled by a different MSC. This project is to reaffirm the standard.

ANSI/TIA 41.290-E-2007 (R2013), Mobile Application Part (MAP) - Intersystem Handoff - Annex A

The Data Message Handler standard has some impact upon MAP. The changes which impact MAP Intersystem Operations are outlined in this standard. This project is to reaffirm the standard.

ANSI/TIA 41.321-E-1 [E]-2012, Mobile Application Part (MAP) - Voice Feature Scenarios: Call Delivery

This section of the TIA-41 series of standards depicts the interactions between network entities in various situations related to automatic roaming and Call Delivery (CD).

ANSI/TIA 41.321-E-2007 (R2013), Mobile Application Part (MAP) - Voice Feature Scenarios: Call Delivery

This section depicts the interactions between network entities in various situations related to automatic roaming and Call Delivery (CD). These scenarios are informative. This project is to reaffirm the standard.

ANSI/TIA 41.322-E-2007 (R2013), Mobile Application Part (MAP) - Voice Feature Scenarios: Call Forwarding

This section depicts the interactions between network entities in various situations related to automatic roaming and Call Forwarding—Busy (CFB). These scenarios are for illustrative purposes only. This project is to reaffirm this standard.

ANSI/TIA 41.323-E-2007 (R2013), Mobile Application Part (MAP) - Voice Feature Scenarios: Call Waiting

This section depicts the interactions between network entities in various situations related to automatic roaming and Call Waiting (CW). These scenarios are for illustrative purposes only. This project is to reaffirm this standard.

ANSI/TIA 41.324-E-1 [E]-2012, Mobile Application Part (MAP) - Voice Feature Scenarios: Calling Number Identification Presentation, Calling Number Identification Restriction

This section of the TIA-41 standards depicts the communications between network entities in various situations related to automatic roaming and Calling Number Identification Presentation (CNIP). These scenarios are for illustrative purposes only. This project is to reaffirm the standards.

ANSI/TIA 41.324-E-2007 (R2013), MOBILE APPLICATION PART (MAP)-VOICE FEATURE SCENARIOS: Calling Number Identification Presentation, Calling Number Identification Restriction

This standard depicts the communications between network entities in various situations related to automatic roaming and Calling Number Identification Presentation (CNIP). These scenarios are for illustrative purposes only. This project is to reaffirm this standards.

ANSI/TIA 41.325-E-2012, Mobile Application Part: Voice Feature Scenarios: Conference Calling

The scenarios in this Part of the TIA-41 standards depict features operating individually, i.e., feature interactions are not considered unless specifically noted.


This document depicts the interactions between network entities in various situations related to automatic roaming and Do Not Disturb (DND).


This section of the TIA-41 standards depicts the interactions between network entities in various situations related to automatic roaming and Flexible Alerting (FA).


This section of the TIA-41 series depicts the interaction between network entities in various situations related to automatic roaming and Mobile Access Hunting.

ANSI/TIA 41.328-E-2012, Mobile Application Part (MAP) - Voice Feature Scenarios: Mobile Access Hunting

This section of the TIA-41 standards depicts the interactions between network entities in various situations related to automatic roaming and Mobile Access Hunting (MAH). These scenarios are for illustrative purposes only.

ANSI/TIA 41.329-E-2012, Mobile Application Part (MAP) - Voice Feature Scenarios: Message Waiting Notification

This section of the TIA-41 standards depicts the interactions between network entities in various situations related to automatic roaming and Message Waiting Notification (MWN).

ANSI/TIA 41.330-E-2012, Mobile Application Part (MAP) - Voice Feature Scenarios: Password Call Acceptance / Selective Call Acceptance

This section of the TIA-41 standards depicts the interactions between network entities in various situations related to automatic roaming and Password Call Acceptance (PCA).


This section depicts the interactions between network entities in various situations related to automatic roaming and Priority Access and Channel Assignment (PACA).


This section depicts the interactions between network entities in various situations related to automatic roaming and Remote Feature Control (RFC).


This section of the TIA-41 standards depicts the interactions between network entities in various situations related to automatic roaming and Subscriber PIN Access (SPINA).
This section of the TIA-41 standards depicts the interactions between network entities in various situations related to automatic roaming and Voice Message Retrieval (VMR).

ANSI/TIA 41.335-E-2012, Mobile Application Part (MAP) - Voice Feature Scenarios: Calling Name Presentation, Calling Name Restriction
This section of the TIA-41 standards depicts the interactions between network entities in various situations related to automatic roaming and Calling Name Presentation (CNAP).

ANSI/TIA 41.336-E-2012, Mobile Application Part (MAP) - Voice Feature Scenarios: Wireless Emergency Services
This section of the TIA-41 series depicts the interactions between network entities in various situations related to automatic roaming and Calling Name Presentation (CNAP).

ANSI/TIA 41.350-E-2012, Mobile Application Part (MAP) - Voice Feature Scenarios: MDN-Based Validation
This section of the TIA-41 series depicts the interactions between network entities in various situations related to MDN-based subscription validation.

ANSI/TIA 41.371-E-2012, Mobile Application Part (MAP) - Broadcast Teleservice Transport Capability
This scenario describes the transfer of a message to several MSCs, and its successful delivery to MS-based SMEs via their respective Serving MSCs.

ANSI/TIA 41.372-E-2012, Mobile Application Part (MAP) - Border MSC SMS Scenarios
This section of the TIA-41 standards depicts the interactions between network entities in various situations related to the delivery of SMS messages to an MS that responds to a page in a Border MSC.

ANSI/TIA 41.400-E-2005 (R2012), Wireless Radiotelecommunications Intersystems Operations: Operations, Administration and Maintenance
Defines the intersystem operations, administration, and maintenance information flows and procedures required for intersystem trunk maintenance.

ANSI/TIA 41.500-E-2004 (R2010), Mobile Application Part - Introduction to Signaling Protocols
This section introduces the signaling protocols for this standard.

ANSI/TIA 41.510-E-2004 (R2010), Mobile Application Part - X.25 Transport Signaling Protocols
This section describes the X.25 transport signaling protocols.

ANSI/TIA 41.511-E-2004 (R2010), Mobile Application Part - ANS/SS7 Transport Signaling Protocols
TIA-41 series part which defines transport signaling protocols.

ANSI/TIA 41.512-E-2004 (R2010), Mobile Application Part - Parameter Types Signaling Protocols
This section describes the signaling protocols for ITU/SS7 transport.

ANSI/TIA 41.520-E-1 [E]-2012, Mobile Application Part (MAP) - TCAP Application Signaling Protocols
This document describes the application layer of the Mobile Applications Parts (MAP) Application Services.

ANSI/TIA 41.520-E-2004 (R2010), Mobile Application Part - TCAP Application Signaling Protocols
This section describes the application layer of the Mobile Applications Parts (MAP) Application Services.

ANSI/TIA 41.540-E-1 [E]-2012, Mobile Application Part (MAP) - Operations Signaling Protocols
This specification supports systems conforming to air-interface technologies AMPS, NAMPS, TDMA and CDMA, including cdma2000.

ANSI/TIA 41.540-E-2004 (R2010), Mobile Application Part - MAP Operations Signaling Protocols
This section describes the operations signaling protocols for MAP.

ANSI/TIA 41.550-E-1 [E]-2012, Mobile Application Part (MAP) - Parameters Signaling Protocols
This document describes the application layer of the Mobile Applications Parts (MAP) Application Services.

ANSI/TIA 41.550-E-2 [E]-2012, Mobile Application Part (MAP) - Parameters Signaling Protocols
This document describes the application layer of the Mobile Applications Parts (MAP) Application Services.

ANSI/TIA 41.550-E-2004 (R2010), Mobile Application Part - MAP Parameters Signaling Protocols
This section describes the MAP parameters signaling protocols.

ANSI/TIA 41.550-E-3 [E]-2012, Mobile Application Part (MAP) - PARAMETERS SIGNALING PROTOCOLS
New SystemMyTypeCode value assignment

ANSI/TIA 41.551-E-2004 (R2010), Mobile Application Part - Parameter Types Signaling Protocols
This section describes the parameter type signaling protocols.

ANSI/TIA 41.590-E-2004 (R2010), Mobile Application Part - MAP Operations Signaling Protocols
This section describes the compatibility signaling protocols for MAP.

ANSI/TIA 41.600-E-2005 (R2012), Wireless Radiotelecommunications Intersystems - Introduction to Procedures
This document describes the signaling and call processing procedures required to perform automatic roaming features and services. The messages required to perform the automatic roaming are defined in Part 540. Conformance with this document shall mean that a system's externally visible behavior is the same as the externally visible behavior of the abstract system described here.

ANSI/TIA 41.630-E-1 [E]-2012, Mobile Application Part (MAP) - Basic Call Processing
This document defines the methods for Mobile Applications Parts (MAP) basic call processing.

ANSI/TIA 41.630-E-2 [E]-2012, Mobile Application Part: Basic Call Processing
This document defines the methods for Mobile Applications Parts (MAP) basic call processing.

ANSI/TIA 41.630-E-2005 (R2012), Wireless Radiotelecommunications Intersystem - Basic Call Procedures
Describes the basic call procedures for wireless radiotelecommunication intersystems.

ANSI/TIA 41.640-E-1 [E]-2012, Mobile Application Part (MAP) - Intersystem Operations
This document defines methods for Mobile Applications Parts (MAP) intersystem operations.

ANSI/TIA 41.640-E-2005 (R2012), Wireless Radiotelecommunications Intersystems - Intersystem Procedures
Describes the intersystem procedures for wireless radiotelecommunication intersystems.

ANSI/TIA 41.641-E-1 [E]-2012, Mobile Application Part (MAP) - SMS
This document defines methods for mobile application SMS transmissions.

ANSI/TIA 41.641-E-2005 (R2012), Wireless Radiotelecommunications Intersystems - SMS
Describes SMS for wireless radiotelecommunication intersystems.

ANSI/TIA 41.642-E-2005 (R2012), Wireless Radiotelecommunications Intersystem - Segmentation
Describes the segmentation for wireless radiotelecommunication intersystems.

ANSI/TIA 41.650-E-2005 (R2012), Wireless Radiotelecommunications Intersystems - Common Voice Feature Procedures
Describes the common voice feature procedures for wireless radiotelecommunication intersystems.
This section describes the distributed plane and ANSI/TIA 41.730 Parts.

This section lists the annexes for this standard

This section describes the WIN feature for wireless radiotelecommunication intersystems.

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ANSI/TIA 455-157-1994 (R2008), Measurement of Polarization Dependent Loss (PDL) of Single-Mode Fiber Optic Components
This document describes a procedure that can be applied to any single mode passive component to determine its sensitivity to changes in polarization.

ANSI/TIA 455-156-A-2000 (R2014), Salt Spray (Corrosion) Test for Fiber Optic Components
This document describes a test method intended to determine the effects of a controlled salt-laden atmosphere on fiber optic interconnecting devices, finishes, and mechanisms.

This standard determines the suitability of optical fibres to withstand the environmental condition of high humidity and high temperature

This test procedure applies to the testing of optical fiber cable. Related tests for connectors and other devices which may be connected to cables under test are discussed in 1.5.

This document describes a test methods and procedures for measuring the attenuation by substitution of short length multimode graded index and single mode optical cable assemblies.

ANSI/TIA 455-172-1986 (R2008), Flame Resistance of Firewall Connector
This document describes a procedure to determine the ability of a cabled and mated connector to resist firewall environments, such as flame or ignition of gases.

Establishes uniform requirements for measuring the chromatic dispersion of optical fibre

Establishes uniform requirements for measuring the geometrical characteristics of uncoated optical fibres

This document establishes uniform requirements for measuring the numerical aperture of optical fibre.

Pertains primarily to testing either fibers as produced by a fiber manufacturer or subsequently overcoated (tight buffered) using various polymers.

This document describes a test method to measure the pertinent coefficients of the logarithmic transfer matrix of a branching device in order to determine the ability of the device to carry out its design function.

ANSI/TIA 455-183-2000 (R2013), Hydrogen Effects on Optical Fiber Cable
The test procedure is intended to provide a type test which characterizes the effect on fiber attenuation due to hydrogen generated by the cable components only. The data must be used cautiously since such data does not account for potential generation of hydrogen from other sources in the installed environment.

ANSI/TIA 455-184-1991 (R2008), Coupling Proof Overload Test, Fiber optic Interconnecting Devices
This document describes a procedure to apply an overload torque to twist type coupling mechanisms. The procedure is applicable to threaded or bayonet twist type coupling mechanisms.

ANSI/TIA 455-185-1991 (R2008), Strength of Coupling Mechanism Fiber Optic Interconnecting Devices
This document describes a procedure to assure that the coupling mechanism of a connector-device combination will withstand the axial loads likely to be applied during normal service.

ANSI/TIA 455-186-1991 (R2008), Proposed New FOTP, Gauge Retention Force Measurement for the Fiber Optic Components
This document describes a procedure used to measure the retention characteristics of a resilient member of a fiber optic component (most commonly a connector). It is specifically intended for use when it is impracticable to define acceptance/rejection criteria for resilient members by the use of size limitations.

This document describes a test method to measure the forces or torques that are required to fully couple or uncouple a connector set.

ANSI/TIA 455-188-1991 (R2008), Low-Temperature Testing of Fiber Optics Components
This document describes a procedure intended for exposing a specimen to the environmental condition of extended low temperature (cold). It is not intended for exposing a specimen to the environmental condition of high temperature variation.

This standard describes the measurement methods and test procedures for determining mode field diameters.

ANSI/TIA 455-192-1999 (R2013), H-Parameter Test Method for Polarization-Maintaining Optical Fiber
This Standard specifies a method of measuring the h-parameter of single mode, highly linearly birefringent optical fiber (commonly called polarization-maintaining fibers). In the case of fibers having connectors attached to one or both ends, or for two or more such fibers joined in series, the polarization crosstalk is a more meaningful measure of performance than the h-parameter. The test method for measuring polarization crosstalk is the subject of FOTP-193.

ANSI/TIA 455-193-1999 (R2013), Polarization Crosstalk Method for Polarization-Maintaining Optical Fiber and Component
This Standard specifies a method of measuring the polarization crosstalk of single mode, highly linearly-birefringent (commonly called polarization-maintaining or PM) optical fiber and components. This Standard is applicable to fibers and components having connectors attached to one or both ends, and to two or more such entities joined in series. This Standard may also have application to other devices constructed from polarization-maintaining fibers and/or components. Hereafter both PM fibers and PM components will be referred to as specimens.

ANSI/TIA 455-194-1999 (R2008), Measurement of Fiber Pushback in Optical Connectors
This document describes a test to measure fiber pushback, defined as permanent or semi-permanent fiber motion under load. It does not include temporary fiber movement relative to the ferrule due to temperature variations, or permanent fiber withdraw that occurs when no load is present.

This standard describes the measurement methods and test procedures for determining coating geometry.

This document discusses the application of the pre-existing fiber test procedures for PMD measurement in fiber to the special case of fiber components. Special precautions are required to avoid several potential problems, and these problems and precautions are described for each of the applicable procedures. This document does not describe the test procedures in detail, merely the variations required for component measurements.


This document describes a procedure for the measurement of polarization-sensitive Differential Group Delay (DDG) of one or two port single mode fiber components over the 1.0 to 1.7 micrometer wavelength range. In this procedure, a modulated light source at a given wavelength is coupled into the component under test, and the phase of the modulated signal exiting the fiber at a first polarization state is compared with the phase at the second, orthogonal polarization state. For the purposes of this document, the component is considered to be measured at a single wavelength, and therefore the result reported is strictly the DDG.

ANSI/TIA 455-18-1998 (R2008), Cable Flexing for Fiber Optic Interconnecting Devices

This document describes a test method intended to determine the ability of fiber optic interconnecting devices, device interfaces, and strain relief to withstand bending and flexing stresses resulting from loads as might be experienced during installation and service conditions.


Describes the methods and test procedures for monitoring changes in optical transmittance.

ANSI/TIA 455-200-2001 (R2008), Insertion Loss of Connectorized Polarization - Maintaining Fiber or Polarizing Fiber Pigtailed Devices and Cable Assemblies

This document describes a procedure for the measurement of the insertion loss of a fiber optic interconnection on single mode, highly birefringent optical fiber, i.e. either polarization-maintaining fiber (PMF) or polarizing fiber (PZF).

ANSI/TIA 455-201-2001 (R2008), Return Loss of Connectorized Polarization-Maintaining Fiber or Polarizing Fiber Pigtailed Devices and Cable Assemblies

This document specifies a procedure for the measurement of the return loss of a fiber optic interconnection on single mode, highly birefringent optical fiber, i.e. either polarization-maintaining fiber (PMF) or polarizing fiber (PZF).


This FOTP is intended to characterize the encircled flux of two types of light sources: transmission light sources, which are usually coherent and substantially under-excite the mode volume of a multimode fiber, and measurement light sources, which are incoherent and must excite most of the mode volume of a multimode fiber.

ANSI/TIA 455-204-A-2013, FOTP-204 - Measurement of Bandwidth on Multimode Fiber

Revision to support OM4/adopt IEC test method.


ANSI/TIA 455-225-2015, FOTP-225 IEC 61745 End-Face Image Analysis Procedure for the Calibration of Optical Fibre Geometry Test Sets

This standard addresses the calibration of measurements made on single-mode fibres only; however, this type of test set may also be used to measure the geometrical parameters of the cores of multimode fibres, but evaluation of uncertainties associated with these measurements is beyond the scope of this standard.

ANSI/TIA 455-231-2003, IEC 61315 - Calibration of Fibre-Optic Power Meters

Standardizes all of the steps involved in the calibration process.

ANSI/TIA 455-231-2015, FOTP-231 IEC 61315 – Calibration of Fibre-Optic Power Meters

This international standard is applicable to instruments measuring radiant power emitted from sources which are typical for the fibre-optic communications industry. The standard describes the calibration of power meters to be performed by calibration laboratories or by power meter manufacturers.


This standard defines a test that determines the suitability of optical fibres to withstand the environment condition of changes in temperatures.


This document specifies two main methods for the determination of the low BER values by making accelerated measurements.


This document provides a parameter definition and a test method for obtaining optical signal-to-noise ratio (OSNR) using apparatus that measures the optical spectrum at a multichannel interface.

ANSI/TIA 455-239-2007, FOTP-239 - Fiber Optic Splice Loss Measurement Methods

This standard will provide a method for accurate measurement of low loss (0.05 dB or less) splices and provide a common method to evaluate the performance of splicing equipment, systems, or methods designed or intended to make low loss splices.


This test method describes a procedure for retrieving the polarization-mode dispersion (PMD&D185) of an installed single-mode optical cable fiber under test (FUT). The procedure is based on measurement and analysis, using polarization sensitive detection, of the transmission differences between pulses of light two closely spaced frequencies (or wavelengths ) launched from a single FUT end and reflected off the FUT far end.

ANSI/TIA 455-244-2011, Express Tube Optical Loss Measurements Methods

This test is applicable to cables containing a multiplicity of buffer tubes and specified for midspan access applications requiring expressed buffer tube storage (buffer tubes stored in their intact form; not cut, opened, or removed).


FOTP 25 existing test procedure is being revised to harmonize with international test method.

ANSI/TIA 455-2C-1998 (R2008), Impact Test Measurements for Fiber Optic Devices

This document describes a test method intended to determine the ability of fiber optic interconnecting devices to withstand impacts of the type that may be encountered in normal service.

ANSI/TIA 455-31-C-1994 (R2013), Proof Testing Optical Fibers by Tension

This test method describes procedures for briefly applying a specified tensile load to continuous lengths of all Class I and Class IV, glass/glass optical fibers. This FOTP should not be applied to Class II (glass/plastic) and Class III (all-plastic) fibers. This method is intended to ensure a minimum strength for fiber that survives proof testing. The minimum strength is a key parameter for determining the minimum survival time at loads less than the minimum strength. This method is intended to ensure a minimum strength for fiber that survives proof testing.
ANSI/TIA 455-32A-1990 (R2008), Fiber Optic Circuit Discontinuities
This document describes a method of testing a broad variety of passive and active fiber optic components or subsystems for susceptibility to discontinuities (transient output of transmission fluctuations) during the application of an external stimulus such as vibration or physical shock.

ANSI/TIA 455-33-B-2005 (R2013), FOTP33 - Optical Fiber Cable Tensile Loading and Bending
This test is intended to verify the ability of an optical fiber cable to perform satisfactorily as required by Detail Specifications (a) while undergoing tensile and bending forces and (b) after undergoing tensile and bending forces.

ANSI/TIA 455-35A-1990 (R2008), Fiber Optic Component Dust (Fine Sand) Test
This document describes a test method intended to ascertain the ability of fiber optic components to resist the effects of dry-dust (fine sand) laden atmosphere. This test simulates the effect of sharp-edged dust particles, up to 150 um size, which may penetrate into cracks, crevices and joints.

ANSI/TIA 455-37-A-1993 (R2013), Low or High Temperature Bend Test
This revision of FOTP -37 significantly expands the scope of the original issue by increasing the number of test procedures options.

ANSI/TIA 455-39-B-1999 (R2013), Fiber Optic Cable Water Wicking Test
This procedure is generally not intended for use on cables containing water swellable tapes, powders, or yarns. Swellable materials must absorb water in order to swell and build a block to further penetration of water. This test method may be used to look at the water wicking characteristics of such cables, however it must be understood that a certain amount of water absorption is necessary for such cables to pass water penetration requirements.

ANSI/TIA 455-3B-2009 (R2014), Procedure to Measure Temperature Cycling Effects on Optical Fiber Units, Optical Cable, and Other Passive Fiber Optic components
This test procedure describes a method for the determination of temperature cycling effects or the temperature dependence of attenuation on optical fiber units, cables, cable assemblies, connectors, and/or other passive fiber optic devices. This procedure tests the ability of the component to withstand changes in temperature of the surrounding atmosphere that may be encountered during operation.

ANSI/TIA 455-42A-1989 (R2008), Optical Crossstalk in Fiber Optic Components
This document describes a procedure to determine the crossstalk ratios between two optical paths in a cable, Connectorized cable, splice or similar device. In addition, the devices contribution to the crossstalk in a system may be determined. The effectiveness of the material surrounding the optical conducting device in restricting light paths to the other elements may also be measured.

ANSI/TIA 455-56C-2009 (R2017), Test Method for Evaluating Fungus Resistance of Optical Fiber and Cable
This method is intended to evaluate the adequacy of optical fibers and cables to retain their structural integrity and performance level under environmental conditions favorable for the development of fungal growth. These conditions are: high humidity, a warm atmosphere, and the presence of inorganic salts.

ANSI/TIA 455-57-B-1994 (R2013), Preparation and Examination of Optical Fiber Endface for Testing Purposes
This procedure provides guidelines for acceptable optical fiber endface appearance and defines the techniques that are commonly employed to obtain such appearance. This procedure is intended to promote uniformity in fiber end preparation quality for testing purposes only and does not address issues associated with endface preparation and examination for the purposes of permanent termination (i.e., connectorization and splicing). This FOTP is not intended to require examination of every fiber end, nor is it intended to establish firm requirements, and is made available only to provide guidelines for various levels of end quality that may be called out in other FOTPs. Lastly, the intent of this method shall not be confused with the intent of FOTP -179, which is concerned primarily with the comparison of relative results.

This standard determines the suitability of optical Fibre to withstand the environmental condition of high temperature (dry heat).

This document describes a procedure to define the exposure conditions for testing resistance of fiber optic components to temperature shock. It also outlines the general approach used for measuring and evaluating the ability of a fiber optic component to withstand sudden changes of ambient temperature that could arise during shipment, storage, or use.

This standard defines the test that determines the suitability of optical fibre to withstand the environmental condition of immersion in distilled or demineralized water.

ANSI/TIA 455-8-B-2000 (R2008), Measurement of Splice or Connector Loss and Reflectance Using an OTDR
This document describes the use of optical time-domain reflectometer (OTDR) to indirectly measure attenuation and reflectance of a splice or connector.

ANSI/TIA 455-80-C-2003, Measuring Cutoff Wavelength of Uncabled Single-Mode Fiber by Transmitted Power
Establishes uniform requirements for measuring cut-off wavelength of single-mode optical fibre.
This document addresses the wideband (150 to 7000 Hz) voice transmission requirements specific to analog telephones equipped with headsets.

ANSI/TIA 470.130-C-2008 (R2016), Telecommunications - Telephone Terminal Equipment - Headset Acoustic Performance Requirements for Analog Telephones with Headsets

This standard provides transmission requirements for analog telephones when used with a headset. The requirements in this standard apply to telephones intended to be connected to the Public Switched Telephone Network (PSTN). These requirements should ensure compatibility and satisfactory performance to the user in a high percentage of installations. The interface between the telephone and the headset is outside the scope of this standard.

ANSI/TIA 470.132-2013, Telecommunications – Telephone Terminal Equipment – Transmission Requirements for Wideband Analog Telephones with Headsets

This document addresses the wideband (150 to 7000 Hz) voice transmission requirements specific to analog telephones equipped with headsets.

ANSI/TIA 470.210-F-2016, Telecommunications - Telephone Terminal Equipment - Resistance and Impedance Performance Requirements for Analog Telephones

Project to revise ANSI/TIA 470.210-E to remove impedance requirements related to B-Type ringing.

ANSI/TIA 470.220-E-2016, Telecommunications - Telephone Terminal Equipment - Alert Acoustic Output Performance Requirements for Analog Telephones

This project is a result of discussion during the May meeting about the fact that the ATIS removed reference to anything other than 20 Hz ringing in the 2000 revision of its ANSI/TI 401 network interface standard (now ATIS-0600401.2006). A liaison request to ACTA (see TR41-15-05-007-L) for guidance on this matter was forward to the ATIS Copper/Optical Access, Synchronization, and Transport Committee (COAST) and resulted in a reply indicating that 20 Hz ringing is all that needs to be supported (see TR41-15-05-008-L)

ANSI/TIA 470.230-C-2005 (R2012), Telecommunications - Telephone Terminal Equipment - Network Signaling Performance Requirements for Analog Telephones

This standard defines the DTMF, Pulse Dial, and Flash network signaling performance requirements for Customer Premises Equipment (CPE) intended for connection to the Public Switched Telephone Network (PSTN). These requirements should ensure compatibility and satisfactory performance to the user in a high percentage of installations.

ANSI/TIA 470.310-D-2010 (R2016), Telecommunications - Telephone Terminal Equipment - Cordless Telephone - Range Measurement Procedures

This standard establishes procedures and criteria for evaluating Cordless Telephone Range Performance in a traditional outdoor environment as well as a controlled laboratory environment.

ANSI/TIA 492AAAA-B-2008, Detail specification for 62.5-micrometer core diameter/125-micrometer cladding diameter class Ia graded-index multimode optical fibers

This Detail Specification applies to class Ia, graded-index, 62.5/125 micron multimode optical fiber used as a component in the manufacture of fiber-optic cable.

ANSI/TIA 492AAAB-A-2008, Detail Specification for 50-um Core Diameter/125-um Cladding Diameter Class Ia Graded-Index Multimode Optical Fibers

This Detail Specification applies to class Ia, graded-index, 50/125 micron multimode optical fiber used as a component in the manufacture of fiber-optic cable.

ANSI/TIA 492AAAC-B-2008, Detail specification for 850-nm laser-optimized, 50-micrometer core diameter/125-micrometer cladding diameter class Ia graded-index multimode optical fibers

This Detail Specification applies to class Ia, graded-index, 50/125 micron multimode optical fiber used as a component in the manufacture of fiber-optic cable.

ANSI/TIA 4950-A-2014, Requirements for Battery-Powered, Portable Land Mobile Radio Applications in Class I, II, and III, Division 1, Hazardous (Classified) Locations

This revision effort intends to further enhance the focus of this document on portable Land Mobile Radio (LMR) applications. The revision will solidify document coverage of the new technologies in use in portable LMR today.

ANSI/TIA 4953-A-2015, Telecommunications - Communications Products - Amplified Telephone Measurement Procedures and Performance Requirements

This revision project is proposed to make the following changes to the existing standard: 1) Add requirements for digital interface telephones. 2) Add requirements for sidetone. 3) Add requirements for distortion for any volume control setting and any input level. 4) Remove the “Maximum Usable Gain” measurement clause. 5) Add requirements for testing send level during conversation simulation. 6) Revise the requirements for the “Mild” criteria to align with the volume control requirements for regular telephones. These revisions are necessary to improve the applications for this standard.

ANSI/TIA 4957.000-A-2017, Overview and Architecture for a Field Area Network

Revise to add new operational modes for Smart Grid, smart metering, and related applications.

ANSI/TIA 4957.100-A-2017, Layer 1 Standard

Specification for the Smart Utility Network

Revise to add new operational modes for Smart Grid, smart metering, and related applications.

ANSI/TIA 4957.200-2013, Layer 2 Standard

Specification for the Smart Utility Network

This is the second part of a multi-part standard specification for the smart utility network. This part covers OSI Layer 2, including the MAC, DLL and forwarding sub-layers. It is intended for networks with a wireless mesh topology.


Specification of a Data Link Sub-Layer

Revise to add new operational modes for Smart Grid, smart metering, and related applications.


Specification for the Field Area Network

Revise to add new operational modes for Smart Grid, smart metering, and related applications.

ANSI/TIA 4957.400-A-2017, Layer 4

Specification for the Field Area Network

Revise to add new operational modes for Smart Grid, smart metering, and related applications.

ANSI/TIA 4957.500-2017, Smart Utility Network-Security

To define key management and other security protocols necessary to fully implement Layer 2 security for Smart Utility Networks.
ANSI/TIA 4963-2013, Electrical Characteristics of Reversible Balanced Voltage Digital Interface Circuits

This new Standard is an enhanced version of TIA-485-A, Electrical Characteristics of balanced voltage digital interface circuits. The new Standard accommodates that generators and receivers are immune of the interchange of binary signals in multipoint interconnection of digital equipment. When implemented within the guidelines of this Standard, multiple generators and receivers may be attached to a common interconnecting cable. The generators and receivers operate with no errors if the balanced interconnecting cables are connected normally or with the differential signal wires reversed. It is planned that users reference this Standard for the point-to-point interchange of binary signals between equipment and components at signaling rates up to 5 Mbps over a single differential transmission line of nominal test load of 60Ω. Higher rates and different transmission line impedance are possible in optimal application.

ANSI/TIA 4965-2012 (R2017), Telecommunications - Telephone Terminal Equipment - Receive Volume Control Requirements for Digital and Analog Wireline Terminals

This standard establishes receive volume control requirements and testing methods for narrowband digital, wideband digital, and analog wireline terminals. Currently, volume control requirements for these types of terminals are included in different standards documents, each with their own revision cycle. Government agencies currently reference outdated revisions of these multiple standards documents for their volume control regulations. Combining the volume control requirements into one standard that can be referenced by these government agencies will help ensure that their requirements are harmonized and up to date.

ANSI/TIA 4966-2014, Telecommunications Infrastructure Standard for Educational Facilities

This Standard specifies telecommunications infrastructure requirements for educational buildings and spaces. It specifies cabling, cabling topologies, and cabling distances - all of which are intended to support a wide range of services and systems. Additionally, pathways and spaces (e.g. sizing and location), and ancillary requirements are addressed. Modern digital telecommunications in educational buildings require a robustly designed building infrastructure to support the numerous systems that rely on the electronic transport of information.

ANSI/TIA 4994-2015, Standard for Sustainable Information Communications Technology

Scope: This Standard addresses the requirements associated with the planning, architecture, design, integration and operation of sustainable information communications technology (ICT). Justifications: This standard describes sustainable concepts for ICT such as lowering energy consumption, reducing material consumption and mitigating the environmental impact.

ANSI/TIA 5017-2016, Telecommunications - Physical Network Security Standard

This document covers the security of telecom cables, pathways, spaces, & other elements of the physical infrastructure. It includes design guidelines, installation practices, administration, & management. It addresses guidelines for new construction as well as renovation of existing buildings. The document also provides installation guidelines, for implementing security cabling systems for premises security systems with an integrated security approach. Justification: This Standard will enable the planning and installation of physical network security systems that protect critical telecommunications infrastructure elements

ANSI/TIA 5041-2016, FAST Digital IF Architecture and Open Standard Digital IF Interfaces

define a standard interface to connect modems, switches and transmitters at a digital intermediate frequency

ANSI/TIA 5045-2017, Numeric Identifier for Conventional Analog Operation

This project provides a standardized numeric identifier messaging format for conventional analog subscriber units.

ANSI/TIA 5048-2017, Automated Infrastructure Management (AIM) Systems - Requirements, Data Exchange and Applications

This standard specifies the requirements and recommendations for the attributes of Automated Infrastructure Management (AIM) systems, explains how AIM systems can contribute to operational efficiency, and specifies a framework of requirements and recommendations for data exchange with other systems.

ANSI/TIA 526-14-C-2015, Optical Power Loss Measurement of Installed Multimode Fiber Cable Plant; Modification of IEC 61280-4-1 edition 2, Fiber - Optic Communications Subsystem Test Procedures - Part 4-1: Installed Cable Plant - Multimode Attenuation Measurement

Modify Foreword to change document from adoption of IEC 61280-4-1ed2 for regional variances. These variances would change presently normative aspects to become informative.


This part of IEC 61280 applies to fibre optic general communication subsystems. The object of this part is to measure the optical power coupled from the output of a transmitter under test into single-mode optical fibre cable containing dispersion-unshifted fibre or dispersion-shifted fibre.


This procedure can be used to measure the optical loss between any two passively-connected points, including end terminations, of a single-mode optical fiber cable plant. The optical fiber cable plant, as the term is used here, may consist of optical fiber cables, connectors, mounting panels, jumper cables, and other passive components, but may not include active components.

ANSI/TIA 568-C.0-1-2010, Generic Telecommunications Cabling for Customer Premises-Addendum 1, Updated Reference for Balanced Twisted-Pair Cabling

This addendum updates balanced twisted-pair references in ANSI/TIA-568.C.0 to the current balanced twisted pair cabling standards of ANSI/TIA-568-C.2 and ANSI/TIA-1152.

ANSI/TIA 568-C.2-1-2016, Balanced Twisted-Pair Telecommunications Cabling and Components Standard, Addendum 1: Specifications for 100 Next Generation Cabling

Develop a new category of cabling to support future applications beyond 10GBASE-T. A new category of cabling to support increased capacity for future applications.


Introduce category 6A patch cord testing requirements to allow test heads qualified to IEC 61935-2 to be used to qualify a patch cord to TIA 568C.2 C6A compliance. Justification.... TIA C6A test heads and ISO C6A test heads used for measurement of patch cords have slightly differing requirements. These difference cause negligible difference to measured patch cord results, however create a situation where a patch cord test head cannot be both TIA and ISO compliant. This causes practical difficulties in both laboratory and field measurements of cords.

ANSI/TIA 568-C.2-2-2009, Balanced Twisted-Pair Telecommunications Cabling and Components Standard

This Standard specifies minimum requirements for balanced twisted-pair telecommunications cabling (e.g. channels and permanent links) and components (e. g. cable, connectors, connecting hardware, patch cords, equipment cords, work area cords, and jumpers) that are used up to and including the telecommunications outlet/connector and between buildings in a campus environment. This Standard also specifies field test procedures and applicable laboratory reference measurement procedures for all transmission parameters.
ANSI/TIA 568-C.3-1-2011, Optical Fiber Cabling Components Standard - Addendum 1: Addition of OM4 Cables Optical Fiber and 24-fiber array connectors

This addendum updates ANSI/TIA-568-C.3 with the addition of 50/125 micrometer laser-optimized OM4 cabled optical fiber and components for 24-fiber array connectors. Acronyms for optical fiber cable types are also added.

ANSI/TIA 568-D.3-2016, Optical Fiber Cabling Component Standard

This Standard is applicable to premises optical fiber cabling and components. Specified in this Standard are requirements for components, such as cable, connectors, connecting hardware and cords. Basic connectivity arrangements formed from these components are also defined. Connector test requirements and guidelines for field testing are also incorporated into this Standard.

ANSI/TIA 568-D.0-D-2015, Generic Telecommunications Cabling for Customer Premises

This Standard specifies requirements for generic telecommunications cabling. It specifies requirements for cabling system structure, topologies and distances, installation, performance and testing. The Standard needs revision to reorganize content among its parts for ease of maintenance. Certain types of equipment outlets are added. Coaxial cabling is incorporated by reference to ANSI/TIA-568-C.4.

ANSI/TIA 568.1-D-2015, Commercial Building Telecommunications Infrastructure Standard

This Standard specifies requirements for telecommunications cabling within a commercial building and between commercial buildings in a campus environment. It defines terms, specifies cabling topology, lists cabling requirements, establishes cabling distances, sets telecommunications outlet/connector configurations and provides additional useful information.

ANSI/TIA 568.4-D-2017, Broadband Coaxial Cabling and Components Standard

This document will supersede and replace ANSI/TIA568C. 4. This Standard specifies requirements and recommendations for 75 broadband coaxial cabling, cables, cords, and connecting hardware to support community antenna television (CATV, commonly referred to as cable television), satellite television, and other applications supported by the telecommunications infrastructure (star topology) defined by ANSI/TIA568C. 0D and other topologies specified within this Standard. Included are transmission requirements, mechanical requirements, testing requirements, and adequate testing procedures.

ANSI/TIA 569-C-2012, Telecommunications Pathways and Spaces

This default ballot is a result of the comment resolution held regarding SP-3-4817-RV3-F and is limited to 5 specific technical changes. Other comments submitted to SP-3-4817-RV3-F were resolved editorially. The results of the SP-3-4817-RV3-F ballot consisted of 15 'abstain', 16 'approve' votes, 4 'approve with comments' votes, and 2 with "disapprove with comments" votes.

ANSI/TIA 569-D-1-2016, Telecommunications Pathways and Spaces: Addendum 1 - Revised Temperature and Humidity Requirements for Telecommunications Spaces

This Addendum specifies new temperature and humidity requirements and recommendations for telecommunications spaces to harmonize with the ASHRAE Thermal Guidelines for Data Processing Environments, 4th Edition published in 2015.

ANSI/TIA 569-D-2015, Telecommunications Pathways and Spaces

This standard specifies requirements for telecommunications pathways and spaces. New revision needed to: • Incorporate content of addendum ANSI/TIA-569-C-1 • Align content with draft ANSI/TIA-568-D-D • Revise/clarify requirements for distributor rooms, conduit

ANSI/TIA 570-B-1-2009, Residential Telecommunications Infrastructure Standard - Addendum 1: Additional Requirements for Broadband Coaxial Cabling

This Addendum specifies additional requirements and recommendations for 75 &##937; broadband coaxial cabling, cables, cords and connecting hardware to support community antenna television (CATV, commonly referred to as cable television), satellite television and other applications in residences as part of a telecommunications infrastructure as defined by ANSI/TIA-570-B. Included are transmission and mechanical requirements and requirements related to electromagnetic compatibility (EMC) for cabling, cables and connectors; cable installation and connector termination procedures; and field testing procedures.

ANSI/TIA 570-C-2012, Residential Telecommunications Infrastructure Standard

ANSI/TIA-570-B, published in 2004 and reaffirmed in 2010, is due for revision. The revision will include content from Addendum 1, modifications to harmonize with ANSI/TIA-568-C Series and draft ANSI/TIA-569-C, and information on new technologies or advancements.

ANSI/TIA 571-C-2015, Telecommunications - Communications Products - Electrical, Thermal and Mechanical Environmental Performance Requirements

TIA-571-B is up for 5-year review. It has been determined that updating and revisions are required. Some items that need consideration are: • Scope – Expansion of the scope to include telecommunications equipment typically found at the premises in today’s broadband environment; • Vibration Tests – It is now generally recognized that random vibration is more representative of real-world conditions and should replace the current sinusoidal vibration tests; • Surge tests – Consideration should be given to TIA 1194, “Surge Resistibility of Smart Grid Equipment Connected to either DC or 120/240 V Single Phase AC and Metallic Communication Lines” as well as a complete review of this section to make sure the standard reflects the latest technologies, installations and adequately addresses the real surge environment for various types of equipment. Different testing paths should be considered for different uses and installations of equipment. For example, consumer/enterprise, portable/installed equipment, etc.

ANSI/TIA 598-D-2014, Optical Fiber Cable Coding

This standard defines the recommended identification scheme or system for individual fibers, fiber units, and groups of fiber units within a cable structure. The methods contained herein may be used to identify and locate specific fibers for the purpose of connection, termination, or testing within a communication system or for the topography of long haul, feeder route, subscriber, or distribution applications for both on-premises and outside plant use.

ANSI/TIA 603-E-2016, Land Mobile FM or PM - Communications Equipment - Measurement and Performance Standards

The scope of the project is to revise the existing document to add methods of measurement for receivers employing class D audio power amplifiers.

ANSI/TIA 604-108-2008 (R2015), FOCIS 10B Fiber Optic Connector Intermateability Standard - Type LC

FOCIS 10B presents the intermateability standard for simplex and duplex connectors with the commercial designation LC, and is issued as an addendum to TIA/EIA 604, Fiber Optic Connector Intermateability Standards. The provisions of TIA/EIA 604 apply to this document.

ANSI/TIA 604-18-2015, FOCIS 18 Fiber Optic Connector Intermateability Standard - Type MPO-16

This document develops a Fiber Optic Connector Intermateability Standard that accommodates a 1x16 and 2x 16 Multifiber Push-On/Multifiber Termination Push-On connector assembly.
ANSI/TIA 604-5-D-2007, FOCIS 5, Fiber Optic Connector Intermateability Standard, Type MPT

FOCIS 5 presents the intermateability standard for connectors with the commercial designation of MPO, and is used as an addendum to TIA/EIA-604, Fiber Optic Connector Intermateability Standards. The provisions of TIA/EIA-604 apply to this document.

ANSI/TIA 606-B-1-2015, Administration Standard for Commercial Telecommunications Infrastructure - Automated Infrastructure Management Systems

The purpose of this addendum is to update the core functions, auxiliary functions, and usage recommendations for automated infrastructure management (AIM) systems specified in TIA-606-B to harmonize with ISO/IEC 14763-2-1 Implementation and operation of customer premises cabling Part 2: Planning and installation – Amendment for inclusion of AIM systems and ISO/IEC 18598 Automated Infrastructure Management (AIM) Systems – Requirements, Data Exchange and Applications

ANSI/TIA 606-C-2017, Administration Standard for Telecommunications Infrastructure

This Standard specifies administration systems for telecommunications infrastructure within buildings (including commercial, industrial, residential, and data center premises) and between buildings. This infrastructure may range in size from a building requiring a single telecommunications space (TS) and associated elements, to many TSs and associated elements in multiple campus locations. This Standard applies to administration of telecommunications infrastructure in existing, renovated, and new buildings.

ANSI/TIA 607-C-1-2016, Generic Telecommunications Bonding and Grounding (Earthing) for Customer Premises Addendum 1 - Bonding in Multitenant Buildings

This Addendum specifies requirements for a generic telecommunications bonding infrastructure in multi-tenant buildings. This Addendum may also be used as a guide for the renovation or retrofit of existing systems.

ANSI/TIA 607-C-2015, Generic Telecommunications Grounding (Earthing) and Bonding for Customer Premises

This Standard specifies requirements for a generic telecommunications bonding and grounding infrastructure and its interconnection to electrical systems and telecommunications systems. This Standard may also be used as a guide for the renovation or retrofit of existing systems. Revision needed to incorporate addenda, update references and harmonize with ISO/IEC 30129.

ANSI/TIA 631-B-2011 (R2017), Telecommunications - Telephone Terminal Equipment - Radio Frequency Immunity Requirements

Revise existing standard to clarify Scope of base document is limited to telephones with handsets but to also add an informative annex suggesting how the test methods and requirements in the standard may be extended to other telephony products such as speakerphones, answering systems, and telephones with headsets.

ANSI/TIA 637-C-1(E)-2007, Short Message Services (SMS) for Wideband Spread Spectrum Systems - Release C Addendum 1

The Short Message Service (SMS) allows the exchange of short messages between a mobile station and the wireless system, and between the wireless system and an external device capable of transmitting and optionally receiving short messages.

ANSI/TIA 637-C-1(E)-2007, Call Forwarding—Busy Features Description

This standard describes wireless features for mobile phones that operate on the cdma2000 network.

ANSI/TIA 637-C-2-2007 (R2013), Wireless Features Description - Addendum 3

This suite of standards present a recommended plan for the implementation of uniform features for use in wireless telecommunications systems. Its intent is to describe services and features so that the manner in which they are used by a subscriber can remain reasonably consistent from system to system. It is not intended to require that specific service offerings be required of all service providers. This document describes a subset of wireless features that are more likely to be used when roaming, and features that are necessary to implement full intersystem operation. This part discusses call delivery for the series.

ANSI/TIA 637-C-1(F)-2007 (R2013), Wireless Features Description - Addendum 4

This suite of standards present a recommended plan for the implementation of uniform features for use in wireless telecommunications systems. Its intent is to describe services and features so that the manner in which they are used by a subscriber can remain reasonably consistent from system to system. It is not intended to require that specific service offerings be required of all service providers. This document describes a subset of wireless features that are more likely to be used when roaming, and features that are necessary to implement full intersystem operation. This part discusses call forwarding—default for the series.

ANSI/TIA 644-000-B-2003 (R2013), Wireless Features Description: Call Forwarding—Busy Call Forwarding (CFB)

This suite of standards present a recommended plan for the implementation of uniform features for use in wireless telecommunications systems. Its intent is to describe services and features so that the manner in which they are used by a subscriber can remain reasonably consistent from system to system. It is not intended to require that specific service offerings be required of all service providers. This document describes a subset of wireless features that are more likely to be used when roaming, and features that are necessary to implement full intersystem operation. This part discusses call forwarding—default for the series.

ANSI/TIA 646-000-B-3-2007 (R2013), Wireless Features Description: Call Forwarding—Default (CFD)

This suite of standards present a recommended plan for the implementation of uniform features for use in wireless telecommunications systems. Its intent is to describe services and features so that the manner in which they are used by a subscriber can remain reasonably consistent from system to system. It is not intended to require that specific service offerings be required of all service providers. This document describes a subset of wireless features that are more likely to be used when roaming, and features that are necessary to implement full intersystem operation. This part discusses call forwarding—default for the series.
This suite of standards present a recommended plan for the implementation of uniform features for use in wireless telecommunications systems. Its intent is to describe services and features so that the manner in which they are used by a subscriber can remain reasonably consistent from system to system. It is not intended to require that specific service offerings be required of all service providers. This document describes a subset of wireless features that a wireless subscriber can use in any wireless system into which the subscriber roams. The selected subset consists of features that are more likely to be used when roaming, and features that are necessary to implement full intersystem operation. This part discusses Call Waiting (CW) for the series.

This suite of standards present a recommended plan for the implementation of uniform features for use in wireless telecommunications systems. Its intent is to describe services and features so that the manner in which they are used by a subscriber can remain reasonably consistent from system to system. It is not intended to require that specific service offerings be required of all service providers. This document describes a subset of wireless features that a wireless subscriber can use in any wireless system into which the subscriber roams. The selected subset consists of features that are more likely to be used when roaming, and features that are necessary to implement full intersystem operation. This part discusses Call Forwarding—No Answer (CFNA) for the series.

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ANSI/TIA 664-513-B-2007 (R2013), Wireless Features Description: Message Waiting Notification (MWN)

This suite of standards presents a recommended plan for the implementation of uniform features for use in wireless telecommunications systems. Its intent is to describe services and features so that the manner in which they are used by a subscriber can remain reasonably consistent from system to system. It is not intended to require that specific service offerings be required of all service providers. This document describes a subset of wireless features that a wireless subscriber can use in any wireless system into which the subscriber roams. The selected subset consists of features that are more likely to be used when roaming, and features that are necessary to implement full intersystem operation. This part discusses Message Waiting Notification (MWN) for the series.

ANSI/TIA 664-514-B-2007 (R2013), Wireless Features Description: Mobile Access Hunting (MAH)

This suite of standards presents a recommended plan for the implementation of uniform features for use in wireless telecommunications systems. Its intent is to describe services and features so that the manner in which they are used by a subscriber can remain reasonably consistent from system to system. It is not intended to require that specific service offerings be required of all service providers. This document describes a subset of wireless features that a wireless subscriber can use in any wireless system into which the subscriber roams. The selected subset consists of features that are more likely to be used when roaming, and features that are necessary to implement full intersystem operation. This part discusses Mobile Access Hunting (MAH) for the series.

ANSI/TIA 664-515-B-2007 (R2013), Wireless Features Description: Password Call Acceptance (PCA)

This suite of standards presents a recommended plan for the implementation of uniform features for use in wireless telecommunications systems. Its intent is to describe services and features so that the manner in which they are used by a subscriber can remain reasonably consistent from system to system. It is not intended to require that specific service offerings be required of all service providers. This document describes a subset of wireless features that a wireless subscriber can use in any wireless system into which the subscriber roams. The selected subset consists of features that are more likely to be used when roaming, and features that are necessary to implement full intersystem operation. This part discusses Password Call Acceptance (PCA) for the series.

ANSI/TIA 664-516-B-2007 (R2013), Wireless Features Description: Preferred Language (PL)

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ANSI/TIA 664-517-B-2007 (R2013), Wireless Features Description: Priority Access and Channel Assignment (PACA)

This suite of standards presents a recommended plan for the implementation of uniform features for use in wireless telecommunications systems. Its intent is to describe services and features so that the manner in which they are used by a subscriber can remain reasonably consistent from system to system. It is not intended to require that specific service offerings be required of all service providers. This document describes a subset of wireless features that a wireless subscriber can use in any wireless system into which the subscriber roams. The selected subset consists of features that are more likely to be used when roaming, and features that are necessary to implement full intersystem operation. This part discusses Priority Access and Channel Assignment (PACA) for the series.

ANSI/TIA 664-518-B-2007 (R2013), Wireless Features Description: Remote Feature Control (RFC)

This suite of standards presents a recommended plan for the implementation of uniform features for use in wireless telecommunications systems. Its intent is to describe services and features so that the manner in which they are used by a subscriber can remain reasonably consistent from system to system. It is not intended to require that specific service offerings be required of all service providers. This document describes a subset of wireless features that a wireless subscriber can use in any wireless system into which the subscriber roams. The selected subset consists of features that are more likely to be used when roaming, and features that are necessary to implement full intersystem operation. This part discusses Remote Feature Control (RFC) for the series.

ANSI/TIA 664-519-B-2007 (R2013), Wireless Features Description: Selective Call Acceptance (SCA)

This suite of standards presents a recommended plan for the implementation of uniform features for use in wireless telecommunications systems. Its intent is to describe services and features so that the manner in which they are used by a subscriber can remain reasonably consistent from system to system. It is not intended to require that specific service offerings be required of all service providers. This document describes a subset of wireless features that a wireless subscriber can use in any wireless system into which the subscriber roams. The selected subset consists of features that are more likely to be used when roaming, and features that are necessary to implement full intersystem operation. This part discusses Selective Call Acceptance (SCA) for the series.

ANSI/TIA 664-520-B-2007 (R2013), Wireless Features Description: Subscriber PIN Access (SPINA)

This suite of standards presents a recommended plan for the implementation of uniform features for use in wireless telecommunications systems. Its intent is to describe services and features so that the manner in which they are used by a subscriber can remain reasonably consistent from system to system. It is not intended to require that specific service offerings be required of all service providers. This document describes a subset of wireless features that a wireless subscriber can use in any wireless system into which the subscriber roams. The selected subset consists of features that are more likely to be used when roaming, and features that are necessary to implement full intersystem operation. This part discusses Subscriber PIN Access (SPINA) for the series.

ANSI/TIA 664-521-B-2007 (R2013), Wireless Features Description: Subscriber PIN Intercept (SPINI)

This suite of standards presents a recommended plan for the implementation of uniform features for use in wireless telecommunications systems. Its intent is to describe services and features so that the manner in which they are used by a subscriber can remain reasonably consistent from system to system. It is not intended to require that specific service offerings be required of all service providers. This document describes a subset of wireless features that a wireless subscriber can use in any wireless system into which the subscriber roams. The selected subset consists of features that are more likely to be used when roaming, and features that are necessary to implement full intersystem operation. This part discusses Subscriber PIN Intercept (SPINI) for the series.
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<th>ANSI/TIA 664-529-B-2007 (R2013), Wireless Features Description: Emergency Services (9-1-1)</th>
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ANSI/TIA 664-533-B-2007 (R2013), Wireless Features Description: Over-the-Air Service Provisioning (OTASP)

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ANSI/TIA 664-534-B-2007 (R2013), Wireless Features Description: Service Negotiation (SN)

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ANSI/TIA 664-535-B-2007 (R2013), Wireless Features Description: User Group (UG)

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ANSI/TIA 664-536-B-2007 (R2013), Wireless Features Description: Group 3 Analog Facsimile Service (G3 AFax)

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ANSI/TIA 664-537-B-2007 (R2013), Wireless Features Description: Wireless Intelligent Network Feature Descriptions

This suite of standards presents a recommended plan for the implementation of uniform features for use in wireless telecommunications systems. Its intent is to describe services and features so that the manner in which they are used by a subscriber can remain reasonably consistent from system to system. It is not intended to require that specific service offerings be required of all service providers. This document describes a subset of wireless features that a wireless subscriber can use in any wireless system into which the subscriber roams. The selected subset consists of features that are more likely to be used when roaming, and features that are necessary to implement full intersystem operation. This part discusses Wireless Intelligent Network Feature Descriptions for the series.

ANSI/TIA 664-601-B-2007 (R2013), Wireless Features Description: Short Message Delivery

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ANSI/TIA 664-602-B-2007 (R2013), Wireless Features Description: Wireless Messaging Teleservice

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ANSI/TIA 664-603-B-2007 (R2013), Wireless Features Description: Wireless Paging Teleservice

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ANSI/TIA 664-701-B-2007 (R2013), Wireless Features Description: Mobile Station Functionality

This suite of standards presents a recommended plan for the implementation of uniform features for use in wireless telecommunications systems. Its intent is to describe services and features so that the manner in which they are used by a subscriber can remain reasonably consistent from system to system. It is not intended to require that specific service offerings be required of all service providers. This document describes a subset of wireless features that a wireless subscriber can use in any wireless system into which the subscriber roams. The selected subset consists of features that are more likely to be used when roaming, and features that are necessary to implement full intersystem operation. This part discusses Mobile Station Functionality for the series.

ANSI/TIA 664-801-B-2007 (R2013), Wireless Features Description: System Functionality

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ANSI/TIA 664-802-B-2007 (R2013), Wireless Features Description: Subscriber Confidentiality

This suite of standards presents a recommended plan for the implementation of uniform features for use in wireless telecommunications systems. Its intent is to describe services and features so that the manner in which they are used by a subscriber can remain reasonably consistent from system to system. It is not intended to require that specific service offerings be required of all service providers. This document describes a subset of wireless features that a wireless subscriber can use in any wireless system into which the subscriber roams. The selected subset consists of features that are more likely to be used when roaming, and features that are necessary to implement full intersystem operation. This part discusses Subscriber Confidentiality for the series.

ANSI/TIA 664-803-B-2007 (R2013), Wireless Features Description: Network Services

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ANSI/TIA 678-B-2011, Data Transmission Systems and Equipment - Serial Asynchronous Automatic Dialing and Control for Character Mode DCE on Wireless Data Services

Applies to the interconnection of data terminal equipment (DTE) and data circuit-terminating equipment (DCE) employing serial binary data operation via the 100-series interchange circuits or data operation over equivalent logical circuits.

ANSI/TIA 758-B-2012, Customer-Owned Outside Plant Telecommunications Infrastructure Standard

This default ballot is a result of the comment resolution held regarding SP-3-3339-RV2 and is limited to 6 specific technical changes. Other comments submitted to SP-3-3339-RV2 were resolved editorially. The results of the SP-3-3339-RV2 ballot consisted of 22 ‘abstain’, 12 ‘approve’ votes, 2 ‘approve with comments’ votes, and 1 with “disapprove with comments”.


This standard addresses the technical issues associated with Type 1, Type 2, and Type 2.5 Customer Premises Equipment for services such as Calling Identity Delivery, Visual Message Waiting Indicator, Calling Identity Delivery on Call Waiting and Call Waiting Deluxe. The Type 1 and Type 2 issues were previously addressed in TIA/EIA-716 and TIA/EIA-777 respectively. This document is intended to replace both TIA/EIA-716 and TIA/EIA-777. The services use On-Hook and Off-Hook signaling with data frames packaged in Single Data Message Format (SDMF), and Multiple Data Message Format (MDMF)
ANSI/TIA 855-A-2011 (R2016),
Telecommunications - Telephone Terminal Equipment - Stutter Dial Tone Detection Device - Performance Requirements

This document provides specifications for Customer Premises Equipment (CPE) devices designed to automatically detect stutter dial tone (SDT) on an analog telephone line. TIA-968-B includes regulatory requirements related to automatic stutter dialtone detection devices for connection to the network. This standard includes criteria to meet the TIA-968-B requirements and additional requirements for the performance of these devices.

ANSI/TIA 862-B-2016, Structured Cabling Infrastructure Standard for Intelligent Building Systems

This Standard specifies minimum requirements for intelligent building system cabling infrastructure including cabling topology, architecture, design and installation practices, test procedures, and components. The cabling infrastructure specified by this Standard is intended to support a wide range of systems, particularly those that utilize or can utilize IP-based infrastructure. Justification: Revision of the document to include additional information regarding cabling supporting intelligent building systems.


This service description document details the Inband Signaling Protocol between Transcoder/Rate adapter Units (TRAU) for speech traffic channels for the Tandem Free Operation (TFO) of Speech Coders, sometimes also termed "Vocoder Bypass." It is applied to the cdma2000 standards.


The scope of this document is to define the physical layer (PHY) of the Scalable Adaptive Modulation (SAM) Wideband Air Interface (WAI). The WAI called Uw is the interface between the fixed network equipment (FNE) and a subscriber unit (SU) or directly between subscribers units in a wideband system. The general wideband system model is shown in Figure 1, and illustrates the Radio to FNE Mode of operation.

ANSI/TIA 902.BAAC-A-2007 (R2013), WIDEBAND AIR INTERFACE MEDIA ACCESS CONTROL / RADIO LINK ADAPTATION (MAC/RLA) LAYER SPECIFICATION

This document defines the Media Access Control / Radio Link Adaptation (MAC/RLA) layer of the Wideband Air Interface (WAI). The WAI called UW is the interface between the Fixed Network Equipment (FNE) and the Mobile Radio (MR), or directly between MRS in a wideband system. The general wideband system model is shown in Figure 1 and illustrates the Radio to FNE Configuration as defined in [1]. A Vehicular Repeater (VR) may additionally act as a relay between Fixed Station (FS) and MR when coverage limitations require the use of this local coverage area extension.


This document is the Scalable Adaptive Modulation (SAM) radio channel coding specification for the Wideband Air Interface (WAI).

ANSI/TIA 902.BAAE-A-2007 (R2013), WIDEBAND AIR INTERFACE LOGICAL LINK CONTROL (LLC) LAYER SPECIFICATION

This document defines the Logical Link Control (LLC) layer of the Wideband Air Interface (WAI). The wideband air interface called Uw is the interface between the fixed network equipment (FNE) and the subscriber units, or directly between subscriber units in a wideband system. The general wideband system model is shown in Figure 1 and illustrates the Radio to FNE Mode of operation. A Vehicular Repeater (VR) may additionally act as a relay between FS and MR when coverage limitations require the use of this local coverage area extension.

ANSI/TIA 902.BAAF-A-2007 (R2013), WIDEBAND AIR INTERFACE MOBILITY MANAGEMENT (MM) LAYER SPECIFICATION PUBLIC SAFETY WIDEBAND DATA STANDARDS PROJECT DIGITAL RADIO TECHNICAL STANDARDS

This document defines the Mobility Management (MM) layer of the Wideband Air Interface (WAI). The wideband air interface called Uw is the interface between the fixed network equipment (FNE) and the MRC units, or directly between MRC units in a wideband system. The general wideband system model is shown in Figure 1 and illustrates the Radio to FNE Mode of operation. A Vehicular Repeater (VR) may additionally act as a relay between FS and MR when coverage limitations require the use of this local coverage area extension.

ANSI/TIA 902.BAEB-A-2007 (R2013), WIDEBAND AIR INTERFACE PACKET DATA SPECIFICATION PUBLIC SAFETY WIDEBAND DATA STANDARDS PROJECT DIGITAL RADIO TECHNICAL STANDARDS

This document is the packet data specification for the Wideband Air Interface (WAI). The wideband air interface called Uw is the interface between the fixed network equipment (FNE) and the subscriber units, or directly between subscriber units in a wideband system. The general wideband system model is shown in Figure 1 and below illustrates the Radio to FNE Mode of operation. A Vehicular Repeater (VR) could additionally act as a relay between FS and MR when coverage limitations require the use of this local coverage area extension.

ANSI/TIA 912-C-2015, Telephony Equipment - Voice Gateway Transmission Requirements

This standard covers transmission requirements for voice gateways (VGs) that provide routing functions between telephones, traditional public and private networks, and modern packet-based networks. VGs include packet-based enterprise equipment, residential gateways, ADSL-based Integrated Access Devices (IADs), and cable-based Multimedia Terminal Adapters (MTAs). The main purpose of this revision is to add requirements for supporting wideband (nominally 100 to 7,000 Hz) analog telephones that may be connected to voice gateways for providing High Definition (HD) voice services such as those available using Voice over Internet Protocol (VoIP).

ANSI/TIA 920.000-B-2015, Telecommunications - Communications Products - Overview of Transmission Requirements for Digital Interface Communications Devices

This standard provides an overview of the structure of the ANSI/TIA-920 series of standards that establish audio transmission performance requirements for digital telephones regardless of protocol or digital format. Transmission may be over any digital interface including Local or Wide Area Networks, Universal Serial Bus (USB), Firewire/IEEE Std 1394, public ISDN or digital over twisted pair wire. This includes TDM-based and packet-based (e.g. VoIP) telephones. These telephones may be connected through modems, voice gateways, wireless access points, or PBXs, or they may be personal computer-based telephones. This revision will add updated requirements for narrowband (300 to 3400 Hz) telephones, previously found in ANSI/TIA-810-B, to the existing wideband (150 to 6800 Hz) requirements in the TIA-920-A series and upgrade the series to ANSI status. The term “wideband” will be dropped from the document title since the revised standard will cover both wideband and narrowband telephones.

ANSI/TIA 920.110-B-2015, Telecommunications - Telephone Terminal Equipment - Transmission Requirements for Digital Telephones with Handsets

This standard establishes audio transmission performance requirements for handset equipped digital telephones regardless of protocol or digital format. Transmission may be over any digital interface including Local or Wide Area Networks, Universal Serial Bus (USB), Firewire/IEEE Std 1394, public ISDN or digital over twisted pair wire. This includes TDM-based and packet-based (e.g. VoIP) telephones. These telephones may be connected through modems, voice gateways, wireless access points, or PBXs, or they may be personal computer-based telephones.
ANSI/TIA 942-B-2006 (R2012), Wireless Telecommunications - Terminal Equipment - Technical Requirements for Connection of Terminal Equipment to the Telephone Network

This Standard specifies technical criteria for terminal equipment approved in accordance with Title 47 of the U.S. Code of Federal Regulations (47 C.F.R.), Part 68 for direct connection to the public switched telephone network, including private line services provided over wireline facilities owned by providers of wireline telecommunications. This addendum adds a new sub-clause specifying the use of an acoustic stimulus signal when testing analog telephones having electroacoustic transducers for live voice input for compliance with out-of-band emissions and in-band longitudinal signal requirements.

ANSI/TIA 948-B-2009 (R2016), Telecommunications - Telephone Terminal Equipment - Technical Requirements for Connection of Terminal Equipment to the Telephone Network

This Standard specifies technical criteria for terminal equipment approved in accordance with Title 47 of the U.S. Code of Federal Regulations (47 C.F.R.), Part 68 for direct connection to the public switched telephone network, including private line services provided over wireline facilities owned by providers of wireline telecommunications.

ANSI/TIA 948-B-3-2016, Telecommunications - Telephone Terminal Equipment - Technical Requirements for Connection of Terminal Equipment to the Telephone Network - Addendum 3

This addendum provides changes to TIA-948-B, Telecommunications - Telephone Terminal Equipment - Technical Requirements for Connection of Terminal Equipment to the Telephone Network. This addendum will remove the AC and DC impedance requirements when subjected to the Type B ringing frequencies and voltage levels. All other clauses in TIA-968-B are not affected.


This standard defines the interfaces between a telecommunications service provider (TSP) and a Law Enforcement Agency (LEA) to assist the LEA in conducting lawfully authorized electronic surveillance.


ANSI/TIA J-STD-025-B-2006 (R2012), Lawfully Authorized Electronic Surveillance (CALEA)

This document defines the interfaces between a telecommunications service provider (TSP) and a Law Enforcement Agency to assist the LEA in conducting lawfully authorized electronic surveillance.

ANSI/TIA J-STD-025-B-3-2013, Lawfully Authorized Electronic Surveillance (LAES) - Addendum 3 - Support for BSD or Subnet

This addendum consists of additions and modifications to ANSI/J-STD-025-B for supporting BSD or Subnet information in the Location Information parameter type of the cdma2000&174; Abstract Syntax for PacketData CII Delivery.


This Standard provides a solution for the handling of Wireless Enhanced Emergency Calls for the FCC E911Phase II mandate. Carrier position reporting to emergency services systems, as mandated by the Federal CommunicationCommission (FCC) under docket 94-102 (including orders 96-264, 99-96 and 99-245) has been addressed bythis Interim Standard without considering position reporting privacy restrictions that may be desirable for future position reporting services. For this reason, this Standard does not preclude these other service restrictions. Position reporting privacy restrictions are beyond the scope of this Standard, and are not addressed here.


This document is a guideline providing methods of representing the process statistics of the chromatic dispersion of optical fibres and related components that may be combined in a link.


This document provides guidelines for the calculation of polarization mode dispersion (PMD) in optical fibre systems to accommodate the statistical variation of PMD and differential group delay (DGD) in optical fibre cables and components.
TOY-TIA (Toy Industry Association)
ANSI Z315.1-2012, Safety Requirements for Tricycles
This standard covers the safety requirements for all tricycles intended for use by children 8 years and under. While the addition of a push handle does not by itself change the classification of a product from a tricycle to a stroller (or other juvenile product), there exist in the marketplace some hybrid products (i.e. tricycle/stroller combinations that have canopies, reclining seats, and/or restraint systems, etc.) which are intended and marketed to fulfill both functions.

TPI (Truss Plate Institute)
ANSI/TPI 1-2014, National Design Standard for Metal Plate Connected Wood Truss Construction
This standard establishes minimum requirements for the design and construction of metal plate connected wood trusses. This standard describes the materials used in a truss, both lumber and steel, and design procedures for truss members and joints. Responsibilities, methods for evaluating the metal connector plates, and manufacturing quality assurance are also contained in this standard.

UAMA (ASC B7) (Unified Abrasives Manufacturers’ Association)
ANSI B7.1-2010, Safety Requirements for the Use, Care and Protection of Abrasive Wheels
Standard sets forth requirements for the safe use, care and protection of abrasive wheels and the machines for which they are designed. Included in this standard are the requirements for safety guards, handling and mounting techniques.

ANSI B7.7-2003 (R2011), Safety Requirements for Abrading Materials with Coated Abrasive Systems
Standard establishes the minimum safety requirements related to the usage of coated abrasive forms. The requirements apply to all hand-held and fixed mounted machine operations that use some form of coated abrasive product, and to safety-related maintenance precautions for the machines and parts.

ANSI B74.12-2012, Specifications for the Size of Abrasive Grain-Grinding Wheels, Polishing and General Industrial Uses
Purpose of this standard is to establish a nationally recognized basis for checking the size of abrasive grain for use in the manufacture of grinding wheels, general polishing and other industrial uses such as pressure blasting, lithoplate grinding, etc.

ANSI B74.13-2016, Markings for Identifying Grinding Wheels and Other Bonded Abrasives
This standard applies to grinding wheels and other bonded abrasives: segments, bricks, sticks, hones, rubs, and other shapes, which are tools used to remove material, alter shape or size, produce a desired surface or accuracy of dimension, or a combination of these objectives. The standard does not apply to specialties such as sharpening stones, or to grinding wheels normally distributed in resale and certain specialized industrial markets, where radically different symbols are commonly used.

ANSI B74.14-2007 (R2013), Methods of Chemical Analysis of Aluminum Oxide Abrasive Grain and Abrasive Crude
These methods cover procedures for the chemical analysis of aluminum oxide abrasive grain and abrasive crude. The methods apply to products as sold commercially but not necessarily after alteration in service.

ANSI B74.15-1992 (R2013), Methods of Chemical Analysis of Silicon Carbide Abrasive Grain and Abrasive Crude
These methods cover procedures for the chemical analysis of silicon carbide grain and abrasive crude. The methods apply to products as sold commercial but not necessarily after alteration in service.

ANSI B74.16-2002 (R2014), Checking the Size of Diamond and Cubic Boron Nitride Abrasive Grain
To establish a common basis for checking the size of diamond and cubic boron nitride (CBN) grain for use in the manufacture of diamond grinding wheels, saws and other industrial diamond products.

ANSI B74.18-2016, Specifications for Grading of Certain Abrasive Grain on Coated Abrasive Material
Correction to tables. This standard specifies grading requirements for the screen grit sizes called macrogrits and the microgrit sizes of aluminum oxide, zirconia alumina, silicon carbide, and garnet abrasive grains for use on coated abrasive products.

ANSI B74.19-2016, Test for Determining the Magnetic Content of Abrasive Grains
To establish a nationally recognized basis for determining the magnetic content of abrasive grain used in the manufacture of grinding wheels, coated abrasive products, etc.
ANSI B74.20-2004 (R2016), Specification for Diamond and CBN Powders in Sub-Sieve Sizes
This standard defines the characterization of sub-sieve size diamond and CBN powders for general industrial use. However there are special applications such as the electronics and pyrocrystallizing diamond/CBN (PCD/PCBN) industries that require custom specifications to be agreed upon between the miconizer and the end user. This standard does not attempt to address these special situations.

ANSI B74.21-2002 (R2014), Fatigue Proof Test Procedure for Vitrified Wheels
To outline a proof test method that will increase the degree of surety at which a vitrified wheel will not fail from normal operating stresses due to fatigue during its useful lifetime.

ANSI B74.22-1991 (R2014), Design Test for Type 27 Portable Grinding Wheels
To outline a test method to be applied to 9” x 1/4” Type 27 wheel designs that set a minimum safety standard to help avoid grinding wheel failure in the event the wheel incurs a crack in use that is not visible to the naked eye.

ANSI B74.23-2002 (R2014), Measuring Relative Crystal Strengths of Diamond and Cubic Boron Nitride
To establish an agreed method for checking the relative strengths of diamond and cubic boron nitride (CBN) grains for use in the manufacture of saw blades and other industrial diamond products.

ANSI B74.24-2016, Specification for Abrasive Materials for Blasting
To establish a specification for manufactured mineral type abrasive materials used with pressure blasting equipment. The abrasives are generally used for blast cleaning metal surfaces to remove scale, rust, paint, encrusted sand, dirt, and other foreign material, and to prepare surfaces for applied finishes such as paints, plasma spray and metal plating.

ANSI B74.3-2003 (R2014), Specifications for Shapes and Sizes of Diamond or CBN Abrasive Products
Details a system to describe the shape of complete diamond or CBN wheels either unitary or built of composite parts and includes mounted wheels and hand hones.

ANSI B74.4-1992 (R2013), Procedure for Bulk Density of Abrasive Grains
The method of test is primarily intended for determining the bulk density of abrasive grains.

UL (Underwriters Laboratories, Inc.)
ANSI/ISA 12.01.01-2013, Definitions and Information Pertaining to Electrical Equipment in Hazardous (Classified) Locations
This document provides general guidance for safe design, installation, and maintenance of electrical equipment in hazardous (classified) locations using appropriate means to prevent ignition of flammable gases and vapors, flammable liquids, combustible dusts, or ignitable fibers or flyings.

ANSI/ISA 12.13.04/FM 6325-2007 (R2014), Performance Requirements for Open Path Combustible Gas Detectors
This standard provides minimum requirements for fixed and transportable open path gas detection apparatus. This standard specifies the construction, performance and testing of open path (line-of-sight) gas monitors that sense the presence of combustible gas or vapor concentrations in air.

ANSI/ISA 60079-0 (12.00.01)-2013, Explosive Atmospheres - Part 0: Equipment - General Requirements
This standard specifies the general requirements for construction, testing and marking of electrical equipment and Ex Components intended for use in explosive atmospheres. Explosive atmospheres are identified by the National Electric Code®(NEC®); ANSI/NFPA 70 as hazardous (classified) locations and include the following specified locations: Class I, Zone 0; Class I, Zone 1; Class I, Zone 2; Zone 20; Zone 21; and Zone 22.

ANSI/ISA 60079-1 (12.22.01)-2009 (R2013), Explosive Atmospheres - Part 1: Equipment Protection by Flameproof Enclosures ‘d’
This standard contains specific requirements for the construction and testing of electrical equipment with the type of protection flameproof enclosure ‘d’, intended for use in Class I, Zone 1, explosive gas atmospheres.

ANSI/ISA 60079-10-1-2014, Explosive atmospheres - Part 10-1: Classification of areas - Explosive gas atmospheres
This standard is concerned with the classification of areas where flammable gas or vapor or mist hazards may arise and may then be used as a basis to support the proper selection and installation of equipment for use in a hazardous area. It is intended to be applied where there may be an ignition hazard due to the presence of flammable gas or vapor, mixed with air under normal atmospheric conditions.

ANSI/ISA 60079-10-2 (12.10.05)-2013, Explosive Atmospheres - Part 10-2: Classification of areas - Combustible dust atmospheres
This standard is concerned with the identification and classification of areas where explosive dust atmospheres and combustible dust layers are present, in order to permit the proper assessment of ignition sources in such areas.

ANSI/ISA 60079-11 (12.02.01)-2014, Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i"
This standard specifies the construction and testing of intrinsically safe apparatus intended for use in an explosive atmosphere and for associated apparatus, which is intended for connection to intrinsically safe circuits which enter such atmospheres.

ANSI/ISA 60079-15 (12.12.02)-2013, Explosive atmospheres - Part 15: Equipment protection by type of protection "n"
This standard specifies requirements for the construction, testing and marking for Group II electrical equipment with type of protection "n" intended for use in explosive gas atmospheres. This standard applies to electrical equipment where the rated voltage does not exceed 15 kV r.m.s. a.c. or d.c. This standard is applicable to non-sparking electrical equipment and also to electrical equipment with parts or circuits producing arcs or sparks or having hot surfaces which, if not protected in one of the ways specified in this standard, could be capable of igniting a surrounding explosive gas atmosphere.

ANSI/ISA 60079-18 (12.23.01)-2012, Electrical Apparatus for Use in Class I, Zone 1 Hazardous (Classified) Locations: Type of Protection - Encapsulation "m"
This standard gives the specific requirements for the construction, testing, and marking of electrical apparatus, parts of electrical apparatus and Ex components with the type of protection encapsulation “m”.

ANSI/ISA 60079-26 (12.00.03)-2011, Explosive Atmospheres - Part 26: Equipment for Use in Class I, Zone 0 Hazardous (Classified) Locations
This standard specifies the particular requirements for construction, test and marking for electrical equipment of Group II intended for use in Class I, Zone 0 as defined in the National Electrical Code, ANSI/NFPA 70. This electrical equipment, within the operational parameters specified by the manufacturer, ensures a very high level of protection that includes rare faults related to the equipment or two faults occurring independently of each other.

ANSI/ISA 60079-28 (12.21.02)-2013, Explosive Atmospheres - Part 28: Protection of equipment and transmission systems using optical radiation
This standard explains the potential ignition hazard from equipment using optical radiation intended for use in explosive gas and combustible dust atmospheres. It describes precautions and requirements to be taken when using optical radiation transmitting equipment in explosive gas and combustible dust atmospheres.

ANSI/ISA 60079-29-1 (12.13.01)-2013, Explosive Atmospheres - Part 29-1: Gas detectors - Performance requirements of detectors for flammable gases
This part of ISA-60079-29 specifies general requirements for construction, testing and performance, and describes the test methods that apply to portable, transportable and fixed apparatus for the detection and measurement of flammable gas or vapour concentrations with air. The apparatus, or parts thereof, are intended for use in explosive gas atmospheres and in mines susceptible to firedamp.
ANSI/ISA 60079-29-2 (12.13.02)-2012, Explosive Atmospheres - Part 29-2: Gas detectors - Selection, installation, use and maintenance of detectors for flammable gases and oxygen

This part of ISA-60079-29 gives guidance on, and recommended practice for, the selection, installation, use and maintenance of electrically operated group II apparatus intended for use in industrial and commercial safety applications for the detection and measurement of flammable gases complying with the requirements of ISA-60079-29-1 and ANSI/ISA -12.13.04.

ANSI/ISA 60079-6 (12.00.05)-2009 (R2013), Explosive atmospheres - Part 6: Equipment protection by oil-immersion "o"

This standard specifies the requirements for the design, construction and testing of oil-immersed electrical equipment, oil-immersed parts of electrical equipment and Ex components in the type of protection oil immersion "o", intended for use in explosive gas atmospheres.

ANSI/ISA 60079-7 (12.16.01)-2008 (R2013), Explosive Atmospheres - Part 7: Equipment protection by increased safety "e"

This standard specifies the requirements for the design, construction, testing and marking of electrical apparatus where the rated voltage does not exceed 11 kV r.m.s. a.c. or d.c. Additional measures are applied to ensure that the apparatus does not produce arcs, sparks, or excessive temperatures in normal operation or under specified abnormal conditions.

ANSI/ISA 61010-031, Amendment 1-2010, Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use - Part 031: Safety requirements for hand-held probe assemblies for electrical measurement and test

The proposal is to include the IEC 2008 Amendment 1 to IEC 61010-031 within ANSI/ISA-61010-031, the US adoption of the IEC standard co-published with UL and CSA. The text is proposed to be published in the ISA, UL, and CSA versions of the standard in order to maintain the standard's harmonized status.

ANSI/ISA 61010-2-030-2012 (82.02.03), Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use - Part 2-030: Particular requirements for testing and measuring circuits

This clause of Part 1 is applicable except as follows: Equipment included in scope Replace the text with the following: This part of IEC 61010 specifies safety requirements for testing and measuring circuits which are connected for test or measurement purposes to devices or circuits outside the measurement equipment itself.

ANSI/ISA 92.00.02-2013, Installation, Operation, and Maintenance of Toxic Gas-Detection Instruments

This standard gives guidance on, and recommended practice for, the selection, installation, use and maintenance of electrically operated equipment intended for use in industrial and commercial safety applications for the detection and measurement of toxic gases complying with the requirements of ANSI/ISA-92.00.01 and ISA-92.00.04.

ANSI/ISA 92.00.04-2014, Performance Requirements for Open Path Toxic Gas Detectors

This standard provides minimum requirements for fixed and transportable open path toxic gas detection equipment. This standard specifies the construction, performance and testing of open path (line-of-sight) gas detectors that sense the presence of toxic gas concentrations in air.

ANSI/ISA 92.04.01 Part 1-2007 (R2013), Performance Requirements for Instruments Used to Detect Oxygen-Deficient/Oxygen-Enriched Atmospheres

This standard addresses the details of construction, performance, and testing of portable, mobile, and stationary electrical instruments used to provide a warning of the presence of oxygen-deficient or oxygen-enriched atmospheres.

UL 1-2007 (R2012), Standard for Safety for Flexible Metal Conduit

Reaffirmation of current ANSI which covers flexible aluminum and steel conduit designed for use as metal raceway for wires and cables.

UL 100-2012 (R2016), Standard for Safety for Sustainability for Gypsum Boards and Panels

The criteria in this standard were developed based on the life cycle stages of gypsum boards and panels. Sustainability factors considered in this standard are: materials, energy, manufacturing and operations, health and environment, product performance, and product stewardship. Credit for innovations in these, or other factors not listed, is also addressed in this standard.

UL 100-2012a, Standard for Sustainability for Gypsum Boards and Panels

Proposed revisions to the proposed First Edition of the Standard for Sustainability for Gypsum Boards and Panels, UL 100

UL 1004-1-2017, Standard for Safety for Rotating Electrical Machines - General Requirements (Proposal dated 8-26-16)

The following is proposed: (1) Exception for non-metallic functional parts and revised definition, and (2) Requirements for separation of circuits

UL 1004-1-2017a, Standard for Safety for Rotating Electrical Machines - General Requirements (Proposal dated 11-18-16)

This recirculation proposal provides revisions to the UL 1004-1 proposal dated 8-26-16.

UL 1004-1-2017b, Standard for Safety for Rotating Electrical Machines - General Requirements (proposal dated 1-27-17)

This recirculation proposal provides revisions to Topic 2 of the UL 1004-1 proposals dated 8-26-16 and 11-18-16 for the addition of requirements to address separation of circuits.

UL 1004-2-2015, Standard for Safety for Impedance Protected Motors (Proposal dated 12-19-14)

Proposal to remove the cheesecloth requirement from the locked-rotor temperature and endurance tests.

UL 1004-3-2015, Standard for Safety for Thermally Protected Motors (Proposal dated 11-7-14)

The following changes are proposed: (1) Remove the cheesecloth requirement from the lock-rotor temperature and endurance tests, and (2) Revised running heating test for direct drive fan air-over motors.

UL 1004-4-2015, Standard for Safety for Electric Generators (Proposal dated 3-6-15)

This proposal aligns the UL 1004-4 harmonic distortion test method with the UL 2200 test method.


The proposals include the following: (1) Alternative to Drip Proof Test, and (2) Expand scope to include larger Horsepower, IEC design N, Single phase motors, and motors rated using IP codes of IPX2


This recirculation proposal provides revisions to the UL 1004-5 proposal dated 1-22-16.

UL 1004-6-2012 (R2017), Standard for Servo and Stepper Motors (proposal dated 12-2-16)

UL proposes a reaffirmation of ANSI Approval of UL 1004-6. This Standard applies to servo and stepper motors. The requirements are intended to evaluate the suitability of the motor for normal use when fed from an appropriate controller (drive) through its manufacturer declared normal operating region.

UL 1004-7-2016, Standard for Safety for Electronically Protected Motors (Proposal dated 3-11-16)

It is proposed to add an option for the evaluation of electronically protected motors for use in appliances.

UL 1004-8-2009 (R2014), Standard for Safety for Inverter Duty Motors (Proposal dated 12-13-13)

UL is proposing to reaffirm the ANSI approval of UL 1004-8. No new revisions are being proposed.
UL 1004-9-2016, Standard for Safety for Form Wound and Medium Voltage Rotating Electrical Machines

UL proposes a new standard which covers field-installed machines with form wound windings and rated for applications between 460 V and up to 34,000 V. This standard also applies to field-installed machines employing random winding windings and rated for applications above 1,000 V and up to 7,200 V.

UL 1008-2015, Standard for Safety for Transfer Switch Equipment

The intent of this proposal is to correct errors that appear in various requirements of UL 1008.


Provides the proposed First Edition of the Standard for Medium-Voltage Transfer Switches, UL 1008A (Recirculation).


Covers solid-state automatic transfer switches intended for use in ordinary locations to provide for lighting and power only in option stand-by systems in accordance with Article 702 of the “American National Standard National Electrical Code,” ANSI/NFPA 70.

UL 101-2002 (R2012), Standard for Safety for Leakage Current for Appliances

Reaffirm the ANSI Approval of UL 101

UL 1012-2012 (R2016), Standard for Safety for Power Units Other than Class 2

Reaffirmation of ANSI approval is proposed for UL 1012

UL 1017-2015, Standard for Safety for Vacuum Cleaners, Blower Cleaners, and Household Floor Finishing Machines

The proposed 9th edition of Standard for Safety for Vacuum Cleaners, Blower Cleaners, and Household Floor Finishing Machines

UL 1017-2015a, Standard for Safety for Vacuum Cleaners, Blower Cleaners, and Household Floor Finishing Machines

The proposed 9th edition of Standard for Safety for Vacuum Cleaners, Blower Cleaners, and Household Floor furnishing.

UL 1022-2012 (R2016), Standard for Safety for Line Isolation Monitors


UL 1023-2013, Standard for Safety for Household Burglar-Alarm System Units

Correction of Table 16.1 for Minimum Spacings

UL 1023-2013a, Standard for Safety for Household Burglar-Alarm System Units

Revision to minimum spacing requirements.

UL 1026-2016a, Standard for Safety for Electric Household Cooking and Fooderving Appliances (Proposals dated 11/20/15)

2. Addition of Separate Action for Stay On Function forToaster Ovens, New 22.12.1 and 22.12.2. 3. Redundant Control Based of Food Load Ignition Test, New 22.18, 55.2.13, 55.2.14,55.2.10.6, 60.4, 60.4.1, 60.4.2, Revised 71.6.


Instruction Manual References to Extension Cords, Proposed Changes to 69.12

UL 1026-2016c, Standard for Safety for Electric Household Cooking and Fooderving Appliances (Proposals dated 4/15/16)

1. Button or Coin Cell Batteries of Lithium Technology - Proposed Reference to UL 4200A, New 33.7.  2. Breakable Surface Impact Utensil - Clarification of Dimensions/Material, Revised 55.2.3.5.  3. Smart Enabled Unattended Products - Exception to "Start" Button Activation for Products without Normally Heated Exterior Surfaces, Revised SA3.3.  4. Various Corrections Including Changes to the Title of the Standard, Revised 41.1.9, 41.2.10, Section 49, 55.3.2.  5. Removal of Definition in 4.16.  6. Clarification of 22.12.1 and 22.12.2


Smart Enabled Toaster Ovens

UL 1029-2012 (R2017), Standard for Safety for High-Intensity-Discharge Lamp Ballasts

Reaffirmation and Continuance of the Fifth Edition of the Standard for High-Intensity- Discharge Lamp Ballast, UL 1029, as an American National Standard

UL 103-2012 (R2017), Standard for Safety for Factory-Built Chimneys for Residential Type and Building Heating Appliances

Reaffirm UL 103 as an American National Standard. UL 103 covers factory-built chimneys intended for venting gas, liquid, and solid-fuel fired residential-type appliances and building heating appliances in which the maximum continuous flue-gas outlet temperatures do not exceed 1000°F (538°C).


The following changes are being proposed: (1) Deletion of 6.4 which references the use of X-rays to determine insulation spacing; (2) Addition of an exception to 14.2 for testing in a forced-air ambient condition.


Revised Electrical Transient Tests, Section 44

UL 1037-2016, Standard for Safety for Antitheft Alarms and Devices

This covers the addition of new tiered performance requirements for residential security containers

UL 104-2016, Standard for Safety for Elevator Door Locking Devices and Contacts

UL 104 covers the following elevator appliances intended for installation and operation on horizontal and vertically opening hoistway doors and gates and car doors and gates in accordance with the requirements of the Safety Code for Elevators and Escalators, ASME A17.1: a) Hoistway-Door Interlocks; b) Hoistway-Door Electric Contacts; c) Hoistway-Door Combination Mechanical Lock and Electric Contacts; d) Hoistway Gate Electric Contacts; e) Car Door Interlocks; and f) Car Door Electric Contacts.

UL 1040-2001 (R2017), Standard for Safety for Fire Test of Insulated Wall Construction

UL proposes a reaffirmation for ANSI approval of UL 1040.

UL 1042-2016, Standard for Safety for Electric Baseboard Heating Equipment

1. Clarification of Requirements for Heating Elements

UL 1042-2016a, Standard for Safety for Electric Baseboard Heating Equipment

1. Clarification of Requirements for Heating Elements

UL 1046-2012 (R2017), Standard for Grease Filters for Exhaust Ducts

UL proposes a reaffirmation for ANSI approval of UL 1046.

UL 1047-2010 (R2015), Standard for Safety for Isolated Power Systems Equipment


UL 1053-2011 (R2015), Standard For Ground-Fault Sensing and Relaying Equipment

Reaffirmation of ANSI Approval for UL 1053.

UL 1054-2008 (R2013), Special-Use Switches


UL 1059-2011, Standard for Safety for Terminal Blocks

The following changes in requirements to the Standard for Terminal Blocks, UL 1059, are being proposed: 1. Addition of exception to 9.1 for performing Mercurox Nitrate or Moist Ammonia Stress Corrosion tests

UL 1062-2014, Standard for Safety for Unit Substations

These requirements cover unit substations of 1000 kVA single phase and 3000 kVA 3-phase maximum having a maximum nominal primary or secondary rating of 600 volts. Their construction, installation, and use are intended to be in accordance with the National Electrical Code, ANSI/NFPA 70.

This proposal includes the following topics: (1) Addition of requirements to allow the measured DC resistance values to be adjusted based on the construction of the cable (2) Addition of requirements to clarify preparation of the sample for the oil immersion test (3) Revision to reinforce requirements for a single conductor wire (4) Revision to Table 17.1 to remove unnecessary footnote


Addition of Requirements to Allow the Measured DC Resistance Values to be Adjusted Based on the Construction of the Cable

UL 1066-2017, Standard for Safety for Low-Voltage AC and DC Power Circuit Breakers Used in Enclosures

1. Revision to SC2.5 to Clarify Testing Requirements for Circuit Breakers with a Remotely Operated Racking Mechanism 2. Revision of the Scope to Increase the Maximum Allowable Voltage of Low-Voltage Power Circuit Breakers


This proposal is a Reaffirmation and Continuance of the Fifth Edition of the Standard for Safety for Electrically Conductive Equipment and Materials for Use in Flammable Anesthetizing Locations.

UL 1067-2011, Standard for Safety for Electrically Conductive Equipment and Materials for Use in Flammable Anesthetizing Locations

This recirculation proposal provides revisions to the proposal document dated June 3, 2011 for the Fifth Edition of the Standard for Electrically Conductive Equipment and Materials for Use in Flammable Anesthetizing Locations, UL 1067 based on a comment received.

UL 1069-2017, Standard for Safety for Hospital Signaling and Nurse Call Equipment

The requirements in this standard cover the individual units and equipment that operate within the context of a fundamental hospital signaling nurse call system (NCS).

UL 1072-2013, Standard for Safety for Medium-Voltage Power Cables

Revised Supplementary Jacket Thickness Requirements

UL 1076-2015, Standard for Safety for Proprietary Burglar Alarm Units and Systems

Revision to minimum spacing requirements.

UL 1077-2016, Standard for Safety for Supplementary Protectors for Use in Electrical Equipment

Clarification for Measuring Spacings as Described in Table 16.1

UL 1077-2016a, Standard for Safety for Supplementary Protectors for Use in Electrical Equipment

Clarification for Measuring Spacings as Described in Table 16.1

UL 1081-2016, Standard for Safety for Swimming Pool Pumps, Filters, and Chlorinators

Proposals to add requirements for electronic circuits, to allow the use of UL 840 to evaluate clearance and creepage distances, and to update requirements for switches

UL 1081-2017, Standard for Safety for Swimming Pool Pumps, Filters, and Chlorinators

These requirements apply to electric motor-operated water pumps of the nonsubmersible type, pump-filter combinations, and chlorinators for use with swimming pools, hot tubs, and spas, to be used in accordance with the National Electrical Code, NFPA 70. The pump is secured directly to the motor or the pump and motor are factory secured to a common frame. It also covers electric pool cleaners.

UL 1081-2017a, Standard for Safety for Swimming Pool Pumps, Filters, and Chlorinators

These requirements apply to electric motor-operated water pumps of the nonsubmersible type, pump-filter combinations, and chlorinators for use with swimming pools, hot tubs, and spas, to be used in accordance with the National Electrical Code, NFPA 70. The pump is secured directly to the motor or the pump and motor are factory secured to a common frame.

UL 1082-2017, Standard for Safety for Household Electric Coffee Makers and Brewing Type Appliances (Proposals dated 9/30/16)

Carafe Handle Security Test

UL 1082-2017a, Standard for Safety for Household Electric Coffee Makers and Brewing Type Appliances (Proposals dated 11/25/16)

Carafe Handle Security Test


Instruction Manual References to Extension Cords, Proposed Changes to 56.11

UL 1083-2016a, Standard for Safety for Household Electric Skillets and Frying-Type Appliances (Proposals dated 4/15/16)

1. Button or Coin Cell Batteries of Lithium Technology - Proposed Reference to UL 4200A, New 24.10.  2. Breakable Surface Impact Utensil - Clarification of Dimensions/Material, Revised 46.2.5

UL 1083-2016b, Standard for Safety for Household Electric Skillets and Frying-Type Appliances, Proposals Dated 8/5/16

Use of Commercially Available Peanut Oil for Testing of Deep Fryers, Oil Fondues, and Skillets, Revised 31.2.2.1, 31.2.4.3, 31.2.10.1, 40.2, 46.3.1, 46.4.1

UL 1086-2016, Standard for Safety for Household Trush Compactors


UL 1088-2015, Standard for Safety for Temporary Lighting Strings

The following changes in requirements to the Standard for Temporary Lighting Strings, UL 1088/ULC-S1088, are being proposed: 1. Proposed New Edition of the Joint UL/ULC Standard for Temporary Lighting Strings, UL 1088/ULC-S1088

UL 1089-2009 (R2013), Standard for Safety for Tube Fittings for Flammable and Combustible Fluids, Refrigeration Service, and Marine Use

UL 109 covers fittings to be used in tubing carrying: a) Fuel gases such as acetylene, liquefied petroleum gas (LP-gas), and other liquefied and non-liquefied flammable gases that are stable because of their composition or because of the conditions of storage; b) Refrigerants; c) Gasoline or gasohol formulated in accordance with ANSI/ASTM D 4814; d) Diesel fuel formulated in accordance with ANSI/ASTM D 975; e) Heating fuel oils formulated in accordance with ANSI/ASTM D 396; and f) Kerosene formulated in accordance with ANSI/ASTM D 3699.

UL 1090-2016, Standard for Safety for Electric Snow Blowers

1. Replace battery operated requirements in UL 1090 with General Requirements for Battery-Powered Appliances, UL 2595

UL 1097-2012 (R2016), Standard for Safety for Double Insulation Systems for Use in Electrical Equipment


UL 10A-2009 (R2013), Standard for Safety for Tin-Clad Fire Doors

UL 10B-2015, Standard for Safety for Fire Tests of Door Assemblies
1. Revision to minimum qualifications for the test probe. 2. Addition of furnace pressure probes. 3. Revision to Thermocouple Attachment Method.

UL 10C-2016, Standard for Safety for Positive Pressure Fire Tests of Door Assemblies
1. Strengthening of existing neutral pressure plane requirements.

UL 10C-2016a, Standard for Safety for Positive Pressure Fire Tests of Door Assemblies
1. Oxygen percentage readings.


UL 110-2017, Standard for Sustainability for Mobile Phones
This Proposed First Edition of the Standard for Sustainability for Mobile Phones, UL 110, is designed to reduce environmental impacts associated with the design, manufacture, use, and disposal of mobile phones.

UL 1123 -2011a, The Standard for Marine Buoyant Devices, UL 1123
These 3 proposals include revisions to: the Dynamic Strength Test; Buoyancy Scale Accuracy; and the requirements for Measuring Excess Body Strap Lengths.

UL 1123-2011b, Standard for Safety for Marine Buoyant Devices
This 4/22/11 UL 1123 proposal specifies Additional Marking for Type V Rescue's Harness PFDs.

UL 1123 new label proposal

UL 1123-2017a, Standard for Marine Buoyant Devices
This recirculation proposal provides revisions to the UL 1123 proposal dated 7-1-16.

UL 1123-2017b, Standard for Marine Buoyant Devices
This recirculation proposal provides revisions to the UL 1123 proposal dated 9-23-16.

UL 1175-2010 (R2014), Standard for Safety for Buoyant Cushions
This proposal adds a reaffirmation for ANSI approval for UL 1175. (NOTE: This standard was prematurely listed in the Call-for-Comment section of last week’s issue of Standards Action. The correct closing date for orders and comments is October 20, 2014.)

UL 1177-2011 (R2015), Standard for Safety for Buoyant Vests
UL proposes a reaffirmation for ANSI approval for UL 1177.

UL 1180-2017, Standard for Fully Inflatable Recreational Personal Flotation Devices
This recirculation proposal provides revisions to the UL 1180 proposal dated 9-9-16.

UL 1180-2017a, Standard for Fully Inflatable Recreational Personal Flotation Devices
This recirculation proposal provides revisions to the UL 1180 proposal dated 9-9-16.

UL 1191-2013, The Standard for Safety for Components for Personal Flotation Devices
This 10/4/13 UL 1191 proposal includes changes to the Metal Hardware Exposures for Webbing and Lacing closures and adjusters (Tables 19.2 and 20.1).

This 3/6/2009 UL 1197 recirculation bulletin includes changes to the following proposal: Storage Case Warning for Users to Verify Appropriate Sizing

UL 1197-2013, Standard for Safety for Immersion Suits
This 9/20/13 UL 1197 proposal includes proposed changes to the Climbing Test for Immersion Suits.


UL 1201-2016, Standard for Sensor Operated Backwater Prevention System

UL 1201-2016a, Standard for Sensor Operated Backwater Prevention System

UL 120202-2014 (R2017), Standard for Safety for Recommendations for the Preparation, Content, and Organization of Intrinsic Safety Control Drawings (Proposal dated 04-28-17)

This proposal includes clarification of cylindrical and straight joints in Section SA6.

This proposal includes 1) Revisions to 10.2.1 and Section 34; and 2) Revisions to 15.1 and Section 24 to align UL 1203 with the current ferrous metal electrical enclosure corrosion protection requirements in UL 50E.

This revision includes proposed changes to 10.2.1 and Section 34 per comments received on proposal dated 06-26 -15.

UL 120404-2012 (R2015), Standard for Pressurized Enclosures (Proposal dated 09-04 -15)

UL 1206-2012a, Standard for Electric Commercial Clothes-Washing Equipment
1. Installation Clearances and Cycle Selection

UL 121203-2011 (R2015), Standard for Portable Electronic Products Suitable for Use in Class I and II, Division 2, Class I, Zone 2 and Class III, Division 1 and 2 Hazardous (Classified) Locations (Proposal dated 09-04-15)
Reaffirmation and Continuance of the 1st Edition of the ANSI/ISA-12.03-03-2011 Standard for Portable Electronic Products Suitable for Use in Class I and II, Division 2, Class I, Zone 2 and Class III, Division 1 and 2 Hazardous (Classified) Locations under UL 121203.

UL 122-2007 (R2015), Standard for Safety for Photographic Equipment
Reaffirmation of ANSI approval is proposed for this standard.

UL 122001-2009 (R2014), General Requirements for Electrical Ignition Systems for Internal Combustion Engines in Class I, Division 2 or Zone 2, Hazardous (Classified) Locations (proposal dated 06-27-14)
Reaffirmation and Continuance of the First Edition of the General Requirements for Electrical Ignition Systems for Internal Combustion Engines in Class I, Division 2 or Zone 2, Hazardous (Classified) Locations, UL 122001, as an American National Standard.
UL 122701-2011 (R2016), Standard for Safety for Requirements for Process Sealing between Electrical Systems and Flammable or Combustible Process Fluids (Proposal dated 03-11-16)


UL 122701-2017, Standard for Safety for Requirements for Process Sealing Between Electrical Systems and Flammable or Combustible Process Fluids (Proposal dated 01-20-17)


UL 123-2014a, Standard for Safety for Oxy-Fuel Gas Torches

New definitions are being added to the Glossary section.

UL 1236-2016, Standard for Safety for Battery Chargers for Charging Engine-Start Batteries (Proposal Date 1/15/16)

1. Modify Supplement SC to allow a communication interface to take the place of physical meters and alarms. 2. Modify Supplement SE to allow a communication interface to take the place of physical meters and alarms.

UL 1238-2016, Standard for Safety for Control Equipment for Use with Flammable Liquid Dispensing Devices

The following topic is being proposed: 1) Add laminated glass and glass with protective coatings for panels.

UL 1240-2012, Standard for Electric Commercial Clothes-Drying Equipment

1. Exception to 49.22 for Non-tumbling Dryers

UL 12402-5-2015, Standard for Safety for Personal Flotation Devices - Part 5: Buoyancy Aids (Level 50) - Safety requirements

This proposal includes changes to the 5-8-15 proposed first edition of UL 12402-5.

UL 12402-9-2015, Standard for Safety for Personal Flotation Devices - Test Methods

This proposal includes changes to the 5-8-15 proposed first edition of UL 12402-9.

UL 1241-2013, Standard for Safety for Junction Boxes for Swimming Pool Luminaires

Proposed revisions to the requirements for bonding to the common bonding grid, number of grounding terminations required, and strain relief and installation instructions

UL 1242-2014, Standard for Safety for Electrical Intermediate Metal Conduit - Steel

Document (dated 1-10-14) proposes the addition of requirements for IMC manufactured from stainless steel and the removal of figure 14 and all applicable references to figure 14.

UL 1247-2014, Standard for Safety for Diesel Engines for Stationary Fire Pumps

The following changes to UL 1247 are being proposed: 1. Revisions to the Terminal Block Arrangement and Associated Requirements; 2. Revisions to Clarify Requirements, Update Test Methods and Correlate With NFPA 20-2013; and 3. Revision to Over-current Protection Criteria

UL 1247-2014a, Standard for Safety for Diesel Engines for Driving Stationary Fire Pumps

The following changes for UL 1247 are being proposed: 1. Further Modifications to Signaling Criteria and Figure 11.1


UL 125-2015, Standard for Flow Control Valves for Anhydrous Ammonia and LP-Gas (Proposals dated 10/10/14)

1. Update Glossary Definition in 6.6 to Reflect Current NFPA Definition. 2. Clarification of the Materials Used for a Lever on a Hose Nozzle Valve, Addition of Exception No. 3 to 8.3.3. Revisions to the Deformation Test to Delete the Machine Oil in 23.2; Delete Second External Leakage Test in 23.3; Revision to the Moist Ammonia Air Stress Cracking Test, 34.2 to replace Teflon with PTFE tape.

UL 1254-2016, Standard for Pre-Engineered Dry Chemical Extinguishing System Units

UL proposes an alternate ultraviolet light exposure test method for UL 1254.

UL 1254-2016a, Standard for Pre-Engineered Dry Chemical Extinguishing System Units

UL proposes a revision to the requirements of extinguant gases in order to allow additional flexibility in the development of products.

UL 1256-2013, the Standard for Fire Test of Roof Deck Constructions

1. Clarification of 1.5 Regarding the Development of the Conditions of Acceptance 2. Clarification of 15.2 that Melting Thermal Plastic Insulation is Not Prohibited

UL 1261-2016, Standard for Safety for Electric Water Heaters for Pools and Tubs

1. Proposal to Add Requirements for Electronic Circuits 2. Proposal to Allow the Use of Standard UL 840 to Evaluate Clearance andCreepage Distances 3. Proposal to Update Requirements for Switches

UL 1261-2016a, Standard for Safety for Electric Water Heaters for Pools and Tubs

Proposal to Add Requirements for Button or Coin Cell Batteries of Lithium Technologies, New 3A12

UL 127-2015, Standard for Safety for Factory-Built Fireplaces

UL proposes an addition of floor temperatures beyond the hearth extension.

UL 1275-2010 (R2014), Standard for Safety for Flammable Liquid Storage Cabinets

1. Reaffirmation and Continuance of the Fourth Edition of the Standard for Flammable Liquid Storage Cabinets, UL 1275

UL 1277-2013, Standard for Safety for Electrical Power and Control Tray Cables with Optional Optical-Fiber Members

Revision of the Dielectric Voltage-Withstand Test to Allow Testing with DC Voltage

UL 1278-2016, Standard for Safety for Movable and Wall- or Ceiling-Hung Electric Room Heaters

1. Polymeric materials enclosure requirements. 2. Allowed use of S" type power supply cords vs "H" type cords. 3. New requirement for soldering internal connections. 4. Wire size AWG for internal wiring based on current

UL 1278-2016a, Standard for Safety for Movable and Wall- or Ceiling-Hung Electric Room Heaters

1. Polymeric materials enclosure requirements. 2. Wire size AWG for internal wiring based on current

UL 1278-2016b, Standard for Safety for Movable and Wall- or Ceiling-Hung Electric Room Heaters

3. Clarification of Requirements for Heating Elements

UL 1278-2016c, Standard for Safety for Movable and Wall- or Ceiling-Hung Electric Room Heaters

3. Clarification of Requirements for Heating Elements


1. Revision of Requirements for Capacitors

UL 1283-2015a, Standard for Safety for Electromagnetic Interference Filters (Proposal dated 07-24-15)

This proposal includes a revision to Section 27, Temperature, to be in line with IEC 60939

UL 1283-2017, Standard for Safety for Electromagnetic Interference Filters

1. Proposed 7th edition of UL 1283 to delete appliance filters that are now covered under UL 60939-3.
UL 1286-2014, Standard for Safety for Office Furnishings
1. Additional Requirement for Vertically Adjustable Surfaces. 2. Revisions to Align with the New Edition of BIFMA X5.9, Storage Units. 3. Additional Requirements for a New Supplement Covering Office Furnishings Attached to the Building Structure. 4. Revisions to Align with the New Edition of BIFMA X5.5, Desk and Table Products.

UL 1286-2014a, Standard for Safety for Office Furnishings
1. Revised Figure for Vertically Adjustable Surfaces.

UL 13-2015, Standard for Safety for Power-Limited Circuit Cables
1. Inclusion of Low Voltage LED Wire

1) Addition of Stainless Steel as a Welded and Corrugated Metal Sheath. 2) Addition of LP Ratings.

UL 1309-2014, Standard for Safety for Marine Shipboard Cable
Revision to requirements for individually shielded components and overall shielding in 11.1

UL 1309-2014a, Standard for Safety for Marine Shipboard Cable (Proposal dated 04-11-14)
The proposal includes a revision to increase the Dielectric Constant for Silicone S100 in Table 5.2

UL 1309-2017, Standard for Safety for Marine Shipboard Cable (Proposals dated 9/16/16)
1. Updates to the Standard for Safety for Marine Shipboard Cable, UL 1309 to Coordinate with the Recommended Practice for Marine Cable for Use on Shipboard and Fixed or Floating Facilities, IEEE 1580, Revised Table 4.2 and Table 38.1; 2. Definition of Spacing Between Cable Holes, Revised 29.2; 3. Correction to Test Temperature in 29.3; 4. Clarification of Reference to Test, Revised 5.4.2.1; 5. Clarification to Constructions Subject to Requirement, Revised 14.1.2, 14.1.3, and 14.2.1; 6. Updated IEC Standard Number, Revised 40.1 (j)

UL 1309-2017a, Standard for Safety for Marine Shipboard Cable (Proposal dated 3/10/17)
5. Clarification to Constructions Subject to Requirement, Revised 14.1.3

UL 1310-2017, Standard for Safety for Class 2 Power Units (Proposal dated 10-21-16)
The following is proposed: 1) Exception to the maximum voltage requirements for a power supply in a no-load condition, and 2) Clarification of spacing required on a semiconductor device

UL 1313-2015, Standard for Nonmetallic Safety Cans for Petroleum Products
The following changes in requirements to the Standard for Nonmetallic Safety Cans for Petroleum Products, UL 1313, are being proposed: 1. Clarify general requirements in Section 3.2. Update references to ASTM standards. 3. Revise UV test methods in Section 26.3 to reflect updated practice

UL 1314-2005 (R2014), Standard for Safety for Special-Purpose Metal Containers
The following is being proposed: 1. Reaffirmation and Continuance of the Fourth Edition of the Standard for Special-Purpose Metal Containers, UL 1314, as an American National Standard

UL 1315-2003 (R2012), Standard for Safety for Metal Waste Paper Containers
The following is being proposed: 1. Reaffirmation and Continuance of the First Edition of the Standard for Metal Waste Paper Containers, UL 1315, as an American National Standard

Replace ASTM G26 with ASTM G155 in 21.1

UL 1322-2010 (R2015), Standard for Safety for Fabricated Scaffold Planks and Stages
This standard covers requirements for the following; a) Wood, metal, or a combination of wood and metal fabricated planks; b) Fabricated platforms for use with suspended, fixed, or rolling scaffold; c) Modular suspended platforms; d) Scaffold decks; e) Mobile work stands; and f) Work cages (basket).

UL 1323-2014, Standard for Safety for Scaffold Hoists
Proposed new paragraph 5.3 requires electrical features of a control box to be evaluated to the Standard for Industrial Control Equipment, UL 508 or the Standard for Power Conversion Equipment, UL 508C.

UL 1323-2014a, Standard for Safety for Scaffold Hoists
These proposals cover the following topics: 1) Editorial revisions; 2) Grounding and bonding; 3) Motor requirements; and 4) Increase voltage rating to 1000 V.

UL 1323-2014b, Standard for Safety for Scaffold Hoists
This proposal revises requirements for hoisting speed in paragraph 5.1.

UL 1332-2016, Standard for Safety for Organic Coatings for Steel Enclosures for Outdoor Use Electrical Equipment
Covers the proposed fifth edition of UL 1332, which includes revisions to clarify existing text, additional terminology, updating of standard references, replacement of obsolete standard references and changes to reflect current practice.

UL 136-2010 (R2015), Standard for Safety for Pressure Cookers (Proposal Dated 1-16-15)
These requirements cover household-type cooking utensils known as pressure cookers or pressure sauce pans which operate at a nominal pressure of 15 psig (103 kPa) or less. They are intended for use over gas- or electric-top burners of residential-type cooking ranges. These requirements do not cover pressure cookers intended for pressure frying with oil. These requirements do not evaluate the toxicity of coatings or the physiological effects of consuming food prepared by use of these appliances. These requirements do not evaluate the operation or use of removable or replaceable parts.

UL 1370-2016, Standard for Safety for Unvented Alcohol Fuel Burning Decorative Appliances
UL proposes the following changes to UL 1370: modifications to the scope, fuel capacity and test room size, editorial correction and addition, and test requirements for outdoor appliances.

UL 1384-2017, Standard for Water-Based Automatic Extinguisher Units
UL proposes the First Edition of the Standard for Water-Based Automatic Extinguisher Units, UL 1384.

UL 140-2008 (R2012), Relocking Devices for Safes and Vaults (Proposal Dated 5/18/12)
These requirements cover relocking devices for the following: Light vault doors, Heavy vault doors, and Safes or chests. Relocking devices are intended to relock the bolt mechanism or door of a vault, safe, or chest in the event that the combination lock is subjected to attack.

UL 141-2011 (R2016), Standard for Safety for Garment Finishing Appliances (Proposal dated 6-17-16)

UL 1411-2011 (R2015), Standard for Safety for Transformers and Motor Transformers for Use in Audio-, Radio-, and Television-Type Appliances
Reaffirmation of ANSI approval is proposed for UL 1411

UL 1412-2012 (R2016), Standard for Safety for Fusing Resistors and Temperature-Limited Resistors for Radio- and Television-Type Appliances
Reaffirm UL 1412 as an American National Standard. UL 1412 covers fusing resistors and temperature-limited resistors to be employed in radio- and television-type appliances. These requirements also apply to resistor mounting assemblies intended for use with such resistors. These requirements cover fusing resistors and temperature-limited resistors for use in radio- and television-type appliances in circuits that do not involve potentials greater than 2500 V peak.
UL 1413-2012 (R2016), Standard for Safety for High-Voltage Components for Television-Type Appliances
Reaffirm UL 1413 as an American National Standard. UL 1413 covers flyback transformers, high-voltage multipliers, deflection yokes and picture-tube high-voltage-neck components intended to be employed in television-type appliances. Protective devices or circuits that are an integral part of a component are to be considered as part of that component.

UL 1416-2012 (R2017), Standard for Safety for Overcurrent and Overtemperature Protectors for Radio- and Television-Type Appliances
Reaffirm UL 1416 as an American National Standard. UL 1416 covers overtemperature protectors, and overcurrent protectors to be employed in radio- and television-type appliances in applications where the protectors are relied upon to limit power, current, or both.

UL 1417-2012 (R2017), Standard for Safety for Special Fuses for Radio- and Television-Type Appliances
Reaffirm UL 1417 as an American National Standard. UL 1417 covers special types of fuses not covered by separate requirements and that are for use in radio- and television-type appliances where they are relied upon to limit power or current, or both. These requirements also apply to holders intended to accept such special fuses, where the holder may be an integral part of the fuse design.

UL 1419-2011 (R2016), Standard for Safety for Professional Video and Audio Equipment
These requirements cover video and audio equipment rated 600 volts or less and operated and maintained by trained personnel under the conditions of controlled access. They cover such equipment as video tape recorders, audio/video editing equipment, audio/video receiving and processing equipment, signal transmission equipment, television cameras, video digitizers, video monitors, metering equipment and similar equipment. This Standard also covers auxiliary equipment and accessories which by themselves may not perform the desired function of the equipment outlined above but are used in addition to or as a supplement to the basic equipment.

UL 1420-2013, Standard for Safety for Steel Aboveground Tanks for Flammable and Combustible Liquids

UL 1424-2010 (R2015), Standard for Safety for Cables for Power-Limited Fire-Alarm Circuits

UL 1425-2010 (R2015), Standard for Safety for Non-Power-Limited Fire-Alarm Circuits

UL 1426-2010 (R2015), Standard for Electrical Cables for Boats

UL 1429-2009 (R2013), Standard for Safety for Pullout Switches

UL 1439-2011a, Standard for Safety for Tests for Sharpness of Edges on Equipment

UL 1439-2013, Standard for Safety for Tests for Sharpness of Edges on Equipment
Alternate Sensing Tapes and Revised Tape Properties

UL 1444-2014, Standard for Safety for LP-Gas Regulators
These proposals cover clarification of requirements, revised Moist Ammonia-Air Stress Cracking Test, and the addition of the Endurance Test for manual shut off valves.

UL 1441-2005 (R2013), Standard for Safety for Coated Electrical Slewing
Reaffirmation of the Standard for Coated Electrical Slewing, UL 1441.

This proposal contains the following revisions: (1) Revision to the Scope (2) Revision to Reference Publications (3) Revision to the definition of Cycle (4) Replacement of Insulation System and Insulation System Class with EIS Electrical Insulation System (5) Clarification of definitions for Major and Minor System Components (6) Revision to the definition of Crossover Insulation (7) Revision to the definition of Securement Tape (8) Revision to the definition of Window Insulation

UL 1446-2016a, Standard for Safety for Systems of Insulating Materials - General

UL 1447-2013, Standard for Safety for Electric Lawn Mowers
UL is proposing Revision to the Battery Voltage Level Requirements for Battery-operated Lawn Mowers

UL 1447-2013a, Standard for Safety for Electric Lawn Mowers
This proposal covers the removal of the Thrown Object Test in Section 69 due to duplication in ANSI B71.1

UL 1449-2016, Standard for Safety for Surge Protective Devices
1. Revision of PV Requirements 2. Testing Methods for Combination Type SPDs 3. Interchangeability of Metal Oxide Varistors (MOVs) 4. Addition of Tolerance Requirements 5. Addition of Requirements for DC SPDs 6. Addition of Requirements for Open Type SPDs 7. Addition of Requirements for SPDs Intended for Connection Using Exposed Wiring Methods 8. SPDs with Only N-G Protection 9. Editorial Corrections to Table 36.2 10. Clarification of Test Method for Fault Current and Overcurrent Tests 11. Type 3 SPD - Cord Connected Intended to be Permanent Mounted on Furniture

UL 1450-2013, Standard for Safety for Motor-Operated Air Compressors, Vacuum Pumps, and Painting Equipment
1. Clarification of the Probe Title for Figure 12.2 2. Addition of an Exception to Paragraph 27.4 to Clarify Printed Wiring Board Spacings. 3. Deletion of the Specification for cheesecloth from the Standard. 4. Correction of Paragraph 46.1.7 by Removing the Reference to Inflators. 5. Addition of an Allowance for DC Use During Production Line Dielectric Testing. 6. Addition of a Specific Reference to Inflators in Paragraph 46.1.8. 7. Revision of Marking Size Requirements to be According to Font Size Rather than Fractional Size. 8. Revision to the Flash Point Requirements by Additionally Restricting the Use to a Higher Flash Point.
UL 1450-2013a, Standard for Safety for Motor-Operated Air Compressors, Vacuum Pumps, and Painting Equipment

1. Deletion of Section 6, Attachments.


This proposal covers the following topic: 1) Revision to polymeric material and thermal insulation requirements

UL 1453-2017a, Standard for Safety for Electric Booster and Commercial Storage Tank Water Heaters

The following topic is being proposed: 1) Addion of requirements for outdoor use equipment.


End Connections and Outlet Pressure/Flow Requirements, Proposed Changes to Section 7, 7.1, 7.2, 7.3, 7.4, and Table 9A.1

UL 147-2016, Standard for Safety for Hand-Held Torches for Fuel Gases

This proposal is being issued to add requirements for battery-operated torches.

UL 1472-2015, Standard for Safety for Solid State Dimming Controls

The following is being proposed: (1) Revision and addition of requirements for ground leakage current.

UL 1472-2015a, Standard for Safety for Solid State Dimming Controls

The following is being proposed: (1) Revision and addition of requirements for ground leakage current.

UL 1478-2004 (R2013), Standard for Safety for Fire Pump Relief Valves
direct acting (spring loaded) and pilot operated fire pump relief valves of nominal 3/4 inch (19.05 mm) size and larger, intended for use in water supply systems for fire protection service.

UL 1478A-2013, Standard for Safety for Pressure Relief Valves for Sprinkler Systems

Pressure relief valves intended for use in sprinkler systems for fire protection service to relieve excessive pressures caused by thermal expansion, downstream of a pressure reducing valve or in valve trim.

UL 1479-2015, Standard for Fire Tests of Through-Penetration Firestops

Including test provisions for membrane penetration type firestop systems.

UL 1479-2015a, Standard for Fire Tests of Through-Penetration Firestops

The following topic for the Fire Tests of Through-Penetration Firestops, UL 1479, is being recirculated: 1. Including test provisions for membrane penetration type firestop systems.

UL 147A-2009 (R2013), Standard for Safety for Nonrefillable (Disposable) Type Fuel Gas Cylinder Assemblies

These requirements cover nonrefillable cylinder assemblies for use with propane, Methlyacetylene-Propadiene, Stabilized (MPS-Gas), and propylene.

UL 147A-2009a, Standard for Safety for Nonrefillable (Disposable) Type Fuel Gas Cylinder Assemblies

Clarification of the fire test in paragraph 14.5.

UL 147B-2016, Standard for Safety for Nonrefillable (Disposable) Type Metal Container Assemblies for Butane

The following topics are being proposed: (1) Revise construction requirements for pressure vessel and (2) Update requirements for protective coatings.

UL 1480-2016, Standard for Safety for Speakers for Fire Alarm and Signaling Systems, Including Accessories, (proposal dated 5-10-13)

New proposed 6th edition of UL 1480, is a binational standard with requirements for the U.S. and Canada covering speakers rated at 300 V or less for fire alarm and signaling systems and intended for indoor and/or outdoor installation in accordance with CSA C22.1, Canadian Electrical Code, Part I, and National Electrical Code, NFPA 70.

UL 1480-2016a, Standard for Safety for Speakers for Fire Alarm and Signaling Systems, Including Accessories

New proposed 6th edition of UL 1480, is a binational standard with requirements for the U.S. and Canada covering speakers, rated at 300 V or less, for fire alarm and signaling systems and intended for indoor and/or outdoor installation in accordance with CSA C22.1, Canadian Electrical Code, Part I, Safety Standard for Electrical Installations, and National Electrical Code, NFPA 70.

UL 1480-2016b, Standard for Safety for Speakers for Fire Alarm and Signaling Systems, Including Accessories

Recirculation of changes for the proposed 6th edition of UL 1480, is a binational standard with requirements for the U.S. and Canada covering speakers, rated at 300 V or less, for fire alarm and signaling systems and intended for indoor and/or outdoor installation in accordance with CSA C22.1, Canadian Electrical Code, Part I, Safety Standard for Electrical Installations, and National Electrical Code, NFPA 70.

UL 1480A-2016, Standard for Safety for Speakers for Commercial and Professional Use

New proposed first edition of UL 1480A, covering speakers for indoor and/or outdoor use in dry, damp, wet, or underwater locations intended for a) Commercial and professional audio systems providing non-emergency sound reinforcement; b) Non-fire emergency voice-warning systems in accordance with the National Electrical Code, NFPA 70.

UL 1482-2011 (R2015), Standard for Safety for Solid-Fuel Type Room Heaters

Reaffirmation of ANSI approval is proposed to be adopted.

UL 1484-2008 (R2013), Standard for Safety for Residential Gas Detectors

Electrically operated gas detectors intended for installation in residential occupancies and recreational vehicles (RVs). Gas detectors intended to detect flammable gases such as propane and natural gas. All remote accessories that may be connected to a gas detector.

UL 1486-2003 (R2013), Standard for Safety for Quick Opening Devices for Dry Pipe Valves for Fire (Proposal dated 6-14-13)

This standard covers quick opening devices intended for attachment to dry pipe valves to reduce the time delay in operation of the valve following opening of one or more sprinklers. The quick opening devices consist of accelerators and exhausters for use with a specific dry pipe valve design. The products covered by this standard are intended for use in fire protection service as outlined by the Standard for Installation of Sprinkler Systems, NFPA 13.

UL 1489-2016, Standard for Safety for Fire Tests of Fire Resistant Pipe Protection Systems Carrying Combustible Liquids

The proposed first edition of the Standard for Fire Tests of Fire Resistant Pipe Protection Systems Carrying Combustible Liquids, UL 1489. This standard covers products such as, but not limited to, sleeve, wrap or spray-on type fire protection systems applied over or on to rigid piping networks typically consisting of short sections of thick wall pipe connected with threaded or welded fittings that are assembled on site. It also describes a standard test method to develop the data necessary for evaluating fire resistive pipe protection systems for specific applications.

UL 14B-2008 (R2013), Standard for Safety for Sliding Hardware for Standard, Horizontally Mounted Tin-Clad Fire Doors

These requirements apply to hardware for horizontally sliding fire doors which have demonstrated in fire tests fire-resistive properties warranting their use with two-ply and three-ply tin-clad fire doors tested in accordance with the Standard for Fire Tests of Door Assemblies, UL 10B (NFPA No. 252).

UL 14B-2008a, Standard for Sliding Hardware for Standard, Horizontally Mounted Tin-Clad Fire Doors

Update of standard references in paragraphs 1.1 and 1.2.

UL 14C-2008 (R2013), Standard for Safety for Swinging Hardware for Standard Tin-Clad Fire Doors Mounted Singly and in Pairs

These requirements apply to hardware for swinging fire doors which have demonstrated in fire tests fire-resistive properties warranting their use with two-ply and three-ply tin-clad fire doors tested in accordance with the Standard for Fire Tests of Door Assemblies, UL 10B (NFPA No. 252).
UL 14C-2008a, Standard for Swinging Hardware for Standard Tin-Clad Fire Doors Mounted Singly and in Pairs

Update of standard references in paragraphs 1.1 and 1.2.

UL 150-2011 (R2015), Standard for Safety for Antenna Rotators

Reaffirm UL 150 as an American National Standard. UL 150 covers antenna rotators for household & commercial use that generally consist of a mast-mounted (generally outdoors), motorized drive unit that rotates the antenna to the desired receiving azimuth; an indoor located (usually near TV- or radio-receiving equipment) user-operated control unit that delivers operating power and direction signals to the drive unit; & a length of multiple-conductor Class-2 circuit cable to electrically interconnect the drive and control units. These requirements do not cover systems that use a stationary antenna and change or rotate the receiving pattern by electronic or switching.

UL 1517-2012, Standard for Safety for Hybrid Personal Floatation Devices

This 2/3/2012 UL 1517 proposal includes changes to the quantity of cartridges required with a hybrid PFD.

UL 153-2017, Standard for Safety for Portable Electric Luminaires

The following changes in requirements to the Standard for Portable Electric Luminaires, UL 153, are being proposed: 1. Add requirements for instant-start ballast and lampholder compatibility. 2. Add requirements for use of split SPT-2 cords.

UL 153-2017a, Standard for Safety for Portable Electric Luminaires

The following changes in requirements to the Standard for Portable Electric Luminaires, UL 153, are being proposed: 1. Add requirements for USB and POE Portable Luminaires. 2. Scope clarification relative to decorative lighting 3. Revise definition of ‘Lamp’& ‘2211; in Glossary. 4. Clarify requirements for portable luminaires intended for use without a shade. 5. Add requirements for lampholders for use with instant start ballasts. 6. Add requirements for button and coin batteries. 7. Add requirements for overcurrent protection. 8. Clarify and consolidate requirements for surface mounted units. 9. Remove requirements for internal wiring protection for cord and chain.

UL 154-2009 (R2014), The Standard for Safety for Carbon-Dioxide Fire Extinguishers

UL proposes a reaffirmation for ANSI approval for UL 154.

UL 155-2009 (R2013), Standard for Tests for Fire Resistance of Vault and File Room Doors

These requirements cover the test procedure applicable to the fire-resistance classification of doors, intended for the protection of openings of vaults and file rooms. Recommendations for record protection equipment and techniques, including the use and installation of vault or file room door assemblies, are contained in the Standard for Protection of Records, NFPA 232. The terms “vault doors” and “file room doors” refer to assemblies consisting of doors, single or in pairs, the frame into which doors are hung, and the necessary hardware. These assemblies are intended to provide fire resistance and protection to contents from heat.

UL 1557-2014, Standard for Safety for Electrically Isolated Semiconductor Devices

(Proposal dated 8/29/14)

Addition of Semiconductor Devices Incorporating Thermistor Type Devices, New Supplement SA

UL 1558-2016, Standard for Safety for Metal-Enclosed Low-Voltage Power Circuit Breaker Switchgear

The requirements of UL 1558 cover metal-enclosed low-voltage power circuit breaker switchgear assemblies containing but not limited to such devices as low-voltage power circuit breakers, other interrupting devices, switches, control, instrumentation and metering, protective and regulating equipment.

UL 1558-2017, Standard for Safety for Metal-Enclosed Low-Voltage Power Circuit Breaker Switchgear

This proposal involves an editorial revision of requirements for Wire Bending Space in Table 16.2.

UL 1559-2011b, Standard for Safety for Insect-Control Equipment - Electrocuton Type

UL proposes the following change to UL 1559: addition of 70.1.2a for allowance of date code markings on attachment plug blades.

UL 1559-2012, Standard for Safety for Insect-Control Equipment - Electrocuton Type

UL proposes revisions to UL 1559 to add requirements for insect-electrocution equipment which generates ultraviolet (UV) radiation.

UL 1561-2015, Standard for Safety for Dry-Type General Purpose and Power Transformers

1. Addition of Overload Test Requirements for 240 C Insulation System

UL 1563-2016, Standard for Safety for Electric Spas, Equipment Assemblies, and Associated Equipment

Proposal to Add Requirements for Button or Coin Cell Batteries of Lithium Technologies, New 7A.5

UL 1564-2013, Standard for Safety for Industrial Battery Chargers (Proposal dated 1-18-13)

The proposal includes revisions to remove references to asbestos materials.

UL 1565-2013 (R2017), Standard for Safety for Positioning Devices

1. Reaffirmation and Continuance of the Fifth Edition of the Standard for Positioning Devices, UL 1565, as an American National Standard

UL 1567-2012 (R2016), Receptacles and Switches Intended for Use with Aluminum Wire

Reaffirmation of ANSI Approval for UL 1567

UL 1569-2016, Standard for Safety for Metal-Clad Cables

The following are being proposed: 1. Revision to permit Ground/Bond conductor to be laid straight for MC Cable having interlocked armor that is intended for use as a ground path and to permit conductors sized 18 and 16 AWG in addition to the prescribed 14-6 AWG size range. 2. Revised length of lay requirement for the signal and/or control cables within a pre-cabled group.

UL 1574-2012 (R2016), Standard for Safety for Track Lighting Systems

The following is being proposed: 1. Reaffirmation and Continuance of the Third Edition of the Standard for Track Lighting Systems, UL 1574, as an American National Standard

UL 1577-2015, Standard for Safety for Optical Isolators (Proposals dated 10/10/14)

1. Deletion of Upper Limit, Production Dielectric Isolation Tolerance (5%) Boundary, Revised 17.2 and Deleted 17.3 2. Deletion of Scope Paragraph, 1.6 3. Removal of Withdrawn ASTM Standard from 13.2


Correction to Metric Conversion of Ohms per 1000 Feet for 25 AWG Conductors at 20 Degrees C in Table 30.4.


ICP Test Method, New 492.8.1; Revised 492.2, 492.3, 492.7, 492.8, 492.9.
The following changes in requirements to the Standard for Luminaires, UL 1598, are being proposed: 1. Revise requirements for mechanical joints and fastenings in Section 5.10.2. Add wire style TFN to Table 6.9.2.3. Correct Enclosed Lamp Compartment entry in legend to Figure 7.2.1.1.4. Increase minimum temperature ratings in Table 7.2.2.1.1 for partially enclosed lamp compartment rated 60 W or less. 5. Revise Canada only branch circuit disconnect requirements for fluorescent luminaires. 6. Change language for polymeric lenses in luminaires. 7. Remove Canadian requirements to Exit signs. 8. How to replace incandescent bulbs with CFLs and LEDs. 9. Additional Canada only annex for RV luminaires. 10. Clarification of required marking in Clause 11.3.4. 11. Clarification of required rating for expansion as Table 19.16.1.

UL 1598A-2005 (R2014), Standard for Safety for Supplemental Requirements for Luminaires for Installation on Marine Vessels

The following is being proposed: 1. Reaffirmation and Continuance of the First Edition of the Standard for Supplemental Requirements for Luminaires for Installation on Marine Vessels, UL 1598A, as an American National Standard

UL 1598B-2014, Standard for Safety for Supplemental Requirements for Luminaire Reflector Kits for Installation on Previously Installed Fluorescent Luminaires

The following changes in requirements to the Standard for Supplemental Requirements for Luminaire Reflector Kits for Installation on Previously Installed Fluorescent Luminaires, UL 1598B, are being proposed: 1. Clarify Requirements for Luminaire Retrofit Kits that Provide Replacement Lampholders or Instant Start Ballasts

UL 1598C-2016, Standard for Light-Emitting Diode (LED) Retrofit Luminare Conversion Kits

1. Supplemental Requirements for Marine Luminaires

UL 1602-2011 (R2017), Standard for Safety for Gasoline-Engine-Powered, Rigid-Cutting-Member Edgers and Edger Trimmers


UL 1610-2016, Standard for Safety for Central-Station Burglar-Alarm Units

This covers a proposal to address single-path communications, alarm control unit.

UL 1610-2016a, Standard for Safety for Central-Station Burglar-Alarm Units

This covers a proposal to address remote access to alarm panels, via smart devices and/or the internet

UL 1610-2016b, Standard for Safety for Central-Station Burglar-Alarm Units

Revises the following proposal as the result of comments received: 1. Single-path communications, alarm control unit

UL 1610-2016c, Standard For Central-Station Burglar-Alarm Units

1. Expand electronic media to include website.

UL 1610-2016d, Standard for Safety for Central-Station Burglar-Alarm Units

Revisions based on comments received on the proposal for remote access to alarm panels, via smart devices and/or the internet.

UL 1618-2009 (R2013), Standard for Safety for Wall Protectors, Floor Protectors, and Hearth Extensions

UL proposes a reaffirmation for ANSI approval of UL 1618.

UL 162-2015, Standard for Safety for Foam Equipment and Liquid Concentrates

The following is being proposed: (1) Revision to Moist Ammonia Test criteria; (2) Revision to Drop Test for larger containers; (3) Revision to exposure tests for polymeric materials and fiberglass components used in parts other than containers; (4) Addition of National and International Standards reference.

UL 1626-2012a, Standard for Safety for Residential Sprinklers for Fire-Protection Service

Recirculation of proposal for UL 1626 regarding Polymeric Sprinklers

UL 1626-2017, Standard for Residential Sprinklers for Fire-Protection Service


UL 1635-2015, Standard for Safety for Digital Alarm Communicator System Units

Revision to minimum spacing requirements.

UL 1637-2016, Standard for Safety for Home Health Care Signaling Equipment

These requirements cover individual units that comprise a home health care system intended for use in indoor residential locations, and a complete system in which a signal initiating device may be connected to receiving equipment at a residence or to continuously monitored receiving equipment at a central supervising station. Components may include signal initiating devices, control units, transmitters, digital communicators, receiving, processing, and displaying equipment. A product that contains features new or different shall be evaluated using the appropriate component and end-product requirements to maintain the acceptable level of safety.

UL 1638-2016, Standard for Safety for Visible Signaling Devices for Fire Alarm and Signaling Systems, Including Accessories


Recirculation of changes for the proposed 5th edition of UL 1638A, covering visual signaling devices intended only for general use – electrically-operated visual signaling appliances rated 300 volts or less, intended for indoor locations, outdoor locations, or both, in accordance with the National Electrical Code, NFPA 70.

UL 1640-2016, Standard for Safety for Portable Power-Distribution Equipment

The requirements of UL 1640 cover portable power-distribution equipment intended for use in the following locations: a) Carnivals, circuses, fairs, and similar locations in accordance with Article 525 of the National Electrical Code (NEC), NFPA 70; b) Exhibition halls in accordance with Article 518 of the NEC; c) Motion picture and television studios and similar locations in accordance with Article 530 of the NEC; d) Theaters, audience areas of motion-picture and television studios, and similar locations in accordance with Article 520 of the NEC; and e) Temporary installations at construction sites in accordance with Article 590 of the NEC.

UL 1640-2016a, Standard for Safety for Portable Power-Distribution Equipment

This project covers revised versions of the following proposals for UL 1640 that were published for ballot on May 27, 2016: 1) Revision of the Scope of UL 1640 and 2) Addition of Requirements for the Use of “Weather Resistant” Receptacles for Equipment Rated for Outdoor Use.

UL 1640-2016b, Standard for Safety for Portable Power-Distribution Equipment

This project covers revised versions of the following proposals for UL 1640 that were published for ballot on May 27, 2016: 1) Revision of the Scope of UL 1640 and 2) Addition of Requirements for the Use of “Weather Resistant” Receptacles for Equipment Rated for Outdoor Use.
The following changes are being proposed; 1. Revisions to 4.1 for the Standards to which control units may be evaluated; 2. Revisions to 5.1.2 for removal of NFPA 74 and adding Chapter 29 of NFPA 72; 3. Revisions to 16.4 referencing codes after verification.

UL 1647-2016, Motor-Operated Massage and Exercise Machines
The following changes in requirements to UL 1647, they are: 1. Deletion of Repetitive Requirements in 29.4, 30 and 31.2. Removal of Section 77.

UL 1647-2016a, Standard for Safety for Motor-Operated Massage and Exercise Machines (Proposal dated 10/14/16)
This proposal includes (1) Revision of requirements to allow detachable power supply cords and change in terminology of a ‘cord set’ to a ‘detachable power supply cord’.

UL 1650-2016, Standard for Safety for Portable Power Cables (Proposal dated 1/29/16)
Tensile Strength for TPE Jacket, Proposed Change to Table 8.3.

UL 1651-2015, Standard for Safety for Optical Fiber Cable
1. Addition of the Physical Properties Test. 2. Revision to Marking Requirements. 3. Addition of “LS” Cable Designation.

UL 1651-2015a, Standard for Safety for Optical Fiber Cable
3. Addition of “LS” Cable Designation.

UL 1653-2014, Standard for Safety for Electrical Nonmetallic Tubing
Document dated 8/8/14 proposes the addition of trade size 2-1/2 (63) for use in Canada only. The National Electrical Code specifies the maximum size for ENT as trade size 2 (52); however, the Canadian Electrical Code has no such limitation. Therefore new clause 7.5.1.2 and revisions to clauses 9.1, 9.2, and Tables 1 - 3 are being proposed for this binational ENT standard.

UL 1655-2009a (R2014), Standard for Safety for Community-Antenna Television Cables
This Standard states the construction, test, and marking requirements covering the safety of single and multiple coaxial and coaxial/optical-fiber cables for the distribution of radio frequency signals such as employed in a community antenna television system, and for supplying low-energy power at a potential not exceeding 60 volts to equipment directly associated with the signal distribution.

These requirements cover the blades of attachment plugs and current taps intended to be connected to the conductors of flexible cords using crimped connections, for use on cord sets and power-supply cords complying with the Standard for Cord Sets and Power-Supply Cords, UL 817.

UL 1660-2014, Standard for Safety for Liquid-Tight Flexible Nonmetallic Conduit
Document dated 1/31/14 proposes the new fifth edition of UL 1660 which covers liquid-tight flexible nonmetallic conduit in the 3/8 - 4 (12 - 103) trade sizes of Type LFNC-A (Layered), Type LFNC-B (Integral), and Type LFNC-C (Corrugated) constructions. The new edition removes the Canadian deviation for direct burial stiffness, and provides additional clarifications and reference updates. The conduit is intended for installation in accordance with the National Electrical Code (NEC) and the Canadian Electrical Code (CEC), Part 1.

UL 1666-2012 (R2017), Standard for Safety for Test for Flame Propagation Height of Electrical and Optical-Fiber Cables Installed Vertically in Shafts (Proposal dated 11/4/16)
This is a fire test for determining values of flame propagation height for electrical and optical-fiber cables that are for installation vertically in shafts or in vertical runs that penetrate one or more floors. The purpose of this test is to determine whether the flame propagation characteristics of these riser cables are in accordance with the National Electrical Code.

UL 1678-2016, Standard for Safety for Household, Commercial, and Institutional-Use Carts and Stands for Use with Audio/Video Equipment
1. Revision to Requirements for Flat Panel Television Test Fixture

UL 1678-2016a, Standard for Safety for Household, Commercial, and Institutional-Use Carts, Stands and Entertainment Centers for Use with Audio and/or Video Equipment
Revision of Requirements for the Simulated TV Test Fixture with Respect to Weight of Product and Center of Gravity

UL 1678-2016b, Standard for Safety for Household, Commercial, and Institutional-Use Carts, Stands and Entertainment Centers for Use with Audio and/or Video Equipment
1. Revision of Requirements for the Simulated TV Test Fixture with Respect to Weight of Product and Center of Gravity

UL 1678-2016c, Standard for Safety for Household, Commercial, and Institutional-Use Carts, Stands and Entertainment Centers for Use with Audio and/or Video Equipment
1. Revisions to address potential injury from different loading and unloading scenarios. 2. Additional requirements regarding the securement of an audio or video device to the cart, stand or entertainment center. 3. Revisions to address polymeric components whose failure would cause the supported weight of the audio or video product to be released. 4. Addition of requirements for testing wide handles with the load distributed between two 3-inch areas on the single handle. 5. Revision to Figure 16.6 (Appurtenance Loading).

UL 1681-2012 (R2016), Wiring Device Configurations
Reaffirmation of ANSI Approval for UL 1681

UL 1682-2017, Plugs, Receptacles, and Cable Connectors, of the Pin and Sleeve Type
This standard applies to pin and sleeve type plugs, receptacles, power inlets, and connectors, rated up to 800 amperes and up to 600 volts ac or dc, and which may include up to eight pilot contacts. These devices are intended to provide power from branch circuits, or are for direct connection to the branch circuit in accordance with the Canadian Electrical Code Part I, the National Electrical Code (NEC), ANSI/NFPA 70, and the Mexican Electrical Code, NOM 001-SEDE, using copper conductors, for use in either indoor or outdoor nonhazardous locations. In Canada, the terminals of a device intended to accommodate aluminum conductors also comply with CSA C22.2 No. 65.

UL 1682-2017a, Standard for Safety for Plugs, Receptacles, and Cable Connectors, of the Pin and Sleeve Type
The Proposed Fifth Edition of the Standard for Safety for Plugs, Receptacles, and Cable Connectors, of the Pin and Sleeve Type, UL 1682, as a Trinational Standard with CSA and ANCE.

UL 1685-2010 (R2015), Standard for Safety for Vertical-Tray Fire-Propagation and Smoke-Release Test for Electrical and Optical-Fiber Cables

UL 1686-2014, Standard for Safety for Pin and Sleeve Type
Addition of 4 O’Clock Dimensional Configuration with a Rated Voltage Not Exceeding 50 V
UL 1690-2011 (R2015), Standard for Safety for Data-Processing Cable
These requirements cover electrical cables consisting of one or more current-carrying copper, aluminum, or copper-clad aluminum conductors with or without either or both grounding conductor(s), and one or more optical-fiber members, all under an overall jacket. These electrical and composite electrical/optical-fiber cables are intended for use (optical and electrical functions associated in the case of a hybrid cable) in accordance with Article 645 and other applicable parts of the National Electrical Code (NEC) under the raised floor of a computer room.

UL 1691-2014, Standard for Safety for Single Pole Locking-Type Separable Connectors
1. Revisions to Figures B1.1 - B1.3 for Clarification of Dimensions and Tolerances and to Address Non-TPE (Rigid) Housings

UL 1692-2009 (R2014), Standard for Safety for Polymeric Materials - Coil Forms

UL 1694-2010 (R2015), Standard for Safety for Tests for Flammability of Small Component Materials

UL 1696-2015, Standard for Safety for Nonmetallic Protection Tubing (NMPT)
Recirculation of changes (document dated 10/3/14) for the proposed Second Edition of the Standard for Mechanical Protection Tubing (MPT) and Fittings, UL 1696

Clarification of the Carbonized Path Arc Ignition Test 2. Clarification of Supplement SA Requirements 3. Revision to the Lamp Burnout Test to Allow the Use of Higher Wattage Bulbs 4. Addition of Supplement SC-AFCIs with Optional Automonitoring Function 5. Revision to the Unwanted Tripping Test to Address High Wattage Electronic Dimmers 6. Revision to 37.5 to Include Combination Type AFCIs 7. Revision to Supplement SA Marking Requirements 8. Revision to Performance Tests for Circuit-Breaker Type AFCIs 9. Additional Installation Instructions for Circuit-Breaker Type AFCIs


UL 1703-2017a, Standard for Flat-Plate Photovoltaic Modules and Panels 1. Clarification for the Use of Coatings at the Interconnection of a Module and a Junction Box.

UL 1703-2017b, Standard for Flat-Plate Photovoltaic Modules and Panels 1. Clarification for the Use of Coatings at the Interconnection of a Module and a Junction Box.

UL proposes a new edition of UL 1709.

UL 1709-2017a, Standard for Rapid Rise Fire Tests of Protection Materials for Structural Steel
This recirculation proposal provides revisions to the UL 1709 proposal dated 2-12-16.

UL 1715-2003 (R2017), Standard for Safety for Fire Test of Interior Finish Material
UL proposes a reaffirmation for ANSI approval of UL 1715.


UL 1730-2007 (R2017), Standard for Safety for Smoke Detector Monitors and Accessories for Individual Living Units of Multifamily Residences and Hotel/Motel Rooms
Reaffirmation of UL 1730 that covers electrically operated smoke detector monitors intended to be used in ordinary indoor locations.

UL proposes revised requirements for the vent test temperature and rating clarification.

UL proposes requirements for harmonizing UL 1738 with UL 5636 and improving performance of condensing gas vents.

UL proposes changing the implementation of the recent Rain Test proposal for UL 1738.

UL 1739-2017, Standard for Safety for Pilot-Operated Pressure-Control Valves for Fire-Protection Service
1. Outlet Pressure Setting

UL 174-2012 (R2016), Standard for Safety for Household Electric Storage Tank Water Heaters
Reaffirm UL 174 as an American National Standard. UL 174 covers household electric storage tank and small capacity storage tank water heaters rated no more than 600 volts and 12 kilowatts.

UL 1740-2007, Standard for Safety Robots and Robotic Equipment
1. Proposed New (Third) Edition for UL 1740 including the following changes: a) Requirements for operation upon failure to complete intended motion/Locked rotor abnormal test; b) Requirement for equipment to stop and alert teacher prior to a “singularity” event; c) Provision of easily unlocked means to exit workcell from within; d) Requirement that manufacturers provide Lockout/Tagout procedures in the Service and Maintenance Manual; e) Requirement that the brake release mechanism be readily accessible without the use of a key or special tools; and more.

UL 1767-2015, Standard for Safety for Early-Suppression Fast-Response Sprinklers
The following changes in the requirements for UL 1767, are being proposed: 1. Revisions to Clarify Requirements and Update Testing Details 2. ESFR Sprinklers Having a RTI Greater Than 36 (m - s)1/2 3. Revised Heat Resistance Test Requirements 4. Sprinkler Test Orientation for Salt Spray Exposure

UL 1769-2016, Standard for Safety for Cylinder Valves
This proposal is being issued to add requirements for valves with quick coupling connections.

UL 1773-2016, Standard for Safety for Termination Boxes (Proposal dated 02-26-16) Revisions to introduce requirements for self-illuminated mounting posts and pedestals and to incorporate a reference to the Rain and Splash Test detailed in the Standard for Power Outlets, UL 231.

UL 1776-2013a, Standard for Safety for High-Pressure Cleaning Machines, Proposal dated August 23, 2013
Deletion of Draft Hood Requirements

UL 1777-2009a (R2014), Standard for Safety for Chimney Liners
UL proposes a reaffirmation for ANSI approval of UL 1777.

UL 1778-2014, Standard for Safety for Uninterruptible Power Systems
This Standard applies to movable, stationary, fixed, and built-in UPS for distribution systems up to 600 V a.c. This equipment is designed to be installed in accordance with the CEC, Part I, CSA C22.1, or the NEC, ANSI/NFPA 70, and the Standard for the Protection of Electronic Computer Data-Processing Equipment, ANSI/NFPA 75. This Standard is intended to reduce the risk of fire, electric shock, or injury to persons from installed equipment, both as a single unit or as a system of interconnected units, subject to installing, operating, and maintaining the equipment in the manner prescribed by the manufacturer.
UL 1778-2014a, Standard for Safety for Uninterruptible Power Systems

This Standard applies to movable, stationary, fixed, and built-in UPS for distribution systems up to 600 V a.c. This equipment is designed to be installed in accordance with the CEC, Part I, CSA C22.1, or the NEC, ANSI/NFPA 70, and the Standard for the Protection of Electronic Computer Data-Processing Equipment, ANSI/NFPA 75. This Standard is intended to reduce the risk of fire, electric shock, or injury to persons from installed equipment, both as a single unit or as a system of interconnected units, subject to installation, operating, and maintaining the equipment in the manner prescribed by the manufacturer.

UL 1784-2015, Standard for Safety for Air Leakage Tests of Door Assemblies

The following changes in requirements to the Standard for Air Leakage Tests of Door Assemblies, UL 1784, are being proposed: 1. General revisions to update the current requirements in UL 1784

UL 1784-2015a, Standard for Safety for Air Leakage Tests of Door Assemblies

The following topics for the Standard for Air Leakage Tests of Door Assemblies, UL 1784, are being recirculated: 1. General revisions to update the current requirements in UL 1784

UL 1786-2012a, Standard for Safety for Direct Plug-In Nightlights

The following topics for the Standard for Direct Plug-In Nightlights, UL 1786, are being recirculated: 1. Revision to requirements for direct plug-in nightlights with child-appealing qualities

UL 1786-2012b, Standard for Safety for Direct Plug-In Nightlights

The following topics for the Standard for Direct Plug-In Nightlights, UL 1786, are being recirculated: 1. Revision to requirements for direct plug-in nightlights with child-appealing qualities

UL 1786-2014, Standard for Safety for Direct Plug-In Nightlights

The following changes in requirements to the Standard for Direct Plug-In Nightlights, UL 1786, are being proposed: 1. Revise polarization requirements for nightlights provided with switches 2. Add reference to UL 8750 for requirements for isolated output LED drivers 3. Revise paragraph 11.5.1 to include cadmium sulfide photocells 4. Add ballast construction requirements to correlate with UL 935 5. Add requirements for nightlights with vessels containing liquid 6. Revise paragraph 1.3 to exclude direct plug in devices such as plasma light 7. Propose additional testing to determine suitability of mechanism and contacts of devices that rotate to accommodate receptacle orientation (add 7.7.4, 11.11, and 11.12)

UL 180-2012a, Standard for Safety for Liquid-Level Gauges for Oil Burner Fuels and Other Combustible Liquids (Bulletin dated August 17, 2012)

Proposed Eighth Edition of the Standard for Safety for Liquid-Level Indicating Gauges for Oil Burner Fuels, UL 180, update coverage of gauge types currently available, and to address outdated requirements for construction, function, and compatibility that are reflective of the expected uses; changes to the following major areas: (a) Scope and Glossary, (b) Construction Requirements, (c) Performance Requirements, and (d) Markings and Instructions.

UL 180-2017, Standard for Liquid-Level Gauges for Oil Burner Fuels and Other Combustible Liquids

The following is being proposed: 1. The required use of liquid level gauges in combustible liquid tanks should reflect the increased capacities typically allowed in these applications. 2. NFPA 110 should be added to the scope since the majority of generator fuel tanks covered by this Code are for combustible liquids that require liquid level gauges.


Includes changes to the requirements for control of the certification mark for portable extinguishers.


Includes changes to the requirements for control of the certification mark for portable extinguishers.

UL 181-2013 (R2017), Standard for Safety for Factory-Made Air Ducts and Connectors

UL proposes a reaffirmation for UL 181.

UL 181A-2013 (R2017), Standard for Closure Systems for Use With Rigid Air

UL proposes a reaffirmation for ANSI approval of UL 181A.

UL 181B-2013 (R2017), Standard for Closure Systems for Use with Flexible Air Ducts and Air Connectors

UL proposes a reaffirmation for UL 181B.

UL 1820-2004 (R2013), Standard for Safety for Fire Test of Pneumatic Tubing for Flame and Smoke Characteristics

UL 1820 is a test method for determining values of flame propagation distance and optical smoke density for pneumatic tubing that is to be installed in ducts, plenums, and other spaces used for environmental air. The purpose of this test method is to determine whether the flame-propagation and smoke-generating characteristics of these tubes are in accordance with the provisions of Installation of Air Conditioning and Ventilating Systems, NFPA 90A.

UL 1821-2015a, Standard for Safety for Thermoplastic Sprinkler Pipe and Fittings for Fire Protection Service

Proposed changes to the 10-31-2014 proposal for Unfinished Basement Fire Tests in UL 1821.


1. Transition from Carbon Arc to Xenon Arc

UL 183-2016, Standard for Safety for Manufactured Wiring Systems

UL proposes the addition of requirements for MC-PCS cables with non Class 2 power conductors.

UL 1838-2015a, Standard for Safety for Low Voltage Landscape Lighting Systems

1. Editorial Revision. 2. Power Supply Cord Types. 3. Location of marking for wet location power units with doors

UL 1838-2017, Standard for Safety for Low Voltage Landscape Lighting Systems


UL 1839-2016, Standard for Safety for Automotive Battery Booster Cables

1. Proposed revision to paragraph 3.1 to clarify the requirements for conductor materials

UL 1863-2012 (R2016), Standard for Safety for Communications-Circuit Accessories

These requirements cover telecommunications-circuit accessories, such as jack and plug assemblies, quick-connect terminal assemblies, telephone wall plates, telephone extension cords, cross-connect terminal-block assemblies, maintenance terminal modules, terminal enclosures, cable-splice enclosures, network-interface devices, wire-guide assemblies, and connector boxes. These devices are intended to be used in telecommunications networks that have an operating root-mean-square (rms) voltage to ground less than 150 volts and installed or used in accordance with the National Electrical Code, ANSI/NFPA 70.

UL 1876-2011 (R2015), Standard for Safety for Isolating Signal and Feedback Transformers for Use in Electronic Equipment

Reaffirmation of ANSI approval is proposed for UL 1876.

UL 1887-2004 (R2013), Standard for Safety for Fire Test of Plastic Sprinkler Pipe for Visible Flame and Smoke Characteristics

UL 1887 is a test method for determining values of flame propagation distance and optical smoke density for plastic sprinkler pipe that is to be installed in ducts, plenums, and other spaces used for environmental air.
UL 1889-2009 (R2013), Standard For Safety For Commercial Filters for Cooking Oil
UL 1889 covers commercial filters for cooking oil rated 600 volts or less and intended for use in accordance with the National Electrical Code, NFPA 70. UL 1889 covers both portable filters and fixed filters intended to be used with a specific fryer or fryers or with any fryer or fryers.

UL 1897-2015, Standard For Uplift Tests for Roof Covering Systems
The following topic for the Standard for Uplift Tests for Roof Covering Systems, UL 1897, is being recirculated: a) Adds clarity to UL 1897 as it relates to the conditions of acceptance, and b) Includes the 2 X 2 pull test and 5 X 9 wind uplift test methods.

UL 19-2013, Standard For Safety for Lined Fire Hose and Hose Assemblies
The following is being proposed: 1. Revision to scope 2. Revision regarding length of hose 3. Revision to correct typographical error and to add 200 psi service test pressure rating for single jacketed hose in the 2 -1/2 to 6 inch size 4. Revisions to Kink Test, Repeated Bending Test, Abrasion Test, Heat Resistance Test, Fold Resistance Test, Wet Hose Test, Low Temperature Test, Friction Loss Test, Accelerated Aging Test of Threads, Accelerated Aging Test of Linings and Covers, Ozone-Exposure Test of Linings and Covers, Water Immersion Test of Linings, Pull Test, Accelerated Aging Test of Hose Assembly, and Accelerated Aging Test of Gaskets

UL 1917-2013, Standard For Safety for Solid-State Fan Speed Controls
(1) Addition of an Abnormal Switching Test. Check

UL 193-2016, Standard For Safety for Alarm Valves for Fire-Protection Service
Revise the Hydrostatic Test Requirements in the Strength of Body Test, 28.1 and Bolt Strength, 10.13; Pressure Gauge Updates, Revised 26.2 and 29.1.8

UL 1951-2017, Standard For Safety for Electric Plumbing Accessories
UL 1951 covers equipment connected to or used with plumbing in commercial or household locations. Examples of equipment covered by these requirements are irrigation equipment, sprinkler controls, pedicure spas, water controls located in kitchens and bathrooms, electric faucets, toilets and toilet flushing systems. All equipment is intended for installation and use in accordance with the National Electrical Code, NFPA 70, and is rated 600 volts or less.

The following is being proposed: 1. Revisions to address the use of flammable refrigerants 2. Clarifications and updates to Section 6, Assembly requirements 3. Clarifications to Table 52.1, Tests on Nonmetallic Materials 4. Updates to Hose Assembly requirements 5. Miscellaneous updates and clarifications 6. Corrections to remove references to UL 984 7. Corrections to switches and controllers requirements

UL 197-2014, Standard for Safety for Commercial Electric Cooking Appliances
(Proposal dated 5/2/14)
1. Addition of Door Opening Test, New SA.9, New Clauses 65A and 65B

UL 1971-2008 (R2013), Standard For Safety for Signaling Devices for the Hearing Impaired
Reaffirmation of current ANSI which covers emergency-signalizing devices for the hearing impaired. The devices and/or systems covered by this standard are suitable for use in a controlled environment, or in an uncontrolled environment as indicated in the product marking. These devices are to be used in accordance with the requirements of the National Fire Alarm Code, NFPA 72.

UL 1973-2016, Standard For Batteries for Use In Light Electric Rail (LER) Applications and Stationary Applications

UL 1978-2013 (R2017), Standard For Safety for Grease Ducts
UL proposes a reaffirmation for UL 1978.

UL 1981-2014, Standard For Safety for Central-Station Automation Systems (Proposal dated 5-30-14)
This recirculation proposal provides modifications to the UL 1981 proposed first edition dated 1-10-14.

UL 1981-2014a, Standard For Safety for Central-Station Automation Systems (Proposal dated 5-30-14)
This recirculation proposal provides modifications to the UL 1981 proposed first edition dated 1-10-14.

UL 1989-2013, Standby Batteries
1. UL 1989 is being proposed for approval as an American National Standard.

UL 1989-2013a, Standby Batteries
1. UL 1989 is being proposed for approval as an American National Standard.

UL 198M-2003 (R2013), Standard For Safety for Mine-Duty Fuses
UL proposes a reaffirmation for ANSI approval of UL 198M.

UL 199-2013 (R2017), Standard For Safety for Automatic Sprinklers for Fire-Protection Service
UL proposes a reaffirmation for UL 199.

UL 1990-2017, Standard For Safety for Nonmetallic Underground Conduit with Conductors (proposal dated 11/18/16)
1. Revised Title for Section 13.2. Add a Test Temperature Requirement into Clause 13.2.3. Revised Table 13.1

UL 1993-2017, Standard For Safety for Self-Ballasted Lamps and Lamp Adapters
UL 1993-2017a, Standard for Safety for Self-Ballasted Lamps and Lamp Adapters

These requirements cover floor proximity and other egress path marking and lighting systems that provide a visual delineation of the path of egress and are also used to identify significant egress path features such as doors, stair balusters, obstacles or information placards. These systems are intended for installation and use as required by codes such as the Life Safety Code, NFPA 101; the Building Construction and Safety Code, NFPA 5000, and the International Building Code.

Proposals to clarify requirements for path marking signs.

Proposals for the color temperature range for LED activation source

The following changes in requirements to the Standard for Heating and Cooling Equipment, UL 1995, are being proposed: 1. Adding requirements for equipment employing power supply cords, appliance couplers, and inlets. 2. Adding requirements for condensing units intended to be used in refrigerator or freezer applications and employing flammable refrigerants. 3. Revisions to electric resistance heater requirements. 4. Products with photovoltaic modules, photovoltaic module input circuits or utility interactive inverters, used with HVAC equipment. 5. Component requirements - moving component requirements from clause 81 into the body of the standard. 6. Requirements for coolant distribution equipment for use in Information Technology Equipment (ITE) rooms. 7. Revisions to the scope to remove those products covered by the ANCE/CSA/UL trinational standard 60335-2-40. 8. Update clause 46.13 to clarify when to de-energize any heat source other than refrigerant heat. 9. Provisions for CO2 transcritical systems. 10. Editorial revisions and clarifications. 11. Update Table 39.5 for the maximum acceptable temperature requirements for Class E insulation, correct temperature for item (B) (3) Class A windings. 12. Maximum power supply cord length of 15 feet for computer room air conditioners. 13. Definition for computer room air conditioners. 14. Revisions to Section 26.10 covering switches, controllers and disconnects. 15. Definition of extra low voltage. 16. Revisions to clause 68.7 covering the supply voltage mentioned in Table 39.6. 17. Clause 77, Change in number of fatigue test samples. 18. Addition of new section that specifically covers heat pump pool heaters. 19. Revision to 28.3 covering the following items originally proposed in the document dated 10

The following is being recirculated: 1. Revision to 28.2 and 28.3 covering motor starting capacitor requirements.

UL 1996-2016, Standard for Safety for Electric Duct Heaters
The following is being proposed: 1. Addition of safety critical functions; 2. Addition of requirements to allow the use of UL 840 to evaluate clearance and creepage distances; 3. Addition of requirements for electronic circuits

Clarification of Requirements for Negative Condition Branch Failure Mode; Revision of the Requirements to Address the Effects of Power Supply Voltage Variations; Editorial Revision of Table A2.1 Formatting

Clarification of Requirements for Negative Condition Branch Failure Mode

- Adds requirements to address separable jumper connector intended for use with separable terminal assemblies; - Flammability testing of self-contained switches; - Switch markings; - Flush switch with integral adjustable mounting yoke; and - Two- or three-circuit switches.

UL 2007A-2011 (R2016), Shatter Containment of Lamps For Use In Regulated Food Establishments
Reaffirmation of the 1st edition of UL 2007A which covers the following: These requirements cover shatter containment mechanisms for lamps, for use in food establishments, that are intended to prevent contamination of food. Types of lamps covered by these requirements include incandescent, halogen, linear fluorescent, pin-base compact fluorescent, screw base compact fluorescent, high intensity discharge (HID), and solid state. These requirements do not apply to the lighting fixtures (luminaires), lamp holders or other apparatus that support the lamps and/or shatter containment mechanism.

UL 201-2015, Standard for Safety for Garage Equipment (Proposals dated July 18, 2014)
These requirements cover equipment intended for use indoors in an automotive repair facility. Products covered by this standard are equipment used in servicing and repairing automobiles, dynamometers, battery testers, roll-up brake lathes, distributor testers, driveway signals, engine analyzers, exhaust emissions testers, generator-alternator-regulator testers, growlers, ignition testers, rectifier diode testers, timing lights, fluid changing equipment, tire changers, tune-up testers, wheel alignment and balance equipment, powered and nonpowered tool cabinets.

UL 201-2015a, Standard for Safety for Garage Equipment (Proposal dated 1/23/15)
ANSI approval of the Proposed Third Edition of the Standard for Garage Equipment, UL 201; Recirculation of 61.4.2.

UL 2017-2016, Standard for Safety for General-Purpose Signaling Devices and Systems

UL 2021-2016, Standard for Safety for Fixed and Location-Dedicated Electric Room Heaters
1. Clarification of Requirements for Heating Elements

UL 2021-2016a, Standard for Safety for Fixed and Location-Dedicated Electric Room Heaters
1. Clarification of Requirements for Heating Elements

UL 2024-2015, Standard for Safety for Cable Routing Assemblies and Communications Raceways
The intent of this proposal is to update the requirements of UL 2024 to correlate with the requirements of NFPA 90A-2015.

UL 2024-2015a, Standard for Safety for Cable Routing Assemblies and Communication Raceways (Proposal Date 6/12/15)
1. Removal of references to optical fiber raceways, signaling raceways and coaxial cable raceways from the current edition of the standard. 2. Clarification that the UL 723 test of Section 11A is an alternate method for qualifying plenum rated communications raceways to Section 11 of NFPA 262.

UL 203-2015, Standard for Safety for Pipe Hanger Equipment for Fire Protection Service
This proposal for UL 203 involves changes to the requirements in Paragraphs 6.2, 6.6, and 15.2 and the addition of Paragraph 6.2.1.

UL 2034-2017, Standard for Safety for Single and Multiple Station Carbon Monoxide Alarms
Document dated 10-7-2016 proposes the following revisions: 1. Supplemental Means For Operating the Sensitivity Test Feature 2. Pre-alarm Notification 3. Remote Alarm Reset/Silence 4. Primary and Secondary Power Supply Requirements 5. Correction to Paragraph 75.2.4

UL 2034-2017a, Standard for Safety for Single and Multiple Station Carbon Monoxide Alarms
UL 2039-2016, Standard for Flexible Connector Piping For Fuels
The first edition of the standard is being proposed and covers primary, secondary, and coaxial types of flexible connector pipes intended for short length transfer and containment of the specific liquid fuels (or vapors thereof) identified in this standard, at commercial (public) or fleet (private) automotive motor vehicle fueling stations.

To resolve comments received by UL to a proposal dated April 10, 2015 to publish UL 203A as an American National Standard.

UL 203A-2015a, Standard for Safety for Sway Brace Devices for Sprinkler System Piping
To resolve comments received by UL to a proposal dated April 10, 2015 to publish UL 203A as an American National Standard.

UL 2040-2015, Standard for Safety for Folding Rollaway Tables
These requirements apply to folding rollaway tables. They may have integral benches or stool seating. This does not apply to any electrical circuitry integral to or provided with these. The requirements covering the intended electrical product to be used with these tables shall be applicable to any electrical circuits in the table. Electrical devices shall comply with the requirements for such devices. A product that contains features, characteristics, components or systems different from those covered by the requirements in this std, and that involves a risk of fire, electric shock or injury shall be evaluated to appropriate component and end-product requirements.

Reinforcement of Code Language, New 1.4; Proposed Change to Test Equipment and Instrumentation, Section 3; Revised and Renumbered Section for Pretest Calibration; Revised 6.1.3, 6.2.2, 6.2.4 in the Test Procedures section; Revised Heat Release Calculations; Relocate Normalized Optical Density to Appx. B; Clarifications to Appx. A; Remove Normalized Measurements to Appx. B

UL 2044-2004 (R2016), Standard for Safety for Commerical Closed-Circuit Television Equipment
Reaffirm UL 2044 as an American National Standard. UL 2044 covers closed-circuit television equipment that are intended for commercial use on supply circuits that receive their signals from a video-recorded medium or image-producing devices in a closed circuit television system.

UL 2061-2015, Standard for Safety for Adapters and Cylinder Connection Devices for Portable LP-Gas Cylinder Assemblies
This proposal revises the Moist Ammonia Air Stress Cracking Test.

UL 207-2014, Standard for Safety for Refrigerant-Containing Components and Accessories, Nonelectrical
The following is being proposed: 1. Revisions to permit certain high-side components based on a reduced test pressure. 2. Addition of alternative moist ammonia test. 3. Clarifications and corrections. 4. Revisions to refrigerant requirements

UL 2075-2013, Standard for Safety for Gas and Vapor Detectors and Sensors
Addition of Field Service Test

1. Revision to requirements for TC Modification.

UL 2089-2011 (R2015), Standard for Safety for Vehicle Battery Adapters
Reaffirmation of ANSI approval is proposed for UL 2089.

UL 2089-2011a, Standard for Safety for Vehicle Battery Adapters
This recirculation proposal provides revisions to the proposed third edition of UL 2089.

UL 209-2016, Standard for Safety for Surface Cellular Metal Floor Raceways and Fittings
Document dated 4-1-16 proposes revisions to installation instructions allowing an option to access a manufacturer’s website for the information.

UL 21-2015, Standard for Safety for LP-Gas Hose
1. Additional options to measure pressure. 2. Hose length. 3. Additional valve types. 4. Update of fuel oil type

UL 2108-2015, Standard for Safety for Low Voltage Lighting Systems

UL 2108-2015a, Standard for Low Voltage Lighting Systems
1. Refinement of Expanded Class 2 Marking Allowance for Power Units.

UL 2108-2017, Standard for Low Voltage Lighting Systems
1. Address Equipment for Use in Environmental Air Spaces 2. Revise Requirements for Enclosure Openings 3. Addition of Electrical Ratings for Power Units and Luminaires

UL 2115-2010 (R2014), Standard for Safety for Processed Solid-Fuel Firelogs
UL proposes a reaffirmation for ANSI approval of UL 2115.

UL 2127-2017, Standard for Inert Gas Clean Agent Extinguishing System Units
UL proposes the Third Edition of the Standard for Inert Gas Clean Agent Extinguishing System Units, UL 2127.

UL 2129-2017, Standard for Safety for Halocarbon Clean Agent Fire Extinguishers
It is recognized that there is not one size fits all quality values for halon replacements, therefore ASTM publishes a quality specification for each extinguishing agent. Revise UL standard to reference applicable ASTM quality specification or equivalent.

UL 213-2013, Standard for Safety for Rubber Gasketed Fittings for Fire-Protection Service
This proposal is to include additional requirements for Standard Grooves in UL 213.

UL 213-2013a, Standard for Safety for Rubber Gasketed Fittings for Fire-Protection Service
This proposal is to include additional requirements for Standard Grooves in UL 213.

UL 213C-2015, Standard for Safety for Grooved and Plain End Fittings
Clarification of Marking Requirements in Paragraphs 13.2 and 13.3

UL 2157-2015, Standard for Safety for Electric Clothes Washing Machines and Extractors
1. The following is being proposed: Adoption of the Third Edition which includes the following changes: (a) revision to polymeric materials requirements and addition of nichrome wire test; (b) addition of clothes washer lid switch redundancy; (c) addition of the option to use a tradename for manufacturer identification; (d) addition of requirements for installation and user maintenance instructions for ungrounded parts; (e) addition of requirements for washing machines with heating elements; (f) revision to clarify the risk of injury due to spillage of wash water through the door or lid opening; (g) revision of requirements for standards referenced for electric motors and motor overload protection; (h) clarification of requirements for polarity of single-pole switches and automatic controls; (i) correction to requirements for bonding conductors of components or separate electrical enclosures; (j) addition of requirements for polymeric materials in contact with or close proximity to live parts; (k) clarification of requirements for nonfunctional parts; (l) addition of flammability requirements; (m) revision to strength and impact test specimens to be molded; (n) addition of supplement SA for ozone generating washing machines; (o) addition of supplement SB for smart enabled washing machines; (p) revisions to relocate component requirements and delete component appendix; (q) revisions to revise and clarify control requirements; (r) editorial type clarifications

UL 2157-2015a, Standard for Safety for Electric Clothes Washing Machines and Extractors
UL 2158-2015, Standard for Safety for Electric Clothes Dryers

UL 2158A-2013 (R2017), Standard for Safety for Clothes Dryer Transition Duct
UL proposes a reaffirmation for UL 2158A.

UL 2162-2014, Standard for Safety for Commercial Wood-Fired Baking Ovens - Refractory Type
UL proposes the First Edition of the Standard for Commercial Wood-Fired Baking Ovens - Refractory Type, UL 2162.

UL 2166-2017, Standard for Halocarbon Clean Agent Extinguishing System Units
UL proposes the Third Edition of the Standard for Halocarbon Clean Agent Extinguishing System Units, UL 2166.

UL 2167-2011 (R2017), Standard for Safety for Water Mist Nozzles for Fire Protection Service
UL proposes a reaffirmation for UL 2167.

UL 217-2016, Standard for Safety for Smoke Alarms
Proposal (dated 10-7-2016) to update the Polyurethane Flaming and Smoldering and Cooking Nuisance Tests to match the recently published requirements in UL 268, Smoke Detectors for Fire Alarm Systems.

UL 218-2015, Standard for Fire Pump Controllers
Correlating UL 218 with the 2013 Edition of NFPA 20. Revise the definitions in UL 218 to correlate with the definitions in the NEC. Revising the requirements covering service equipment markings to include a reference to NEC Article 230. Revisions to the construction requirements, dielectric withstand test, disconnecting means, diesel engine drive controllers, dump valves, variable speed fire pump controllers, markings, the deletion of requirements covering the limited service controllers for electric motor driven fire pumps, and the addition of Section 17, Routine Tests.

UL 218-2015a, Standard for Fire Pump Controllers
The National Building Code of Canada and CE Code, Part 1 recognize only emergency generators and not stand-by generators. Clause 11.4.1 was revised to remove ‘stand by’ for #8221; to comply with the Canadian codes. Clarification of the use of medium voltage & #8221; term generated the need to add medium voltage & #8221; definition from C22.2 No. 253 as added clause 5.18.

UL 218-2015b, Standard for Fire Pump Controllers
Revisions to 7.14.1, 7.14.2, 14.2.7 and Annex A due to comments received on CSA’s Ballot.

UL 2182-2017, Standard for Refrigerants
Revisions to clarify the common flammable refrigerant requirements covering many UL standards.

UL 218A-2004 (R2013), Battery Contactors for Use in Diesel Engines Driving Centrifugal Fire Pumps
These requirements cover battery contactors for use in the starting systems of diesel engines driving centrifugal fire pumps, in accordance with the Standard for the Installation of Stationary Pumps for Fire Protection, NFPA 20. These requirements cover battery contactors for use in starting systems rated 50 volts maximum.

UL 219-2013, Standard for Safety for Lined Fire Hose for Interior Standpipes
The following is being proposed: 1. Revision to scope with respect to NFPA references.

UL 219-2013a, Standard for Safety for Lined Fire Hose for Interior Standpipes
The following is being proposed: 1. Revision to scope with respect to NFPA references.

UL 2196-2006 (R2012), Standard for Safety for Tests for Fire Resistive Cables
The test method described in this standard is intended to evaluate the fire resistive performance of electrical cables as measured by functionality during a period of fire exposure, and following exposure to a hose stream.

UL 22-2010 (R2014), Standard for Safety for Amusement and Gaming Machines (Proposal Dated 9/5/14)
These requirements cover electrical, electronic, and electromechanical commercial amusement and gaming machines and accessories that are intended to be used in accordance with the National Electrical Code, NFPA 70. Amusement and gaming machines as covered by this standard are intended for indoor use only, except that they will be investigated for outdoor use or use in a protected location if so designated by the manufacturer. These requirements do not cover coin-operated sound-recording and -reproducing machines or carnival rides.

UL 2200-2015, Standard for Safety for Stationary Engine Generators Assemblies
1. Revision to Paragraph 41.1.3.3 to Add Higher Pressure Flexible Fuel Tubing and Hose Types for Gasoline or Diesel Fuel

UL 2200-2015a, Standard for Safety for Stationary Engine Generators Assemblies
1. Revision to Paragraph 41.1.3.3 to Add Higher Pressure Flexible Fuel Tubing and Hose Types for Gasoline or Diesel Fuel

The following is being proposed: 1. Revisions to scope for clarification purposes 2. Addition of paragraph 5.2.4 for clarification 3. Revision to paragraphs 6.1.1 and 14.1 to address personnel protection systems 4. Revision to paragraph 13.1 to address vehicle connectors 5. Addition of absence of cooling means test to body of standard and revision of supplement SA to remove test and add reference 6. Addition of production line tests

The following is being proposed: Revisions to clarify classified area use.

UL 2208-2006 (R2015), Standard for Safety for Solvent Distillation Units
UL proposes a Reaffirmation of ANSI approval for UL 2208.

1. Clarification on preparation of samples for UL 2218 Impact Tests. 2. First time ANSI approval of UL 2218.

Revisions to Add Low Ambient Requirements for Cable Glands to Section 24, 37.2 and 37.3.

UL 2225-2017a, Standard for Safety for Cables and Cable-Fittings for Use in Hazardous (Classified) (Proposal dated 01-27-17)
This recirculation proposal provides revisions to the UL 2225 proposal dated November 25, 2016.

UL 2227-2014, Standard for Safety for Overfilling Prevention Devices
Revisions to the test container requirements in the Operation Test.

1. Revision to Require a Ground Monitor/Interrupter Circuit for Hardwired and Cord-Connected EVSE (Deletion of Cable Flexing Test, Section 37 of UL 2231 -2) 2. Clarification of Requirements for Isolation Monitors for EV Charging Equipment 3. Additional Reference to CSA C22.2 No. 0.4. Addition of Definition for Programmable Components
1. New Section for Environmental Sequence
2. Power Interruption
5. Leakage Current Requirements
6. Ground Monitor/Interrupter (GM/I)
7. Manufacturing and Production Line Tests
8. Clarification of Scope 9 Cable Flexing Test
10. Weld Monitor Self Test
11. Exemption of the Dielectric Withstand after the Extra-Low-Resistance Ground Fault Test and Short Circuit Test
12. EMC Exposure
13. Programmable Components and Reliability of Solid State Circuitry

Addition of Evaluation Requirements for Conduit and Hardware Devices.

7. Deletion of Plates.
8. Clarification of the Term ‘Bushings.’
10. Additional Requirements for Protector Plates.
11. Deletion of Insulated Standoff Requirements for Canada in Accordance with the CEC.
12. New Section for Environmental Sequence
13. Power Interruption
14. Minimum Delay for the Automatic Reset of an Operating Mechanism in 14.3

UL 2231-2016, Standard for Safety for Personnel Protection Systems for Electric Vehicle (EV) Supply Circuits; Part 2: Particular Requirements for Protection Devices for Use in Charging Systems

1. Component Accessibility, Proposed Change to 8.2.8
2. Correction to Clause Reference in 35.7.3
3. Use of “Type WR” Receptacles, New 8.2.11
4. Addition of “Loop Feed Current Rating”, New 3.6.1 and 32.3
5. “Extra-Duty” Outlet Box Hoods, Revised 5.7.2

UL 2333-2003 (R2014), Standard for Safety for Infrared Thermometers
UL proposes a reaffirmation for ANSI approval of UL 2333.

UL 2235-2012, Standard for Safety for Low Voltage Lighting Fixtures for Use in Recreational Vehicles
The following changes in requirements to the Standard for Low Voltage Lighting Fixtures for Use in Recreational Vehicles, UL 2235, are being proposed: 1. Add requirements for RV luminaires suitable for direct contact with bedding (or similar) materials 2. Revision to ambient temperature measurement method

UL 2344-2012, Standard for Safety for Material Lifts
These requirements cover manually, electrically and pneumatically powered lifts. They are intended for the lifting and transport of materials and not for the movement or support of people. They are rated 250 volts or less, to be employed in nonhazardous environmental locations in accordance with the National Electrical Code, NFPA 70.

UL 2351-2014, Standard for Safety for Spray Nozzles for Fire-Protection Service
The following changes to UL 2351 are being proposed: 1. Revisions to More Closely Align Text with UL’s Sprinkler Standards, Clarify Requirements and Update Testing Details 2. New Air Bath Test for Automatic Nozzles with Glass Bulb Heat Responsive Elements; 3. New Heat Resistance Test Requested; and 4. Protection of Glass Bulb Tips

This proposal contains the following revisions: (1) Revision of requirements to specify solvent-based enamel (2) Revision of requirements for taped wrapped wire (3) Revision of requirements to incorporate fully insulated wire (FIW)

UL 2353-2016a, Standard for Safety for Single- and Multi-Layer Insulated Winding Wire
3. Revision of requirements to incorporate fully insulated wire (FIW).
These requirements cover the test methods for measuring the fire performance of sheet plastics used in semi-conductor wet bench tool construction.

UL 2367-2009 (R2014), Standard for Safety for Solid State Overcurrent Protectors
UL proposes a reaffirmation for UL 2367.

The intent of this proposal is: 1) To propose revisions to clarify the test, requirements, and test methods of UL 2368 and 2) To propose revisions of UL 2368 to require Intermediate Bulk Containers (IBCs) to be filled with Mineral Seal Oil for Fire Testing rather than water and a small quantity of Heptane.

UL 2388-2014a, Standard for Safety for Flexible Lighting Products
This covers revisions to requirements for Class 2 power supplies; revisions for conductor sizes and miscellaneous editorial revisions

UL 2388-2014b, Standard for Safety for Flexible Lighting Products
This covers revisions to requirements for Class 2 power supplies; revisions for conductor sizes and miscellaneous editorial revisions

UL 2388-2017, Standard for Safety for Flexible Lighting Products
Revision to the weight requirement for the Flexing Test and the Crimp Connection Securesness Test for conductors smaller than 18 AWG

UL 2390-2009, The Standard for Test Method for Wind Resistant Asphalt Shingles with Sealed Tabs

UL 2390-2009a, The Standard for Test Method for Wind Resistant Asphalt Shingles with Sealed Tabs

This proposed First Edition of UL 2416 covers requirements for Audio/Video, Information and Communication Technology Equipment Cabinet, Enclosure and Rack Systems. For the purpose of this proposed Standard cabinet, enclosure and rack systems are all referred to as ‘enclosure systems.

UL 242-2004 (R2013), Standard for Safety for Nonmetallic Containers for Waste Paper

UL 2420-2012a (R2016), Standard for Safety for Belowground Reinforced Thermosetting Resin Conduit (RTRC) and Fittings
1. Reaffirmation and Continuous of the First Edition of the Standard for Belowground Reinforced Thermosetting Resin Conduit (RTRC) and Fittings

This 1/31/14 proposal includes a proposed second edition of the Standard for Durability of Spray-Applied Fire Resistive Coatings. The second edition also includes a proposed standard title change to, the Standard for Durability of Fire Resistive Coatings and Materials.

UL 2438-2014, Standard for Safety for Outdoor Seasonal-Use Cord-Connected Wiring Devices (Proposal dated 06-13-14)
The proposal contains a revision to add audio features, flasher controls, different number of receptacles, and change in power supply cord length

UL 2442-2014, Standard for Safety for Wall- and Ceiling-Mounts and Accessories
Revisions of requirements to address field cutting and drilling of video mounting systems

UL 2443-2016, Flexible Sprinkler Hose With Fittings for Fire Protection Service
Updated maximum span between end brackets to be provided in the installation instructions. High pressure flow test revised to include testing using the minimum length of hose in addition to the maximum length of hose. Revisions throughout the standard to clarify and update test methods.

UL 2459-2014, Standard for Safety for Insulated Multi-Pole Splicing Wire Connectors
These revisions cover the following proposals: 1) Clarification of Clause 1.3; 2) LED retrofit application addition to scope; 3) Editorial revisions; 4) Mechanical Sequence, wire combinations under single clamping means and revision to address testing max and min sizes in a wire range; and 5) Mechanical Sequence orientation when testing mating (separable-type) device having multi-port line side connections (feed thru or daisy chain).

UL 2460-2015, Standard for Safety for Nonshielded Cable (Proposal dated 8-7-15)
UL proposes the first edition of UL 2460 which covers single-conductor, nonshielded cables rated 3000 or 8000 volts, 90°C that are intended solely for use as factory-installed wiring in equipment (internal wiring), in industrial applications where such cable systems are maintained by trained personnel, not as Type MV.

1. Editorial Correction in Table 5. 2. Recovery Voltage Clarification.

UL 248-10-2011 (R2015), Standard for Safety for Low-Voltage Fuses - Part 10: Class L Fuses
Reaffirmation of ANSI Approval for UL 248-10

UL 248-11-2011 (R2015), Standard for Safety for Low-Voltage Fuses - Part 11: Plug Fuses
Reaffirmation of ANSI Approval for UL 248-11

UL 248-12-2011 (R2015), Standard for Safety for Low-Voltage Fuses - Part 12: Class R Fuses
Reaffirmation of ANSI Approval for UL 248-12

Reaffirmation of ANSI approval for UL 248-13

UL 248-14-2005 (R2015), Standard for Safety for Low-Voltage Fuses - Part 14: Supplemental Fuses
Reaffirmation of ANSI approval for UL 248-14.

Reaffirmation of ANSI approval for UL 248-15.

UL 248-16-2004 (R2013), Standard for Safety for Low-Voltage Fuses - Part 16: Test Limiters
UL proposes a reaffirmation for UL 248-16.

The following changes are being recirculated: Proposed First Edition of UL 248-19, the Standard for Safety for Photovoltaic Fuses.

UL 248-2-2005 (R2014), Standard for Safety for Low-Voltage Fuses - Part 2: Class C Fuses
Reaffirmation of ANSI Approval for UL 248-2

UL 248-3-2005 (R2014), Standard for Safety for Low-Voltage Fuses - Part 3: Class CA and CB Fuses
Reaffirmation of ANSI Approval for UL 248-3

UL 248-4-2005 (R2014), Low-Voltage Fuses - Part 4: Class CC Fuses
Reaffirmation of ANSI Approval for UL 248-4

UL 248-5-2005 (R2015), Low-Voltage Fuses - Part 5: Class G Fuses
Reaffirmation of ANSI Approval for UL 248-5

UL 248-6-2005 (R2015), Low-Voltage Fuses - Part 6: Class H Non-Renewable Fuses
Reaffirmation of ANSI Approval for UL 248-6
UL 248-7-2005 (R2015), Standard for Safety for Low-Voltage Fuses - Part 7: Class H Renewable Fuses
Reaffirmation of ANSI Approval for UL 248-7
UL 248-8-2011 (R2015), Standard for Safety for Low-Voltage Fuses - Part 8: Class J Fuses
Reaffirmation of ANSI Approval for UL 248-8
Reaffirmation of ANSI approval for UL 248-9.
UL 25-2016, Standard for Safety for Meters for Flammable and Combustible Liquids and LP-Gas
This proposal is being issued to revise the Moist Ammonia-Air Stress Cracking Test.
UL 25-2016a, Standard for Safety for Meters for Flammable and Combustible Liquids and LP-Gas
The following topic is being proposed: 1) Addition of torque requirements for larger size valve.
UL 2515-2014, Standard for Safety for Aboveground Reinforced Thermosetting Resin Conduit (RTRC) and Fittings (Proposal dated 9-20-2013)
Document (dated 9-20-2013) proposes revisions to tensile strength requirements to align with those of UL 2420, Belowground Reinforced Thermosetting Resin Conduit (RTRC) and Fittings.
UL 2515A-2016, Standard for Safety for Supplemental Requirements for Extra Heavy Wall Reinforced Thermosetting Resin Conduit (RTRC) and Fittings
Document (dated 7-10-2015) proposes new requirements to evaluate Extra Heavy Wall Aboveground RTRC for use at extended support distances as permitted by the NEC.
UL 2515A-2016a, Standard for Safety for Supplemental Requirements for Extra Heavy Wall Reinforced Thermosetting Resin Conduit (RTRC) and Fittings
Based on a previous proposal that did not achieve consensus, this document (dated 12-04-2015) proposes new requirements to evaluate Extra Heavy Wall Aboveground RTRC for use at extended support distances as permitted by the NEC.
UL 2518-2016, Standard for Safety for Air Dispersion Systems
UL 252-2015, Standard for Safety for Compressed Gas Regulators
Proposal to add requirements for backpressure regulators
UL proposes revisions to UL 2523 to add requirements for ANSI/ASME pressure vessel stamps.
UL 2523-2013a, Standard for Safety for Solid Fuel-Fired Hydronic Heating Appliances, Water Heaters and Boilers
This re-circulation proposal provides revisions to the UL 2523 proposals dated 9-21-12.
UL 252A-2010 (R2015), Standard for Safety for Compressed Gas Regulator Accessories
Reaffirmation of the Fourth Edition of the Standard for Safety for Compressed Gas Regulator Accessories, UL 252A, as an American National Standard. UL 252A covers accessories intended for direct connection to the low or delivery pressure side of compressed gas regulators. These devices are not intended for direct connection to high or storage cylinder pressures. Accessories covered by these requirements are intended for use with compressed gases such as air, carbon dioxide, inert gases, fuel gases, nitrogen, nitrous oxide and oxygen.
UL 2556-2015, Standard for Safety for Wire and Cable Test Methods (Proposal dated 05-01-15)
This recirculation provides revisions to the UL 2556 proposed new edition dated 5-1-15.
UL 2556-2015a, Standard for Safety for Wire and Cable Test Methods (Proposal dated 05-01-15)
This recirculation provides revisions to the UL 2556 proposed new edition dated 5-1-15.
Proposals including: 1. Proposed new test methods for spread spectrum technologies. 2. Identification of UL 2560 requirements considered to be met by a product that already complies with UL 60950-1. 3. Proposal to provide an additional option (the use of a symbol) for marking a device, such as a switch, intended for emergency service. 4. Products intended for outdoor use. 5. Proposed changes to the battery life test, and 6. Requirements for openings in non-resident-accessible equipment
UL 2560-2015a, Standard for Safety for Emergency Call Systems for Assisted Living and Independent Living Facilities
Proposed new test methods for spread spectrum technologies; proposal to provide an additional option (the use of a symbol) for marking a device, such as a switch, intended for emergency service; and requirements for openings in non-resident-accessible equipment
UL 2561-2009 (R2013), Standard for Safety for 1400 Degree Fahrenheit Factory-Built Chimneys
UL proposes a reaffirmation for ANSI approval of UL 2561.
UL 2565-2013, Standard for Safety for Semiautomatic Metal Sawing Machines
1. The Proposed First Edition And First Time ANSI Approval Of The Standard For Semiautomatic Metal Sawing Machines
UL 2572-2016, Mass Notification Systems
Revision of the Short Range Radio Frequency Device Test Methods to Incorporate Spread Spectrum Technology. Revisions Added for New and Revised Class Designations and Operation for NACs, IDCs, and SLCs. Miscellaneous Editorial Revisions, Corrections, and Clarifications.
UL 2572-2016a, Mass Notification Systems
Revision of the Short Range Radio Frequency Device Test Methods to Incorporate Spread Spectrum Technology. Revisions Added for New and Revised Class Designations and Operation for NACs, IDCs, and SLCs. Miscellaneous Editorial Revisions, Corrections, and Clarifications.
UL 2575-2012, Lithium Ion Battery Systems for Use in Electric Power Tool and Motor Operated, Heated and Lighting Appliances
Covers: (1) Proposal to correct standard title reference error in 29.3.
UL 2577-2013, Standard for Safety for Suspended Ceiling Grid Low Voltage Systems and Equipment
The following topics for the Standard for Suspended Ceiling Grid Low Voltage Systems and Equipment, UL 2577/ULC-S2577, are being recirculated: 1. The Proposed First Edition of the Joint UL/ULC Standard for Suspended Ceiling Grid Low Voltage Systems and Equipment, UL 2577/ULC-S2577
UL 2577-2017, Standard for Safety for Suspended Ceiling Grid Low Voltage Systems and Equipment
The following changes in requirements to the Standard for Suspended Ceiling Grid Low Voltage Systems and Equipment, UL 2577/ULC-S2577, are being proposed: 1. Add new definition for Low Voltage/Extra-Low Voltage and revise voltage references throughout the standard to correlate with the Canadian Electrical Code, Part 1, and the National Electrical Code, NFPA 70
UL 2580-2016, Standard for Batteries for Use In Electric Vehicles
1. Correction of IEC standard number. 2. Clarification of the Overcharge Test and revision of the Isolation Test and External Fire Exposure Test. 3. Revision of samples numbers for cell testing in 16.2 and 16.3.
UL 2580-2016a, Standard for Batteries for Use In Electric Vehicles
2. Clarification of the Overcharge Test and revision of the Isolation Test and External Fire Exposure Test. 3. Revision of samples numbers for cell testing in 16.2 and 16.3.
UL 2586-2014, Standard for Safety for Hose Nozzle Valves
This proposal clarifies the test methods of the Operation Test, Sensitivity Test, Hose Nozzle Endurance Test, and Drop Test.
UL 2586-2014a, Standard for Safety for Hose Nozzle Valves
Recirculation of proposal for paragraph 17.1.

UL 2586-2014b, Standard for Safety for Hose Nozzle Valves
These revisions clarify the secondary shut off operation requirements.

UL 2586A-2016, Standard for Hose Nozzle Valves for Gasoline and Gasoline/Ethanol Blends with Nominal Ethanol Concentrations up to 85 Percent (E0 - E85)
The following is being proposed: 1. Update requirements to include alternate requirements for compression set limits of constant pressure static face seals

UL 2586B-2015, Standard for Safety for Hose Nozzle Valves with Nominal Ethanol Concentrations up to 85 Percent (B20), Kerosene, and Fuel Oil
These requirements cover hose nozzle valves that are intended to be used for the control of diesel fuel, biodiesel fuel, diesel/biodiesel blends with nominal biodiesel concentrations up to 20 percent (B20), kerosene, and fuel oil.

UL 2592-2015, Standard for Safety for Low Voltage LED Wire (Proposal dated 10/10/14)
These requirements cover single-conductor and multi-conductor, unjacketed, 18 – 10 AWG (0.807 - 5.16 mm squared), low voltage LED wire rated 105°C - 250°C (221°F - 482°F), and 300 or 600 volts, suitable for installation in dry and damp, or wet locations. These wires are for use with signs, outline lighting, and interior lighting where the wire is only connected to the output of the driver to the LED array, is only accessible during user servicing of the sign, and is not required to be additionally enclosed by the sign enclosure, in accordance with the Standard for Electrical Signs, UL 48.

UL 2594-2016, Standard for Safety for Electric Vehicle Supply Equipment

UL 2594-2016a, Standard for Safety for Electric Vehicle Supply Equipment
18. Withdrawal of Proposal: Revision of Requirements for Surface Temperatures

UL 2594-2016b, Standard for Safety for Electric Vehicle Supply Equipment

UL 2595-2015, Standard for General Requirements for Battery-Powered Appliances
1. The proposed Bi-National Standard Resulting in the 2nd Edition Including the Following Changes: a) Revisions to Add References to the Applicable CSA Standards; b) New and Clarified Definitions; c) Clarifications and New Requirements for Markings and Instructions; d) Clarification of Requirements for Harnesses; e) Clarification that All Cells Shall Comply with the Requirements of UL 62133; and f) Revision of Indent G Instructions Providing Guidance that the End Product Standard be Revised to Also Include a Statement that UL 2595 Functional Safety Requirements for an Electronic Safety Control Circuit Fulfills the Requirements of the End-Product Standard.

UL 2595-2015a, Standard for Safety for General Requirements for Battery-Powered Appliances
1. The proposed Bi-National Standard Resulting in the 2nd Edition Including the Following Changes: a) Revisions to Add References to the Applicable CSA Standards; b) New and Clarified Definitions; c) Clarifications and New Requirements for Markings and Instructions; d) Clarification of Requirements for Harnesses; e) Clarification that All Cells Shall Comply with the Requirements of UL 62133; and f) Revision of Indent G Instructions Providing Guidance that the End Product Standard be Revised to Also Include a Statement that UL 2595 Functional Safety Requirements for an Electronic Safety Control Circuit Fulfills the Requirements of the End-Product Standard.

UL 25A-2016, Standard for Safety for Meters for Gasoline and Gasoline/Ethanol Blends with Nominal Ethanol Concentrations up to 85 Percent (E0 - E85)
This proposal is being issued to revise the Moist Ammonia-Air Stress Cracking Test.

UL 25A-2016a, Standard for Safety for Meters for Diesel Fuel, Biodiesel Fuel, Diesel/Biodiesel Blends with Nominal Biodiesel Concentrations up to 20 Percent (B20), Kerosene, and Fuel Oil
The following topic is being proposed: 1) Addition of torque requirements for larger size valve.

UL 25B-2016, Standard for Safety for Meters for Diesel Fuel, Biodiesel Fuel, Diesel/Biodiesel Blends with Nominal Biodiesel Concentrations up to 20 Percent (B20), Kerosene, and Fuel Oil
The following topic is being proposed: 1) Addition of torque requirements for larger size valve.

UL 25A-2016b, Standard for Safety for Meters for Diesel Fuel, Biodiesel Fuel, Diesel/Biodiesel Blends with Nominal Biodiesel Concentrations up to 20 Percent (B20), Kerosene, and Fuel Oil

UL 260-2008 (R2017), Standard for Safety for Dry Pipe and Deluge Valves for Fire-Protection Service
UL proposes a reaffirmation for UL 260.

This 2/6/15 proposal adds a Furnace Exposure Test to UL 263.

UL 268-2016, Standard for Safety for Smoke Detectors for Fire Alarm Systems
Proposed new seventh edition of binational standard UL 268, updating requirements for both the United States and Canada including new requirements for multi-criteria smoke detectors and polyurethane flaming and smoldering tests.

UL 268-2016a, Standard for Safety for Smoke Detectors for Fire Alarm Systems
Recirculation of changes for proposed seventh edition of UL 268 published on 6-27-2014, including the addition of a ‘Do not paint&8221; marking symbol.

UL 268-2016b, Standard for Safety for Smoke Detectors for Fire Alarm Systems
Recirculation of changes for proposed seventh edition of UL 268 published on 6-27-2014, includes addition of a ‘Do not paint&8221; marking symbol and corrections to the original proposal.

UL 268-2016c, Standard for Safety for Smoke Detectors for Fire Alarm Systems
June 3, 2016 document proposes changes to original proposal dated 2-12-16 regarding cooking nuisance and polyurethane flaming and smoldering tests for the seventh edition of UL 268.

UL 268A-2016, Standard for Safety for Smoke Detectors for Duct Application
Proposal dated 7-1-2016 adds a reference to the Field Services Test in UL 268 for paragraph 53.1.

UL 2703-2015, Standard for Mounting Systems, Mounting Devices, Clamping/Retention Devices, and Ground Lugs for Use with Flat-Plate Photovoltaic Modules and Panels
1. The First Edition of the Standard for Mounting Systems, Mounting Devices, Clamping/Retention Devices, and Ground Lugs for Use with Flat-Plate Photovoltaic Modules and Panels, UL 2703, which covers rack mounting systems and clamping devices for flat-plate photovoltaic modules and panels that comply with the Standard for Flat-Plate Photovoltaic Modules and Panels, UL 1703, intended for installation on or integral with buildings, or to be freestanding (i.e., not attached to buildings).

The proposal is to add UL 62368-1 as a permitted base standard.

UL 2743-2016, Standard for Portable Power Packs

Revisions to the first edition of UL 2743 are being recirculated: The First edition of UL 2743, Standard for Portable Power Packs covers: Portable and movable power packs provided with one or more batteries or electrochemical capacitor modules. If provided with a battery, the battery shall be either a lead acid or lithium ion battery. The power packs are provided with one or more inputs, and they are provided with one or more outputs. For power packs provided with a booster function, the power packs are used for providing a temporary power source to a depleted land vehicle battery, rated 12 or 24 V, to provide emergency starting power.

UL 2743-2016a, Standard for Portable Power Packs

Revisions to the first edition of UL 2743 are being recirculated: The First edition of UL 2743, Standard for Portable Power Packs covers: Portable and movable power packs provided with one or more batteries or electrochemical capacitor modules. If provided with a battery, the battery shall be either a lead acid or lithium ion battery. The power packs are provided with one or more inputs and they are provided with one or more outputs. For power packs provided with a booster function, the power packs are used for providing a temporary power source to a depleted land vehicle battery, rated 12 or 24 V, to provide emergency starting power.

UL 275-2013, Standard for Safety for Automotive Glass-Tube Fuses

This proposed Ninth edition of the Standard for Safety for Automotive Glass-Tube Fuses is being issued to obtain ANSI Approval. No technical changes have been made to the standard.

UL 2775-2016, Standard for Safety for Fixed Condensed Aerosol Extinguishing System Units

UL proposes an alternate ultraviolet light exposure test method for UL 2775.

UL 2788-2014, Standard for Safety for Industrial and Commercial Vibrators (Proposal dated 2-21-14)

UL proposes the first edition of UL 2788 which covers industrial and commercial vibrators intended to facilitate the flow and settling of granular materials and slurries.

UL 2790-2010a, R2014, Standard for Safety for Commercial Incinerators

UL proposes a reaffirmation for ANSI approval of UL 2790.

UL 283-2016, Standard for Safety for Air Fresheners and Deodorizers (Proposal dated 5-20-16)

This proposal includes alternative test methods for flash point fragrances

UL 283-2016a, Standard for Safety for Air Fresheners and Deodorizers (proposal dated 8-19-16)

This proposal includes (1) STP-1 supply cords for lightweight products (2) Revision to increase the allowed temperature of hot liquids

UL 283-2016b, Standard for Safety for Air Fresheners and Deodorizers (proposal dated 10-28-16)

This Recirculation proposal provides revisions to the UL 283 proposal dated 2016-05-20.


The following changes in requirements to the Standard for Fire Test of Plastic Water Distribution Plumbing Pipe for Visible Flame and Smoke Characteristics, UL 2846, are being proposed: 1. Revision of the Scope of Products Covered by UL 2846


UL 291-2012 (R2016), Standard for Safety for Automated Teller Systems (Proposal Dated 4/1/16)

These requirements cover the construction and security of equipment intended to automatically dispense currency when operated as intended by an authorized customer, and to provide a limited degree of protection against unauthorized removal of currency.

UL 294-2013, Standard for Safety for Access Control System Units

Proposed new edition including: Revised scope; Updated general requirements; Updated glossary; new requirements for single point lock; Defined tiered access control performance levels; Revised enclosure opening requirements; Addition of separation of circuit requirements; Revised field wiring and terminal requirements; Revised electrical spacing requirements; New secondary power section; New test emulated system requirements; New Class 2 and 3 circuit tests; Revised component temperature test; Revised Input/Output Circuit Transient Test; Revised Destructive Attack Test; New line security requirements; Revised marking requirements; and updated Appendix A.

UL 294B-2013, Standard for Safety for Power Over Ethernet (PoE) Power Sources for Access Control Systems and Equipment

This proposed first edition covers requirements for the evaluation of Power over Ethernet (PoE) power sources for access control systems and equipment. The power sources may be provided integral with the access control equipment or as a separate device supplying power. The equipment is intended to comply with Article 725.121 of the National Electrical Code. Equipment covered by this standard provides a nominal source voltage of 48 or 53 V DC. This standard applies to all connected equipment and interconnections necessary to ensure normal operation of the PoE powered control system.

UL 295-2017, Standard for Safety for Commercial-Industrial Gas Burners

The following topics are being proposed: 1) Addition of requirements for gas assist (pre-mix) burners and 2) Clarification of requirements for high gas pressure switch.

UL 295-2017a, Standard for Safety for Commercial-Industrial Gas Burners

The following topic is being recirculated: 1) Addition of requirements for gas assist (pre-mix) burners.

UL 296-2017, Standard for Safety for Oil Burners

The following topic is being proposed: 1) Revise requirements for programming and timings for burners.

UL 296-2017a, Standard for Safety for Oil Burners

The following topic is being recirculated: 1) Revise requirements for programming and timings for burners.

UL 299-2012, Standard for Safety for Dry Chemical Fire Extinguishers

This 10/21/11 UL 299 proposal includes clarifications of cylinder requirements with DOT and TDRG specifications.

UL 30-2004 (R2014), Standard for Safety for Metal Safety Cans

The following is being proposed: 1. Reaffirmation and Continuance of the Ninth Edition of the Standard for Metal Safety Cans, UL 30, as an American National Standard


UL proposes requirements for appliance specific nozzle coverage and grease auto-ignition temperature for UL 300.


This re-circulation proposal provides revisions to the UL 300 proposal dated 5-16-14.
UL 305-2012a (R2017), Standard for Safety for Panic Hardware
UL proposes a reaffirmation for ANSI approval of UL 305.

UL proposes a reaffirmation for ANSI approval for UL 307A.

UL 310-2014, Standard for Safety for Electrical Quick-Connect Terminals
Proposed Ninth Edition of the Standard for Safety for Electrical Quick-Connect Terminals

UL 310-2014a, Standard for Safety for Electrical Quick-Connect Terminals
Proposed Ninth Edition of the Standard for Safety for Electrical Quick-Connect Terminals

UL 312-2010 (R2015), Standard for Safety for Check Valves for Fire-Protection Service (Proposal dated 1-16-15)
These requirements cover check valves of 1 NPS and larger, used in piping systems supplying water for fire protection service. The check valves covered by these requirements are intended for installation and use in accordance with the Standards: NFPA 11; NFPA 13; NFPA 14; NFPA 15; NFPA 20; NFPA 22; NFPA 24; NFPA 750; and NFPA 13R.

UL 32-2014, Standard for Safety for Metal Waste Cans
The following changes in requirements to the Standard for Metal Waste Cans, UL 32, are being proposed: 1. Clarify intent of trade sizes shown in Table 1; 2. Add marking requirement for waste cans with flat sides

UL 325-2017, Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems

UL 325-2017a, Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems
7. Editorial Changes

UL 325-2017b, Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems
1. The Proposed Seventh Edition of the Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems, UL 325, Incorporating Requirements Applicable for Canada

UL 33-2010 (R2015), Standard for Safety for Heat Responsive Links for Fire Protection Service
Reaffirmation of the Standard for Safety for Heat Responsive Links for Fire Protection Service, as an American National Standard

UL 330-2017, Standard for Safety for Hose and Hose Assemblies for Dispensing Flammable Liquids
The following is being proposed: 1. Revision to requirement for samples in the tensile strength and elongation tests. 2. Clarification of ethanol levels and fuels not covered by the standard. 3. Deletion of scope paragraph 1.3 regarding fuels not covered in paragraph 1.1.

UL 330B-2015, Standard for Safety for Hose and Hose Assemblies for Use With Dispensing Devices Dispensing Diesel Fuel, Biodiesel Fuel, Diesel/Biodiesel Blends With Nominal Biodiesel Concentrations Up To 20 Percent (B20), Kerosene, and Fuel Oil
First edition of the Standard for Hose and Hose Assemblies for Use With Dispensing Devices Dispensing Diesel Fuel, Biodiesel Fuel, Diesel/Biodiesel Blends With Nominal Biodiesel Concentrations Up To 20 Percent (B20), Kerosene, and Fuel Oil is being proposed

UL 331-2008a, Strainers for Flammable Fluids and Anhydrous Ammonia (proposal dated 1/4/08)
Revise item (a) in proposed new exception to 5.3 for clarification.

Non-Potable Water Strainers, New Supplement SA

UL 331A-2015, Standard for Safety for Strainers for Gasoline and Gasoline/Ethanol Blends with Nominal Ethanol Concentrations Up to 85 Percent (E0—E8S) (Proposal dated 10/17/14)
The requirements cover complete, self-contained strainer or filter assemblies intended for use with fuels designated below. Although these devices are designated strainers, they may be either strainers or filters according to the common terminology of the industry. Strainers and filter assemblies covered by these requirements are intended for use with one or more of the following fuels: ANSI/ASTM D975; ANSI/ASTM D7467; ANSI/ASTM D6751; ANSI/ASTM D3699; ANSI/ASTM D396.

UL 340-2009 (R2014), Standard for Safety for Tests for Comparative Flammability of Liquids
This standard provides a method, based on the results of specified flammability tests, for the classification of fluids or liquids as nonflammable, or as flammable with the degree of fire hazard rated both in general terms and on a numerical scale, in comparison with well-known products whose hazards have been established by field experience.

UL 343-2013, Standard for Safety for Pumps for Oil-Burning Appliances (Proposal dated 8/10/12)
These requirements cover pumps that are intended to be used as part of oil-burning appliances or installed in fuel-oil piping systems serving such equipment. Oil-burning appliance pumps may be either automatic or power-operated.

UL 346-2005 (R2014), Standard for Safety for Waterflow Indicators for Fire Protective Signaling Systems
The following is being proposed: 1. Reaffirmation and Continuance of the Fifth Edition of the Standard for Waterflow Indicators for Fire Protective Signaling Systems, UL 346, as an American National Standard

UL 347-2016, Standard for Safety for Medium-Voltage AC Contactors, Controllers, and Control Centers
Proposed Sixth Edition of UL 347, Standard for Safety for Medium-Voltage AC Contactors, Controllers, and Control Centers

UL 347-2016a, Standard for Safety for Medium-Voltage AC Contactors, Controllers, and Control Centers
This standard is applicable to ac contactors with rated voltages of 1 501 to 7 200 V, and metal-enclosed contactor-based controllers, control centers, and other control assemblies and associated equipment with rated voltages of 751 to 7 200 V, designed for operation at frequencies of 50 or 60 Hz on three-phase systems. These requirements cover equipment intended for use in ordinary (non-hazardous) locations and installed in accordance with the applicable local installation codes and standards. These requirements, as modified by the applicable national standards for fire pump controllers, also cover fire pump controllers.


UL 355-2011 (R2016), Standard for Cord Reels
These requirements cover cord reels for general use, as well as cord reels - herein referred to as special-use cord reels - intended to be mounted on or in electrical utilization equipment such as appliances, portable lamps, or similar equipment. These requirements also cover reels for use in factories, household workshops, garages, commercial facilities and construction sites where an additional degree of protection against the risk of the entrance of water, dust or other contaminants might be needed. A cord reel, as covered by these requirements, is a reel equipped with, or intended for use with, a length of flexible cord.

UL 360-2015, Standard for Safety for Liquid-Tight Flexible Metal conduit

Document (dated 10-24-14) proposes the replacement of references to ASTM Oil No. 2 with IRM 902 oil and a correction to a typo in Xenon-air cooled transformers and dc output power supplies intended to supply fountains, swimming pool, and spa luminaires in accordance with Article 680 of the National Electrical Code, ANSI/NFPA 70.

UL 363-2011 (R2015), Standard for Knife Switches

UL 365-2015a, Standard for Safety for Police Station Connected Burglar Alarm Units and Systems
1) Revision of minimum wire size requirements for field wiring terminals and modification of the requirements for field wiring leads. (2) Revisions to attack and tamper-resistant alarm sounding device requirements.

UL 365-2015b, Standard for Safety for Police Station Connected Burglar Alarm Units and Systems
(1) Revision of minimum wire size requirements for field wiring terminals and modification of the requirements for field wiring leads. (2) Revisions to attack and tamper-resistant alarm sounding device requirements.

UL 3703-2015, Standard for Safety for Solar Trackers
1. Correction of a reference in paragraph 16.2 and the deletion of Section 69, Emergency Movement of Platform Without Drive Power Test.

UL 3703-2015a, Standard for Safety for Solar Trackers
1. Correction of a reference in paragraph 16.2 and the deletion of Section 69, Emergency Movement of Platform Without Drive Power Test.

UL 3730-2014a, Standard for Photovoltaic Junction Boxes
1. The First Edition of the Standard for Photovoltaic Junction Boxes, UL 3730, which covers photovoltaic junction boxes intended to be attached to photovoltaic modules and panels. In addition, these requirements cover photovoltaic junction boxes intended for factory and field wiring and may include conduit openings, wiring leads, and/or photovoltaic connectors intended for interconnection of PV modules. The products covered by these requirements are intended to be installed in accordance with the National Electrical Code, ANSI/NFPA 70.

UL 3730-2017, Standard for Photovoltaic Junction Boxes
1. Expansion of UL 3730 to Include Junction Boxes up to 1500 V dc or Less

UL 379-2013, Standard for Safety for Power Units for Fountain, Swimming Pool, and Spa Luminaires
ANSI approval of UL 379, which covers field-installed air-cooled transformers and dc output power supplies intended to supply fountain, swimming pool, and spa luminaires in accordance with Article 680 of the National Electrical Code, ANSI/NFPA 70.

Reaffirmation of current ANSI which covers manual signaling boxes for fire alarm systems intended for permanent installation and use in ordinary locations in accordance with the National Electrical Code, NFPA 70, and the National Fire Alarm Code, NFPA 72.

Reaffirmation of ANSI approval is proposed for UL 385.

UL 391-2006 (R2014), Standard for Safety for Solid-Fuel and Combination-Fuel Central and Supplementary Furnaces
UL proposes a reaffirmation for ANSI approval of UL 391.

UL 399-2013a, Standard for Safety for Drinking Water Coolers
The following is being proposed: 1. Revision of requirements for switches and controllers

UL 399-2017, Standard for Safety for Drinking Water Coolers (Proposal dated 11-4-16)
This proposal includes (1) Addition of parameters for alternative capacitor requirements in UL 60384-14 (2) Addition of start-to-discharge test to allow pressure relief valves, other than ASME stamped valves, on pressurized product systems (3) Clarification of requirements involving ultraviolet radiation lamps (4) Align controls requirements with water heater controls requirements and add alternate protective electronic controls requirements (5) Revisions to Supplement SB for drinking water coolers employing a flammable refrigerant (6) Addition of requirements for remotely operated drinking water coolers (7) Clarification of test enclosure requirements...

UL 4-2008 (R2013), Standard for Safety for Armored Cable

UL 401-2017, Standard for Safety for Portable Spray Hose Nozzles for Fire-Protection Service
1. Inlet Pressure Ratings 2. Revisions to Clarify Requirements and Update Testing Details

UL 404-2015, Standard for Safety for Gauges, Indicating Pressure, for Compressed Gas Service
Proposal to clarify pressure gauge construction

UL 405-2014, Standard for Safety for Fire Department Connection Devices
Eliminate the criteria for comparing the area of the inlet and outlet openings in favor of including a new table which specifies the maximum number of each size of fire department connection inlet and roof manifold outlet that is permitted.

UL 407-2004 (R2013), Standard for Safety for Manifolds for Compressed Gases
Reaffirmation of the Seventh Edition of the Standard for Safety for Manifolds for Compressed Gases, UL 407, as an American National Standard. UL 407 covers equipment for manifolding high-pressure gas cylinders to supply gas for various industrial and commercial applications. Cylinders are manifolded for the purpose of centralizing the gas supply, to provide a continuous supply of gas, or to provide gas at a rate in excess of that which may be obtained from a single cylinder.
UL 412-2017, Standard for Refrigeration Unit Coolers
Addition Of Requirements For Remotely Operated Unit Coolers. Proposal To Update And Clarify Controls Requirements; Add Alternate Protective Electronic Controls Requirements And Alternate Spacings Requirements. Addition Of Reference To Across-The-Line Capacitor Standards. Revisions To Refrigerant Requirements.

Resolve comments received by UL to the following proposals for UL 414, which were originally published on February 1, 2008: (1) Requirements for Current Carrying Part of Potential Jaw Assembly; (3) Addition of Requirements for Rejection Clips; and (6) Addition of Appendix for Explanatory Information Regarding Wire Bending Distance

UL 414-2009c, Standard for Safety for Meter Sockets
The following are proposed requirements for UL 414: 1. Addition of Spacing Requirements for Uninsulated Live Parts of the Same Polarity; 3. Clarification of Temperature Rise Requirements for Potential Jaw Assemblies; 4. Clarification of Requirements for Rating of Metering Transformer Cabinets Intended for Use with "Donut Type" Current Transformers; and 5. Removal of Reference to UL 486E, the Standard for Equipment Wiring Terminals for Use with Aluminum and/or Copper Conductors.

UL 414-2016, Standard for Safety for Meter Sockets
This proposal for UL 414 involves the addition of requirements for clamping jaw designs for Meter Sockets.

UL 4200A-2015, Standard for Safety for Products Incorporating Button or Coin Cell Batteries of Lithium Technologies

UL 4248-1-2013, Standard for Safety for Fuseholders - Part 1: General Requirements
The following changes in requirements to UL 4248-1, are being proposed: 1. Revision to clarify the term 'ferrous'; 2. Revision to address the specification of torque values; 3. Revision to include UL 486E as a reference in Appendix B.4; 4. Revision to correct a typographical error in Clause 7.5.3; 5. Revision to specify the fuse shall be retained in the load side of the fuseholder; 6. Alternatives for the evaluation of the adequacy of surface tracking characteristics of polymeric materials used in fuseholders rated >600 volts less than or equal to 35 kV; 7. Introduction of exception to requirement for withstand testing.

UL 4248-11-2007 (R2012), Standard for Safety for Fuseholders - Part 11: Type C (Edison Base) and Type S Plug Fuse
UL proposes a reaffirmation for ANSI approval of UL 4248-11.
UL 44-2014, Standard for Safety for Thermoset-Insulated Wires and Cables
1. Proposed New Edition of UL 44 2. Revision to the Conductor Sizes Subject to the VW-1 Flame Test

This recirculation proposal provides revisions to the UL 44 recirculation dated 04-19-13.

This recirculation proposal provides revisions to the UL 44 recirculation dated 04-19-13.

UL 441-2006 (R2014), Standard for Safety for Gas Vents
UL proposes a reaffirmation for ANSI approval of UL 441.

UL 443-2008 (R2013), Standard for Safety for Steel Auxiliary Tanks for Oil-Burner Fuel (Bulletin dated December 21, 2012)
Reaffirmation and Continuance of the Sixth Edition of the Standard for Steel Auxiliary Tanks for Oil-Burner Fuel, UL 443, as an American National Standard

UL 444-2017, Standard for Safety for Communications Cables (Proposals Dated 6/3/16)
Proposed Fifth Edition of the Standard for Communication Cables, UL 444, including the following changes: (a) Revision to Paragraph 5.9.2 to Ensure Proper Bonding; (b) LP Cables; (c) Revision to Recognized Markings in Canada; (d) Correction to Drop Weight in Paragraph 7.13.3; (e) Addition of Material Type TPE to Tables 9 & 10; (f) Update to Table A1 in Appendix A; (g) Editorial Corrections

UL 448-2016, Standard for Safety for Centrifugal Stationary Pumps for Fire-Protection Service
The following changes to the Standard for Safety for Centrifugal Stationary Pumps for Fire-Protection Service, UL 448, are being proposed: 1. Requirements Addressing Multistage Multipump Fire Pumps 2. Clarification of Requirements Related to Pump Construction and Performance Testing 3. Revised Requirements Related to Keyways to Secure Shafts and Impellers

UL 448A-2013, Standard for Flexible Couplings and Connecting Shafts for Stationary Fire Pumps
The following changes for UL 448A are being proposed: 1. Clarify and Update Requirements Related to the Construction, Performance Testing and Marking of Flexible Couplings and Connecting Shafts

UL 448B-2013, Standard for Safety for Residential Fire Pumps for One- and Two-Family Dwellings and Manufactured Homes
The following changes in requirements for UL 448B are being proposed: 1. Clarify and Update Requirements Related to Pump Construction and Performance Testing

UL 448C-2014, Standard for Safety for Stationary, Rotary-Type, Positive-Displacement Pumps for Fire-Protection Service
The following changes in UL 448C are being proposed: 1. Clarification and Updating of Requirements Related to Pump Construction, and Performance Testing and Marking; and 2. Revised Marking Requirements

UL 452-2011 (R2015), Standard for Safety for Antenna-Discharge Units
Reaffirm UL 452 as an American National Standard. UL 452 covers antenna-discharge units for radio and television receiving equipment and amateur radio-transmitting and -receiving equipment, to be employed in accordance with the National Electrical Code, NFPA 70. An antenna-discharge unit as covered by these requirements consists of a gap, a fixed resistance or other discharge element, or a combination of such features, connected between each antenna lead-in terminal and a grounding terminal.

1. Overcurrent Protection for Output AC Circuits. 2. Revision to replace Carbon Arc testing with Xenon Arc testing for UV exposure.

UL 458-2015a, Standard for Power Converters/Inverters and Power Converter/Inverter Systems for Land Vehicles and Marine Crafts
1. Branch rated breakers in output circuit of inverter.

UL 464-2016, Standard for Safety for Audible Signaling Devices for Fire Alarm and Signaling Systems, Including Accessories
New proposed 10th edition of UL 464, a binational standard with requirements for the U.S. and Canada covering electrically operated bells, sirens, horns, and similar audible signaling devices, rated at 300 V or less, for fire alarm and signaling systems and intended for indoor and/or outdoor installation in accordance with CSA C22.1, Canadian Electrical Code, Part I, CAN/ULC-S524, Installation of Fire Alarm Systems, and National Electrical Code, NFPA 70, National Fire Alarm and Signaling Code, NFPA 72.

UL 464-2016a, Standard for Safety for Audible Signaling Devices for Fire Alarm and Signaling Systems, Including Accessories
Recirculation of changes for the proposed 10th edition of UL 464, a binational standard with requirements for the U.S. and Canada covering electrically operated bells, sirens, horns, and similar audible signaling devices, rated at 300 V or less, for fire alarm and signaling systems and intended for indoor and/or outdoor installation in accordance with CSA C22.1, Canadian Electrical Code, Part I, CAN/ULC-S524, Installation of Fire Alarm Systems, and National Electrical Code, NFPA 70, National Fire Alarm and Signaling Code, NFPA 72.

UL 464A-2016, Standard for Safety for Audible Signal Appliances for General Signaling Use
New proposed first edition of UL 464A, covering electrically and electronically operated bells, buzzers, horns, and similar audible signal appliances, rated 300 volts or less, for commercial general signaling service and intended for indoor or outdoor locations or both in accordance with the National Electrical Code, NFPA 70.

UL 466-2004 (R2013), Standard for Safety for Electric Scales UL 466 (Proposal dated March 8, 2013)
These requirements cover portable scales, including counter, jewelry, grain, floor, and other electronic scale designations. These scales are ordinarily of the computing type, that are rated 250 volts, or less. These scales consist of an attachment plug, a length of flexible cord, a switch, one or more lamps, lampshades, ballasts if electric-discharge lamps are used, and associated internal wiring. They are intended to be used in accordance with the National Electrical Code, NFPA 70.

UL 467-2013 (R2017), Standard for Safety for Grounding and Bonding Equipment
Reaffirmation of the Tenth Edition of the Standard for Grounding and Bonding Equipment, UL 467.

UL 467-2013a, Standard for Safety for Grounding and Bonding Equipment
The following changes to UL 467 are being recirculated: a) Editorial revisions; b) Revise definition for Intersystem Bonding Termination; c) Revise Clause 6.6.4; d) Delete proposed Clauses 6.4.8 and 6.4.9; e) Add UPC label note in Clauses 10.8 and D.3.2; f) Revise requirements in Annex C; and g) Delete proposed Annex E.

UL 47-2004 (R2017), Standard for Safety for Semiautomatic Fire Hose Storage Devices
UL proposes a reaffirmation of UL 47.

UL 4703-2014, Standard for Safety for Photovoltaic Wire (Proposal Dated 5-9-14)
This Standard covers single-conductor, insulated and integrally or non-integrally jacketed, sunlight resistant, photovoltaic wire rated 90°C, 55°C, 105°C, 60°C, 125°C, or 150°C wet, dry, and ground, 0°C, 60°C, 100°C, or 200°C V for interconnection wiring of grounded and ungrounded photovoltaic power systems as described in Wiring Systems, Article 690, and other applicable parts of the National Electrical Code (NEC), NFPA 70.

UL 4703-2014a, Standard for Safety for Photovoltaic Wire (Proposal Dated 5-9-14)
This Standard covers single-conductor, insulated and integrally or non-integrally jacketed, sunlight resistant, photovoltaic wire rated 90°C, 55°C, 105°C, 60°C, 125°C, or 150°C wet, dry, and ground, 0°C, 60°C, 100°C, or 200°C V for interconnection wiring of grounded and ungrounded photovoltaic power systems as described in Wiring Systems, Article 690, and other applicable parts of the National Electrical Code (NEC), NFPA 70.
UL 471-2016, Standard for Commercial Refrigerators and Freezers
The following is being proposed: 1. Addition of UL 60335-1 based requirements for the evaluation of electronic circuits. 2. Addition of requirements for thermoelectric refrigerators

UL 471-2016a, Standard for Safety for Commercial Refrigerators and Freezers
Update and clarify Section 9, Field Supply Connections; revise Section 90, Installation And Operating Instructions; addition of requirements to the alternate strength and fatigue test; and update temperature of fan motor windings during the fan failure test.

UL 474-2015, Standard for Safety for Dehumidifiers
The following is being proposed: 1. Addition of test condition to ensure component temperature limits are not exceeded in event of a refrigerant loss

UL 474-2015a, Standard for Safety for Dehumidifiers
The following is being proposed: 1. Addition of supplement for requirements for alternative path for electronic controls

UL 474-2015b, Standard for Safety for Dehumidifiers
The following is being recirculated: 1. Addition of test condition to ensure component temperature limits are not exceeded in event of a refrigerant loss

UL 48-2014, Electric Signs
1. Addition of requirements for laminated or organic-coated glass and revision to test method. 2. Addition of requirements for signs with photovoltaic systems or modules.

UL 482-2005 (R2014), Standard for Safety for Portable Sun/Heat Lamps
The following is being proposed: 1. Reaffirmation and Continuance of the Ninth Edition of the Standard for Portable Sun/Heat Lamps, UL 482, as an American National Standard.

UL 484-2016, Standard for Room Air Conditioners
Addition of Requirements Covering Button or Coin Cell Batteries of Lithium Technologies, Section 32A.

UL 486A-486B-2016, Standard for Safety for Wire Connectors
The following topic is being proposed: 1) Delete restriction on compact conductor size allowance.

UL 486C-2016, Standard for Safety for Splicing Wire Connectors
The following topic is being proposed: 1) Delete restriction on compact conductor size allowance.

UL 486D-2015, Standard for Safety for Sealed Wire Connector Systems
This proposed new edition includes the following topics: (a) NEC 555.9 and use in marina (salt environment), Clause 1.1; (b) Normative reference updates, Section 2.2; (c) Wire size units, AWG/kcmil, units, Clauses 3.1 and 3.2; (d) Wire conductor test clarification, Clause 7.1.1; (e) Two conductor requirement, Clause 9.1.2; (f) Conductor insulation for size 16 AWG and smaller, Clause 9.1.4; (g) Impact Test apparatus, Figure A.1; and (h) Clarification to Clause 10.2.

UL 486E-2015, Standard for Safety for Equipment Wiring Terminals for Use with Aluminum and/or Copper Conductors
This proposal includes the addition of requirements for testing with uninsulated conductors.

UL 486F-2015, Standard for Safety for Bare and Covered Ferrules
This proposal modifies requirements for plastic sleeve.

UL 489-2016, Standard for Safety for Molded-Case Circuit Breakers, Molded-Case Switches and Circuit-Breaker Enclosures

UL 489-2016a, Standard for Safety for Molded-Case Circuit Breakers, Molded-Case Switches and Circuit-Breaker Enclosures

UL 489A-2008 (R2013), Standard for Safety for Circuit Breakers for Use in Communications Equipment
The requirements of this standard cover single pole or multi-pole DC rated circuit breakers intended for use as branch circuit overcurrent and short-circuit protection in communications equipment. All poles of multi-pole circuit breakers covered by this standard operate at the same potential. The requirements of this standard cover devices rated 600 volts DC or less. This standard is intended to be used with the Standard for Molded-Case Circuit Breakers, Molded-Case Switches and Circuit-Breaker Enclosures, UL 489, as the requirements of this standard modify tests described in that standard.

UL 489B-2016, Standard for Safety for Molded-Case Circuit Breakers, Molded-Case Switches, and Circuit-Breaker Enclosures For Use With Photovoltaic (PV) Systems

UL 489B-2016a, Standard for Safety for Molded-Case Circuit Breakers, Molded-Case Switches, and Circuit-Breaker Enclosures For Use With Photovoltaic (PV) Systems

UL 493-2012 (R2016), Standard for Safety for Thermoplastic-Insulated Underground Feeder, and Branch-Circuit Cables (Proposal dated 8/26/16)
These requirements cover 14 - 4/0 AWG single-conductor PVC-insulated and -jacketed underground feeder and branch-circuit cable and flat multiple-conductor PVC-jacketed underground feeder and branch-circuit cables containing two or three 14 - 6 AWG PVC-insulated circuit conductors with or without a grounding conductor. These Type UF cables are intended for use in accordance with Article 340 and other applicable parts of the National Electrical Code, ANSI/NFPA-70 in wiring systems operating at a potential of 600 V or less.

UL 496-2013, Standard for Safety for Lampholders
The following changes in requirements to the Standard for Lampholders, UL 496, are being proposed: 1. Add peak voltage requirement equal to pulse rating for test potential of lampholders made of inorganic material 2. Clarify RTI temperature marking to avoid interference with IEC T-marking 3. Revision to the scope of the standard to clarify that outlet-box lampholders with shades are not covered 4. Addion of ratings for GU24 lampholders 5. Addition of test method for Switched GU24 Lampholders

UL 496-2013a, Standard for Safety for Lampholders

UL 496-2013b, Standard for Safety for Lampholders
The following topics for the Standard for Lampholders, UL 496, are being recirculated: 1. Add peak voltage requirement equal to pulse rating for test potential of lampholders made of inorganic material 3. Revision to the scope of the standard to clarify that outlet-box lampholders with shades are not covered 6. Revision of mold stress-relief test method to address temperature rated fluorescent lampholders
UL 497-2004 (R2013), Standard for Safety for Protectors for Paired-Conductor Communications Circuits
UL 497 covers protectors for paired-conductor communications circuits to be used in accordance with Article 800 of the National Electrical Code, NFPA 70. A communications circuit protector consists of single- and multiple-pair air gap arresters, gas tube arresters, or solid state arresters, with or without fuses or other voltage-limiting devices. A circuit protector is intended to protect equipment, wiring, and personnel against the effects of excessive potentials and currents in telephone lines caused by lightning, contacts with power conductors, power induction, and rises in ground potential.

UL 497A-2004 (R2017), Standard for Safety for Secondary Protectors for Communications Circuits
Covers the third edition of UL 497A, secondary protectors for use in single- or multiple-pair-type communications circuits that are intended to be installed in accordance with Article 800 of the National Electrical Code, ANSI/NFPA 70.

UL 497B-2004 (R2017), Standard for Safety for Protectors for Data Communications and Fire Alarm Circuits
Covers the fourth edition of UL 497B, protectors for data communications and fire-alarm circuits.

UL 497C-2004 (R2017), Standard for Safety for Protectors for Coaxial Communications Circuits
Covers the second edition of UL 497C, protectors for use on coaxial cable circuits to be used in accordance with the applicable requirements of the National Electrical Code, NFPA 70.

This proposal includes: (1)Revision to SG4.3 use of nonmetallic sheathed interconnect devices (2) New Supplement SH - Magnetically Coupled Cord Connector and Inlet

This proposal includes: 1. Addition of insertion testing for 5-15R and 5-20R normal household receptacles 2. Receptacles identified for use with 75° C Insulated Conductors 3. Editorial correction to specify the pin material for test pin B of the grounding contact test

UL 498-2016b, Standard for Safety for Attachment Plugs and Receptacles (Proposal dated 04/08/16)
The following changes are being recirculated: Proposed changes to Attachment Plugs and Receptacles: 1. Additional exemption added to address Horsepower Overload Testing for specific configurations. 2. Supplement SG, Use of Nonmetallic Sheathed Cable Interconnects

UL 498-2016c, Standard for Safety for Attachment Plugs and Receptacles
1. Revision to paragraph 15.3.6 to reference UL 1681.

UL 498-2017, Standard for Safety for Attachment Plugs and Receptacles
This proposal is for the identification of Horsepower ratings for ANSI/NEMA Configurations L25-30R and L26-30R in Tables 115.2 and 183.2 of UL 498.

UL 498-2017a, Standard for Safety for Attachment Plugs and Receptacles
This is a revised version of the proposal for the identification of Horsepower ratings for ANSI/NEMA Configurations L25-30R and L26-30R in Tables 115.2 and 183.2 that was published by UL on December 2, 2016.

This proposal includes the following revisions: (1)Addition of requirements for child-appealing or toy-like features (2)Addition of requirements to address the perimeter of a current tap enclosure to prevent single-pole insertion.

This recirculation provides revisions to the proposal dated 11-27-2015.

UL 498C-2017, Standard for Safety for Appliance and Flatiron Plugs
UL 498C covers flatiron and appliance plugs intended for use on cord-connected portable cooking or heating appliances rated up to 20 A, 250 Volts or less, intended for use in ordinary non-hazardous locations - all intended for connection to a branch circuit for use in accordance with the National Electrical Code, NFPA 70 and the Canadian Electrical Code, Part I, CSA C22.1-15.

UL 499-2017, Standard for Safety for Electric Heating Appliances
1. Proposal to Revise Requirements for Steam Generators

UL 5-2016, Standard for Safety for Surface Metal Raceways and Fittings
Document dated 4-1-16 proposes revisions to installation instructions allowing an option to access a manufacturer’s website for the information.

UL 50-2015, Standard for Safety for Enclosures for Electrical Equipment, Non-Environmental Considerations
UL proposes a new edition of UL 50.

UL 506-2008 (R2012), Standard for Safety for Specialty Transformers
These requirements cover ignition transformers for use with gas burners and oil burners and specialty step-up transformers used in applications such as insect electrocuting. Transformers incorporating overcurrent or over-temperature protective devices, transient voltage surge protectors, or power factor correction capacitors are also covered by these requirements. These transformers are intended to be used in accordance with the National Electrical Code, NFPA 70.

UL 508-2013, Standard for Safety for Industrial Control Equipment
Covers revisions to the following topics based on comments received: (a) Equipment door opening 90 degrees from the closed position (b) Field wiring terminals marking

UL 508S-1-2013, Standard for Safety for Low Voltage Transformers - Part 1: General Requirements
Addition of Requirements for Double Insulation

UL 508S-2-2012, Standard for Safety for Low Voltage Transformers - Part 2: General Purpose Transformers

UL 508S-3-2012, Standard for Safety for Low Voltage Transformers - Part 3: Class 2 and Class 3 Transformers

UL 508C-2016, Standard for Safety for Power Conversion Equipment
Covers: (1) Addition of requirements for modular drive systems; (2) Modification of short-circuit testing requirements; (3) Clarification of control circuit transformer protection requirements; (4) Revision of ratings for capacitors in AC circuits; (5) Revision of marking and instruction requirements to use appropriate signal words; (6) Revision of frequency requirements for dielectric voltage withstand testing; (7) Revision of breakdown of components testing in secondary circuits; and (8) Revision of Table 63.1 to include marking requirements in 56.6 and 56.7.
UL 508C-2016a, Standard for Safety for Power Conversion Equipment
Revisions to the proposed requirements for Modular Drive Systems as the result of comments received.

UL 508C-2016b, Standard for Safety for Power Conversion Equipment
Covers: (a) Slash and Straight Voltage Ratings for Drives with a 3-Phase Input; (b) Clarification of the test sample for the single phasing test as per Table 39.1; (c) Revision to the conductor temperature limit during the Temperature Test; (d) Revision to the temperature recording intervals during the Temperature Test; (e) Addition of a time limit for the Breakdown of Components Test; (f) Revision of 56.7 to align with requirements in NFPA 70; (g) Revisions to Plenum Rated Drives

UL 50E-2015, Standard for Safety for Enclosures for Electrical Equipment, Environmental Considerations
UL proposes a new edition of UL 50E.

UL 51-2015, Standard for Safety for Power-Operated Pumps and Bypass Valves for Anhydrous Ammonia, LP-Gas, and Propylene
(Project) proposed 1-16-15
Pressure Marking, Proposed Change to 25.2

UL 51A-2015, Standard for Safety for Metallic Outlet Boxes
4. Revision to the Type of Vibrator Referenced for Testing in Clause 12.18.7

UL 51A-2015a, Standard for Safety for Metallic Outlet Boxes
1. Clarification for the Evaluation of Covers. 2. Clarification of the Term & #178;Cross-Sectional Area& #178; of Conduit Bodies. 3. Clarification of Conduit Bodies, including New and Deleted Requirements. 4. Revision to the Type of Vibrator Referenced for Testing in Clause 12.18.7 . 5. Correction of a Dimension in Clause 13.11

UL 51B-2012a, Standard for Safety for Conduit, Tubing, and Cable Fittings
(1) Proposed Sixth Edition: Modifications to clauses 7.18.2 and 8.33.1.1 after consideration of comments; (2) Proposed changes to clause 8.3.1 to specify smaller range of sheet metal thicknesses for snap-in type fittings.

UL 51B-2014, Standard for Safety for Conduit, Tubing and Cable Fittings
1. Proposed Revision And Addition Of Requirements Specific To Conduit Bodies To Distinguish Between Requirements Applicable To Conduit Bodies For Use With Rigid PVC Conduit And Requirements Applicable To Conduit Bodies For Use With Rigid Metal Conduit, Electrical Metallic Tubing and Intermediate Metal Conduit 2. Proposed Revision And Addition Of Construction And Marking Requirements Specific To The Dimensional Criteria For Conduit Bodies To Align With Changes To The 2014 National Electrical Code 3. Proposed Revision Of Requirements For Conduit Bodies To Clarify That The Cross-Sectional Area Of A Conduit Body Is Internal To The Body 4. Proposed Revision And Deletion Of Requirements For Thread Count For The Connection Of Conduit As A Result Of The Introduction Of Thread Gaging Requirements 5. Proposed Addition And Revision Of Construction And Test Requirements To Clarify Existing Requirements Specific To Reducing Washers For Use In Wet Locations or Liquid-Tight Applications 6. Proposed Addition Of Clause 5.19.4 To Clarify Construction And Test Requirements For Sealing-Type Conduit Locknuts For Use In Wet Locations Or Liquid-Tight Applications 7. Proposed Addition Of Construction And Test Requirements Applicable To Sealing Rings 8. Proposed Addition Of Requirements To Specify Tools Required For The Assembly Of Fitting Samples To Be Tested 9. Proposed Revision To Clause 8.5.3 To Allow The Use Of Memineralized Water As A Substitute For Distilled Water For The Metallic Coating Thickness Test 10. Proposed Revision To Clause 8.5.4 To Align The Test Method For The Metallic Coatings Thickness Test With Similar Tests In Other UL Standards 11. Proposed Revision To Clause 8.7.4 To Align The Test Method For The Use of Mating Threads For Conduit

UL 51C-2014, Standard for Safety for Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers
1. Clarification of the Use of Nonmetallic Material in the Ground Path. 2. Revision to the Minimum RTI Requirement for Box Extenders. 3. Correction of UL 5148 Clause Reference Regarding Nonmetallic Cable Clamps. 4. Clarification of the Requirements to Evaluate the Combination of Receptacle and Cover as an Assembly. 5. Clarification of the Cross Sectional Area of Conduit Bodies.

UL 51C-2014a, Standard for Safety for Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers
2. Revision to the Minimum RTI Requirement for Box Extenders. 4. Clarification of the Requirements to Evaluate the Combination of Receptacle and Cover as an Assembly.

UL 51C-2014c, Standard for Safety for Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers
1. Clarification of the Use of Sealing Compound for Damming Scrub-Water Solution When Conducting Scrub-Water Exclusion Test. 2. Correlation of RTI Requirements for Polymeric Box Extenders. 3. Revisions to Section S3, Resistance to Ultraviolet Light and Water, by Adding an Option for Xenon-Arc Method. 4. Revisions to Improve the Correlation of Fixture/Luminaire and Ceiling Suspended Fan Support Requirements Between UL 514C and the Standard for Metallic Outlet Boxes, UL 51A. 5. Revisions to Improve the Correlation of Floor Box Requirements Between UL 514C and the Standard for Metallic Outlet Boxes, UL 51A.

UL 51C-2014d, Standard for Safety for Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers
1. Clarification of the Use of Sealing Compound for Damming Scrub-Water Solution When Conducting Scrub-Water Exclusion Test. 4. Revisions to Improve the Correlation of Fixture/Luminaire and Ceiling Suspended Fan Support Requirements Between UL 514C and the Standard for Metallic Outlet Boxes, UL 51A. 5. Revisions to Improve the Correlation of Floor Box Requirements Between UL 514C and the Standard for Metallic Outlet Boxes, UL 51A.

UL 51D-2016, Standard for Safety for Cover Plates for Flush-Mounted Wiring Devices
1. Proposed Revision And Addition Of Requirements To Clarify Requirements Applicable To Outlet Box Hood Types Of Other Than The Extra-Duty Type 2. Proposed Addition Of Resistance To Ignition Test Requirements To Clarify That The Test Sample May Be A Finished Cover Plate Or Plate Material 3. Proposed Revision Of The Tables In Clause 8.1.1 And Clause 8.1.2 To Clarify Resistance To Moisture Test Requirements Applicable To Cover Plates And Various Types Of Outlet Box Hoods 4. Proposed Revisions To Clarify That Cover Plates Are To Be Hinged To Outlet Box Hoods During The Cold Impact Test 5. Proposed Addition Of Requirements To Exempt Outlet Box Hood With Very Low-Profile After Installation From The Impact Resistance Test 6. Proposed Addition To The Hinge Stress Test Requirements To Clarify That The Specimen Orientation Specified For The Test Applies For The Test Only And Not To The Installation Orientation Specified By The Manufacturer 7. Proposed Revision To Clause 5.3.8 To Clarify All Requirement Applicable To Outlet Box Hoods Marked

UL 521-2016, Standard for Safety for Heat Detectors for Fire Protective Signaling Systems
Proposal dated 8-26-2016 adds an alternative symbol for the “Do Not Paint” marking referenced in paragraph 53.1 and additionally updates the titles of ASTM standards referenced throughout the document

UL 525-2008 (R2012), Standard for Safety for Flame Arresters (Proposal bulletin dated 05-25-12)
UL 539-2017, Standard for Safety for Single and Multiple Station Heat Alarms

Document dated 9-30-2016 proposes revisions to the oven test in section 24 and proposes a new Rate-of-Rise Operation Test for the standard.

UL 539-2017a, Standard for Safety for Single and Multiple Station Heat Alarms

1. Alternative Paintbrush Marking for “Do Not Paint” Requirement

UL 541-2016, Refrigerated Vending Machines

1. Proposed Addition And Revision Of Requirements To Provide An Alternate Method of Evaluating Protective Electronic Circuits And Controls 2. Proposed Addition and Revisions Of Requirements To Clarify Requirements And To Allow For An Alternate Compliance Method For Testing Vending Machines Having A Flammable Refrigerant 3. Proposed Revisions To And Addition Of Requirements To Address Vending Machines With Remote Operation Or Monitoring Functionality

UL 542-2005 (R2014), Standard for Safety for Fluorescent Lamp Starters

The following is being proposed: 1. Reaffirmation and Continuance of the Ninth Edition of the Standard for Fluorescent Lamp Starters, UL 542, as an American National Standard

UL 551-2009 (R2013), Standard for Safety for Transformer-Type Arc-Welding Machines


UL 555-2016, Standard for Safety for Fire Dampers (Proposal dated 08-19-16)

The following changes in requirements to the Standard for Fire Dampers, UL 555, are being proposed: 1. The Long Term Holding Test 2. Temperature range expansion for Dynamic Closure Test

UL 555S-2016, Standard for Safety for Smoke Dampers (Proposal Dated 08-19-16)

The following changes in requirements to the Standard for Smoke Dampers, UL 555S, are being proposed: 1. Alignment between UL 555 group of standards

UL 558-2016, Standard for Safety for Industrial Trucks, Internal Combustion Engine-Powered (Proposal dated 8-19-16)

This proposal includes (1) Wiring and cable exposure to fuel drippage (2) Overcurrent protection devices (3) Electrical system protection (4) Sparking component enclosure requirement (5) Manual disconnect switch

UL 558-2016a, Standard for Safety for Industrial Trucks, Internal Combustion Engine-Powered (Proposal dated 10-28-16)

This Recirculation proposal provides revisions to the UL 558 proposal dated 2016-08-19.

UL 561-2011, Standard for Safety for Floor-Finishing Machines (Proposal dated 5/13/11)

Adds component requirements to the body of the standard and incorporates specific component requirements that are being applied within the end product requirements.

UL 561-2011a, Standard for Safety for Floor-Finishing Machines (Proposal dated 9/16/11)

Recommended Failure Rate, Revised 16A.4.3

UL 563-2017, Standard for Ice Makers

Proposal to add a reference to UL 60335-1 based requirements for the evaluation of electronic circuits.

UL 565-2013, Standard for Safety for Liquid-Level Gauges for Anhydrous Ammonia and LP-Gas (Proposal dated 7-26-13)

Changes to the proposed sixth edition of UL 565

UL 567-2014, Standard for Safety for Emergency Breakaway Fittings, Swivel Connectors and Pipe-Connection Fittings for Petroleum Products and LP-Gas

UL proposes to clarify and revise the Moist Ammonia-Air Stress Cracking Test.

UL 567A-2015, Standard for Safety for Emergency Breakaway Fittings, Swivel Connectors and Pipe-Connection Fittings for Gasoline and Gasoline/Ethanol Blends with Nominal Ethanol Concentrations up to 85 Percent (E0 - E85)

These requirements cover emergency breakaway fittings, swivel connectors and pipe-connection fittings of the threadless compression type for gasoline and gasoline/ethanol blends with nominal ethanol concentrations up to 85 percent (E0 - E85).

UL 567A-2015a, Standard for Safety for Emergency Breakaway Fittings, Swivel Connectors and Pipe-Connection Fittings for Gasoline and Gasoline/Ethanol Blends with Nominal Ethanol Concentrations up to 85 Percent (E0 - E85)

This proposal covers the following topics: 1) Relocation of paragraph 9.1 to the Scope section and 2) Revised Moist Ammonia Air Stress Cracking Test.

UL 567B-2015, Standard for Safety for Emergency Breakaway Fittings, Swivel Connectors and Pipe-Connection Fittings for Diesel Fuel, Biodiesel Fuel, Diesel/Biodiesel Blends with Nominal Biodiesel Concentrations up to 20 Percent (B20), Kerosene, and Fuel Oil

These requirements cover emergency breakaway fittings, swivel connectors and pipe-connection fittings of the threadless compression type for diesel fuel, biodiesel fuel, diesel/biodiesel blends with nominal biodiesel concentrations up to 20 percent (B20), kerosene, and fuel oil.

UL 568-2016, Standard for Safety for Emergency Breakaway Fittings, Swivel Connectors and Pipe-Connection Fittings for Diesel Fuel, Biodiesel Fuel, Diesel/Biodiesel Blends with Nominal Biodiesel Concentrations up to 20 Percent (B20), Kerosene, and Fuel Oil

This proposal covers the following topics: 1) Relocation of paragraph 9.1 to the Scope section and 2) Revised Moist Ammonia Air Stress Cracking Test.

UL 568-2004 (R2014), Standard for Safety for Nonmetallic Cable Tray Systems

Reaffirmation of current ANSI which covers requirements for nonmetallic cable trays and associated fittings designed for use in accordance with the rules of the Canadian Electrical Code (CEC) Part 1, and the National Electrical Code#174; (NEC).

UL 569-2013, Standard for Safety for Pigtails and Flexible Hose Connectors for LP-Gas

1. Revision to Section 14 - Bending Test - Metallic Tubing; 2. Revision to Section 15 - Bending Test - Hose

UL 574-2014, Standard for Safety for Electric Oil Heaters (Proposals Dated 2/7/14)


UL 583-2016, Standard for Safety for Electric-Battery-Powered Industrial Trucks

UL proposes the following changes to UL 583: removal of 150 volt statement in 1.4, addition of new battery cable requirements, addition of UL 2271 to Section 15.2, and exception of 17.1.2.

UL 583-2016a, Standard for Safety for Electric-Battery-Powered Industrial Trucks (Proposal dated 7-15-16)

This proposal includes (1) Removal of marking requirements for supplying an electrical schematic with the truck (2) LVLE qualification of a regulating network (3) Revision to grounding of a truck (4) Revision to allow generators under motors and electromechanical brakes (5) Revision to dielectric voltage withstand to allow multiple energy sources on trucks (6) Revision to define the power source for Type EE trucks

UL 583-2016b, Standard for Safety for Electric-Battery-Powered Industrial Trucks (Proposal dated 9-30-16)

This Recirculation proposal provides revisions to the UL 583 proposal dated 2016-07-15.

UL 586-2009 (R2014), Standard for Safety for High-Efficiency, Particulate, Air Filter Units

The following is being proposed: Reaffirmation of the Ninth Edition of the Standard for High-Efficiency, Particulate, Air Filter Units
UL 588-2015, Standard for Safety for Seasonal and Holiday Decorative Products
This covers: 1) Revision of decorative outfit product accessory length; and 2) Addition of CXTW-S

UL 588-2015a, Standard for Safety for Seasonal and Holiday Decorative Products
This covers revisions to the scope of the standard and revisions to the requirements for Class 2 power supplies

UL 588-2015b, Standard for Safety for Seasonal and Holiday Decorative Products
Revises the following proposals as the result of comments received: Miscellaneous Revisions and Revision to Amenity of Cords; 2) Revision to Requirements of Tree Poles Employing Seasonal Use Extension Cords; and 3) Revised Requirements for Parallel-Connected Lighting Strings

UL 588-2015c, Standard for Safety for Seasonal and Holiday Decorative Products
This covers: 1) Miscellaneous Revisions and Revision to Ampacity of Cords; 2) Revision to Requirements of Tree Poles Employing Seasonal Use Extension Cords; and 3) Revised Requirements for Parallel-Connected Lighting Strings

UL 588-2015d, Standard for Safety for Seasonal and Holiday Decorative Products
This covers revisions for motorized products employing 20 AWG SPT-2W.

UL SA-2015, Standard for Safety for Nonmetallic Surface Raceways and Fittings
Proposed Fourth Edition of the Standard for Nonmetallic Surface Raceways and Fittings, UL SA

UL SA-2015a, Standard for Safety for Nonmetallic Surface Raceways and Fittings
Upon review of comments responding to UL's original proposal dated 9-26-14, UL is recirculating revised changes (dated 1-16-15) to the proposed Fourth Edition of UL SA.

UL SA-2015b, Standard for Safety for Nonmetallic Surface Raceways and Fittings
Upon review of comments responding to UL's recirculation on 1-16-15, UL is recirculating a change (dated 3-27-15) to the proposed Fourth Edition of UL SA.

UL SB-2014, Standard for Safety for Strut-Type Channel Raceways and Fittings
Addition of Xenon-arc Conditioning as an Option to Carbon-arc

UL SC-2016, Standard for Safety for Surface Metal Raceways and Fittings for Use with Data, Signal, and Control Circuits
Proposes revisions to installation instructions and external standards references.

UL 6-2014, Standard for Safety for Electrical Rigid Metal Conduit - Steel
Document (dated 3-28-2014) proposes marking limitations on small trade size elbows and nipples

UL 60034-1-2016, Standard for Safety for Rotating Electrical Machines - Part 1: Rating and Performance
UL proposes to adopt the requirements of IEC 60034-1, which covers rating and performance criteria applicable to all rotating electrical machines.

UL 60034-1-2016, Standard for Safety for Rotating Electrical Machines - Part 1: Rating and Performance
UL proposes to adopt the requirements of IEC 60034-1, which covers rating and performance criteria applicable to all rotating electrical machines.

UL proposes the identical adoption of IEC 60034-2-1:2014 (2nd Edition), the Standard for Rotating electrical machines - Part 2-1: Standard methods for determining losses and efficiency from tests (excluding machines for traction vehicles), as UL 60034-2-1. This part of IEC 60034 is intended to establish methods of determining efficiencies from tests, and also to specify methods of obtaining specific losses. This standard applies to d.c. machines and to a.c. synchronous and induction machines of all sizes within the scope of IEC 60034-1.

UL 60065-2015, Standard for Safety for Audio, Video and Similar Electronic Apparatus - Safety Requirements

UL 60065-2015a, Standard for Safety for Audio, Video and Similar Electronic Apparatus - Safety Requirements
The proposed eighth edition of the Standard for Audio, Video and Similar Electronic Apparatus - Safety Requirements, UL 60065. This new edition is based on the Eighth Edition of IEC 60065. Technical changes to the IEC Standard have been incorporated into the new edition of the UL Standard. National Differences from the Seventh Edition of UL 60065 were reviewed and updated in the new edition.

This proposal incorporates technical and editorial revisions that address the ISA and UL comments received during the preliminary review.

UL 60079-0-2013, Standard for Safety for Explosive Atmospheres - Part 0: Equipment - General Requirements
This recirculation proposal provides revisions to the bulletin dated May 11, 2012 for the PNE of UL 60079-0 based upon the comments received. This revision is a complete rewrite of text to coincide with the IEC text and contains US deviations.

This proposal provides revisions to the proposal document dated January 23, 2015 for the Adoption of IEC 60079-1, Explosive Atmospheres - Part 1: Equipment Protection by Flameproof Enclosures "d" (7th ed, issued by IEC June 2014) as a new IEC-based UL standard, UL 60079-1 to applicable requirements per accepted comments received.

UL 60079-11-2014, Standard for Safety for Explosive Atmospheres - Part 11: Equipment Protection by Intrinsic Safety "i" (Proposal Ballot dated 08-16-13)
This bulletin proposes revisions to update ANSI/UL 248-1 references and clarification for Figure 2

UL 60079-11-2014a, Standard for Safety for Explosive Atmospheres - Part 11: Equipment Protection by Intrinsic Safety "i" (Proposal Ballot dated 01-24-14)
This bulletin proposes revisions to clause 7.3 for non-intrinsically safe circuit connections of galvanically separating components

UL 60079-15-2013 (R2017), Standard for Safety for Explosive Atmospheres - Part 15: Equipment Protection by Type of Protection "n" (Proposal dated 03-03-17)

UL 60079-17-2017, Standard for Safety for Explosive Atmospheres - Part 17: Electrical Installations Inspection and Maintenance (Proposal dated 02-17-17)
This proposal provides revisions to the proposal document dated July 25, 2016 for the Adoption of IEC 60079-17, Explosive Atmospheres - Part 17: Electrical Installations Inspection and Maintenance (fifth edition, issued by IEC November 2013) as a new IEC-based UL standard, UL 60079-17 to the applicable requirements per comments received.

UL 60079-17-2017a, Standard for Safety for Explosive Atmospheres - Part 17: Electrical Installations Inspection and Maintenance (Proposal dated 02-17-17)
This proposal provides revisions to the proposal document dated July 25, 2016 for the Adoption of IEC 60079-17, Explosive Atmospheres - Part 17: Electrical Installations Inspection and Maintenance (fifth edition, issued by IEC November 2013) as a new IEC-based UL standard, UL 60079-17 to the applicable requirements per comments received.


UL 60079-18-2016a, Standard for Safety for Explosive Atmospheres - Part 18: Equipment Protection by Encapsulation "m" (Proposal dated 01-29-16)

This proposal includes a revision for 10 e) to align with the tests specified in 8.2.2 and correct the conflict with the NEC.


This proposal includes a revision for 10 e) to include the appropriate US terms for EPLs.

UL 60079-2-2010 (R2015), Standard for Safety for Explosive Atmospheres - Part 2: Equipment Protection by Pressurized Enclosures "p"

Reaffirmation and Continuance of the Standard for Explosive Atmospheres - Part 2: Equipment Protection by Pressurized Enclosures "p"


This proposal provides revisions to the proposal document dated December 16, 2016 for the Adoption of IEC 60079-2, Explosive Atmospheres - Part 2: Equipment Protection by Pressurized Enclosure "p", (sixth edition, issued by IEC July 2014) as a new UL IEC-based UL standard, UL 60079-2 to the applicable requirements per comments received.


Reaffirmation and Continuance of the Standard for Explosive Atmospheres - Part 25: Intrinsically Safe Electrical Systems


This proposal provides revisions to the proposal document dated August 19, 2016 for the Adoption of IEC 60079-26, Explosive Atmospheres - Part 26: Equipment with Equipment Protection Level (EPL) Ga (third edition issued by IEC October 2014) as a new IEC-based UL standard, UL 60079-26 to the applicable requirements per comments received.


UL 60079-31-2015a, Standard for Safety for Explosive Atmospheres - Part 31: Equipment Dust Ignition Protection by Enclosure "t" (Proposal dated 04-03-15)

This proposal provides revisions to the proposal document dated January 23, 2015 for the Adoption of IEC 60079-31, Explosive Atmospheres - Part 31: Equipment Dust Ignition Protection by Enclosure "t" (second edition, issued by IEC November 2011) as a new IEC-based UL standard, UL 60079-31 to applicable requirements per comments received.

UL 60079-5-2016, Standard for Safety for Explosive Atmospheres - Part 5: Equipment Protection by Powder Filling "q" (Proposal dated 01-29-16)


UL 60079-6-2016, Standard for Safety for Explosive Atmospheres - Part 6: Equipment Protection by Liquid Immersion "o" (Proposal dated 01-29-16)


UL 60079-7-2008 (R2013), Standard for Safety for Explosive Atmospheres - Part 7: Equipment Protection by Increased Safety "e"


UL 60079-7-2017, Standard for Safety for Explosive Atmospheres - Part 7: Equipment Protection by Increased Safety "e" (Proposal dated 06-03-16)


UL 60079-7-2017a, Standard for Safety for Explosive Atmospheres - Part 7: Equipment Protection by Increased Safety "e" (Proposal dated 12-16-16)

This proposal provides revisions to the proposal document dated June 3, 2016 for the Adoption of IEC 60079-7, Explosive Atmospheres - Part 7: Equipment Protection by Increased Safety "e" (fifth ed, issued by IEC June 2015) as a new IEC-based UL standard, UL 60079-7 to the applicable requirements per comments received.

UL 603-2013, Standard for Safety for Power Supplies for Use with Burglar-Alarm Systems

Modification of Table 26.1 to add Access Control System Units

UL 60320-1-2011 (R2015), Standard for Appliance Couplers for Household and Similar General Purposes - Part 1: General Requirements


UL 60335-1-2016a, Standard for Safety of Household and Similar Electrical Appliances, Part 1: General Requirements


UL 60335-2-24-2017a, Household and Similar Electrical Appliances, Part 2: Particular Requirements for Refrigerating Appliances, Ice-Cream Appliances and Ice-Makers


UL 60335-2-3-2016, Standard for Household and Similar Electrical Appliances, Part 2: Particular Requirements for Electric Irons


UL 60335-2-34-2013, Standard for Safety for for Household and Similar Electrical Appliances, Part 2: Particular Requirements for Motor-Compressors

Document (dated 9-7-2012) is proposing the Fifth Edition of UL 60335-2-34, a trinational IEC-based standard covering motor compressor requirements harmonized for Canada, Mexico, and the U.S. The standard will be aligned with IEC 60335-2-34, Fourth Edition, Amendment 2


In recent years, millions of dehumidifiers have been recalled due to a potential fire hazard. The industry has determined that the cause of the overwhelming majority of the dehumidifier fires is due to loss of charge in combination with small unventilated polymeric compressor enclosures. Therefore, UL is proposing to add these requirements.

UL 60335-2-40-2017a, Household and Similar Electrical Appliances, Part 2: Particular Requirements for Electrical Heat Pumps, Air-Conditioners and Dehumidifiers

In recent years, millions of dehumidifiers have been recalled due to a potential fire hazard. The industry has determined that the cause of the overwhelming majority of the dehumidifier fires is due to loss of charge in combination with small unventilated polymeric compressor enclosures. Therefore, UL is proposing to add these requirements.

UL 60335-2-79-2016, Standard for Safety for Household and Similar Electrical Appliances, Part 2: Particular Requirements for High Pressure Cleaners (proposal dated 9-4-15)


UL 60335-2-8-2012, Safety for Household and Similar Electrical Appliances, Part 2: Particular Requirements

1. Revision of the IEC text to incorporate amendment 2 of IEC 60335-2-8 issued September 2008 and revision to minimize the number of national differences and more closely align with the IEC standard.

UL 60335-2-8-2012a, Standard for Safety for Household and Similar Electrical Appliances, Part 2: Particular Requirements for Shavers, Hair Clippers, and Similar Appliances

1. Revision of the IEC text to incorporate amendment 2 of IEC 60335-2-8 issued September 2008 and revision to minimize the number of national differences and more closely align with the IEC standard.


1. Removal of Figure 9D lowes modification.

UL 60691-2016, Standard for Safety for Thermal-Links - Requirements and Application Guide

The following changes in requirements to the Standard for Thermal-Links - Requirements and Application Guide, UL 60691, are being proposed: 1. ANSI Approval of the Fourth Edition of UL 60691

UL 60730-1-2016, Automatic Electrical Controls, Part 1: General Requirements

Adopt the fifth edition of IEC 60730-1 as the fifth edition of UL 60730-1.

UL 60730-2-10-2013, Automatic Electrical Controls for Household and Similar Use; Part 2: Particular Requirements for Motor Starting Relays

This part of IEC 60730 applies to controls for automatically controlling the starting windings of single phase motors associated with equipment for household and similar use. This standard applies to motor-starting relays using NTC or PTC thermistors, additional requirements for which are contained in Annex I. This standard also covers centrifugal switches intended to be integrated into motors. Such devices are tested with the intended motor as an integrated control.

UL 60730-2-11-2013, Automatic Electrical Controls for Household and Similar Use; Part 2: Particular Requirements for Energy Regulators

In general, this part of IEC 60730 applies to energy regulators for use in, on, or in association with equipment for household and similar use, including energy regulators for heating, air conditioning and similar applications. The equipment may use electricity, gas, oil, solid fuel, solar thermal energy, etc. or a combination thereof. This standard applies to the inherent safety, to the operating values, operating times and operating sequence where such are associated with equipment safety, and to the testing of automatic electrical energy regulator devices used in, or in association with, household or similar equipment.

UL 60730-2-12-2014, Automatic Electrical Controls for Household and Similar Use; Part 2: Particular Requirements for Electrically Operated Door Locks

In general, this part of IEC 60730 applies to electrically operated door locks intended to prevent the opening of doors in equipment for household and similar use. This standard applies to the inherent safety, to the operating values, operating sequences where such are associated with equipment protection, and to the testing of door locks used in, or in association with, household and similar equipment.

UL 60730-2-12-2017, Standard for Automatic Electrical Controls - Part 2-12: Particular Requirements for Electrically Operated Door Locks

The IEC published the third edition of IEC 60730-2-12 in April 2015. Therefore, UL is proposing the third edition of UL 60730-2-12.


This part of IEC 60730 applies to automatic electrical humidity sensing controls for use in, on or in association with equipment for household and similar use, including controls for heating, air-conditioning and similar applications. The equipment may use electricity, gas, oil, solid fuel, solar thermal energy, etc. or a combination thereof. This standard applies to automatic electrical controls, mechanically or electrically operated, responsive to or controlling humidity.
UL 60730-2-14-2013 (R2017), Standard for Automatic Electrical Controls; Part 2: Particular Requirements for Electric Actuators

This part of IEC 60730 applies to electric actuators for use in, on, or in association with equipment for household and similar use for heating, air-conditioning and ventilation. The equipment may use electricity, gas, oil, solid fuel, solar thermal energy, etc., or a combination thereof. This part 2 applies to electric actuators using NTC or PTC thermistors, additional requirements for which are contained in annex J.

UL 60730-2-15-2014, Standard for Automatic electrical controls for household and similar use - Part 2-15: Particular requirements for automatic electrical air flow, water flow and water level sensing controls

This standard covers automatic electrical air flow, water flow and water level sensing controls for use in, or in association with, boilers with a maximum pressure rating of 2 000 kPa (20 bar) and equipment for general household and similar use including controls for heating, air-conditioning and similar applications. Examples are water flow and water level sensing controls of the float or electrode-sensor type used in boiler applications and air flow, water flow and water level sensing controls for swimming pool pumps, water tank pumps, cooling towers, dishwashers, washing machines, air conditioning chillers and ventilation applications.

UL 60730-2-2-2014, Standard for Automatic Electrical Controls for Household and Similar Use; Part 2: Particular Requirements for Thermal Motor Protectors

This proposal revises the requirements covering the endurance test and adds deviation and drift requirements to provide a performance/reliability bench mark for thermal motor protectors when tested to the manufacturer’s declared electrical and thermal rating.


This part of IEC 60730 applies to the partial evaluation of thermal motor protectors as defined in IEC 60730-1 for household and similar use, including heating, air conditioning and similar applications as well as for sealed (hermetic and semi-hermetic type) motor-compressors.

UL 60730-2-3-2013, Standard for Automatic Electrical Controls for Household and Similar Use; Part 2: Particular Requirements for Thermal Protectors For Ballasts For Tubular Fluorescent Lamps

This part of IEC 60730 applies to the evaluation of thermal protectors for ballasts for tubular fluorescent lamps. This standard applies to thermal protectors using NTC or PTC THERMISTORS, additional requirements for which are contained in Annex J. Requirements concerning the testing of the combination of ballast and thermal protector are given in IEC 61347-1 and UL 935. This standard applies to the inherent safety, to the OPERATING VALUES, OPERATING TIMES, and OPERATING SEQUENCES where such are associated with equipment safety and to the testing of thermal protectors used to protect ballasts for tubular lamps from overheating.

UL 60730-2-5-2014, Standard for Safety for Automatic Electrical Controls for Household and Similar Use, Part 2: Particular Requirements for Automatic Electrical Burner Control Systems

Document (dated 2-1-2013) is proposing the Third Edition of UL 60730-2-5, a binational IEC-based standard covering electrical burner control system requirements harmonized for Canada and the U.S. The standard will be aligned with IEC 60730-2-5, Third Edition, Amendment 2

UL 60730-2-6-2016, Standard for Automatic Electrical Controls - Part 2-6: Particular Requirements for Automatic Electrical Pressure Sensing Controls Including Mechanical Requirements

The IEC published the third edition of IEC 60730-2-6 in April 2015. Therefore, UL is proposing the third edition of UL 60730-2-6.

UL 60730-2-7-2014, Standard for Automatic Electrical Controls for Household and Similar Use - Part 2-7: Particular Requirements for Timers and Time Switches

This part of IEC 60730 applies to TIMERS and TIME SWITCHES for household and similar use that may use electricity, gas, oil, solid fuel, solar thermal energy, etc., or a combination thereof, including heating, air conditioning and similar applications. This standard is also applicable to individual TIMERS utilized as part of a control system or TIMERS which are mechanically integral with multifunctional controls having non-electrical outputs. This standard does not apply to time-delay switches within the scope of IEC 60669-2-3. Devices which only indicate time or passage of time are not included.

UL 60730-2-8-2007 (R2012), Standard for Automatic Electrical Controls for Household and Similar Use - Part 2: Particular Requirements for Electrically Operated Water Valves, Including Mechanical Requirements

This part 2-8 applies to electrically operated WATER VALVES for use in, on or in association with equipment for household and similar use that may use electricity, gas, oil, solid fuel, solar thermal energy, etc., or a combination thereof, including heating, air-conditioning and similar applications. This part 2-8 is also applicable to electrically operated WATER VALVES for appliances within the scope of IEC 60335. These requirements do not cover VALVES for marine use. This part 2-8 contains requirements for electrical features of WATER VALVES and requirements for mechanical features of VALVES that affect their intended OPERATION.

UL 60730-2-8-2017, Automatic Electrical Controls for Household and Similar Use; Part 2: Particular Requirements for Electrically Operated Water Valves, Including Mechanical Requirements

The IEC issued edition 2.2 of IEC 60730-2-8 in November 2015. The previous UL edition was based on edition 2.1 of IEC 60730-2-8. Therefore, UL is proposing to adopt the revisions contained in the second amendment to edition No. 2 of IEC 60730-2-8.

UL 60730-2-9-2017, Automatic Electrical Controls - Part 2-9: Particular Requirements for Temperature Sensing Controls

This standard covers automatic electrical temperature sensing controls for use in, on or in association with equipment, including electrical controls for heating, air-conditioning and similar applications. The equipment may use electricity, gas, oil, solid fuel, solar thermal energy, etc., or a combination thereof.


1. Proposed Revision To Align The UL Version Of 60745-1, Figure 1 To The IEC Version Of 60745-1, Figure 1


UL 60745-2-12-2008 (R2013), Standard for Safety for Hand-Held Motor-Operated Electrical-Tools Safety - Part 2-12: Particular Requirements for Concrete Vibrators


1. Deletion of Clause 1DV, 2DV And Revision To Clause 8.1DV To Remove The Reference To CSA Z62.1 And Class 2C Chain Saws


The following changes are being recirculated: Proposed changes to Hand-Held Motor-Operated Electric Tools - Safety - Part 2-15: Particular Requirements for Hedge Trimmers: (1) New and revised requirements that address extended-reach hedge trimmers.


Proposed Revision Of Clause 19.103DV To Specify Requirements For Category 4 Hedge Trimmers


1. Addition Of National Difference Clauses To Specify Ratchet Drivers In The Scope Of The Standard And To Clarify Test Requirements As They Apply To Ratchet Drivers


1. Proposed Revision To Clause 8.1DV To Allow For The Use Of Alternative Marking For Cut-Off Machines With A Permanently Fixed Guard


1. Proposed Addition Of Clause 24.4DV.1 To Allow For The Use Of Lighter Duty Supply Cord For Rotary Tools

UL 60745-2-3-2013, Standard for Hand-Held Motor-Operated Electrical - Tools Safety - Part 2-3: Particular Requirements for Grinders, Polishers, and Disk-Type Sanders

1. Proposed Revisions To Align Amendments No. 1 And No. 2 For IEC 60745-2-3, Second Edition And Proposed National Differences To The IEC Text

UL 60745-2-4-2009 (R2014), Standard for Safety for Hand-Held Motor-Operated Electrical - Tools Safety - Part 2-4: Particular Requirements for Sanders and Polishers Other Than Disk Type


UL 60745-2-5-2012 (R2017), Standard for Safety for Hand-Held, Motor-Operated Electric Tools - Safety - Particular Requirements for Circular Saws


UL 60745-2-6-2009 (R2014), Hand-Held Motor-Operated Electric Tools - Safety - Part 2-6: Particular Requirements for Hammers


UL 608-2012 (R2017), Standard for Safety for Burglary Resistant Vault Doors and Modular Panels
UL proposes a reaffirmation for UL 608.

UL 609-2015, Standard for Safety for Local Burglar Alarm Units and Systems
Revision to minimum spacing requirements

UL 60939-3-2016, Standard for Safety for Passive filter units for electromagnetic interference suppression - Part 3: Passive filter units for which safety tests are appropriate (Proposal dated 5-6-16)
This proposal includes adoption of IEC 60939-3, Passive filter units for electromagnetic interference suppression - Part 3: Passive filter units for which safety tests are appropriate as a new IEC-based UL Standard, UL 60939-3 with US differences.

UL 60947-1-2013, Standard for Safety for Low-Voltage Switchgear and Controlgear - Part 1: General rules
This standard applies, when required by the relevant product standard, to switchgear and controlgear hereinafter referred to as "equipment" and intended to be connected to circuits, the rated voltage of which does not exceed 1 000 V a.c. or 1 500 V d.c. It does not apply to low-voltage switchgear and controlgear assemblies which are dealt with in IEC 60439.

UL 60947-4-1A-2014, Standard For Safety For Low-Voltage Switchgear and Controlgear - Part 4-1: Contactors and Motor-Starters - Electromechanical Contactors and Motor-Starters

UL 60947-4-2-2014, Standard for Safety for Low-Voltage Switchgear and Controlgear - Part 4-2: Contactors and Motor-Starters - AC Semiconductor Motor Controllers and Starters
Cover revisions to the previously proposed first edition based on comments received.

UL 60947-5-1-2014, Standard for Safety for Low-Voltage Switchgear and Controlgear - Part 5-1: Control Circuit Devices and Switching Elements - Electromechanical Control Circuit Devices
This covers revisions to the previously proposed standard based on comments received.

UL 60947-5-2-2014, Standard for Safety for Low-Voltage Switchgear and Controlgear - Part 5-2: Control Circuit Devices and Switching Elements - Proximity Switches
Applies to inductive and capacitive proximity switches that sense the presence of metallic and/or non-metallic objects, ultrasonic proximity switches that sense the presence of objects and/or non-mechanical magnetic proximity switches that sense the presence of objects with a magnetic field. These proximity switches are self-contained, have semiconductor switching elements(s), and are intended to be connected to circuits, the rated voltage of which does not exceed 250 V 50 Hz/60 Hz a.c. or 300 V d.c.

UL 60947-7-1-2017, Standard for Safety for Low-Voltage Switchgear And Controlgear - Part 7-1: Ancillary Equipment - Terminal Blocks for Copper Conductors
1. Revision to National Differences to the Standard for Low-Voltage Switchgear and Controlgear &ndash; Part 7-1: Ancillary Equipment &ndash; Terminal Blocks for Copper Conductors, UL 60947-7-1 to include Canada

UL 60947-7-2-2017, Standard for Safety for Low-Voltage Switchgear and Controlgear - Part 7-2: Ancillary Equipment - Protective Conductor Terminal Blocks for Copper Conductors
1. Revision to National Differences to the Standard for Low-Voltage Switchgear and Controlgear &ndash; Part 7-2: Ancillary Equipment - Protective Conductor Terminal Blocks for Copper Conductors, UL 60947-7-2 to include Canada

UL 60947-7-3-2017, Standard for Safety for Low-Voltage Switchgear and Controlgear - Part 7-3: Ancillary Equipment - Safety Requirements for Fuse Terminal Blocks
1. Revision to National Differences to the Standard for Low-Voltage Switchgear and Controlgear &ndash; Part 7-3: Ancillary Equipment - Safety Requirements for Fuse Terminal Blocks, UL 60947-7-3 to include Canada

Proposals to (1) align with Amendment 2 and Corrigendum 1 to IEC 60950-1; (2) Annexes P.1 and P.2 to address the editorial maintenance of the Standard and (3) update references based on the latest versions of the National Electrical Code (NEC) and the Canadian Electrical Code (CEC).


UL 60950-22-2011, Standard for Safety for Information Technology Equipment - Safety - Part 22: Equipment to be Installed Outdoors
(1) Proposed Addition of UL 50E and CAN/CSA C22.2 No. 94.2 as Alternative Component Standards and (2) Proposal to Update References Based on the Latest Versions of the National Electrical Code (NEC) and the Canadian Electrical Code (CEC)


UL 60950-23-2007 (R2016), Standard for Safety for Information Technology Equipment - Safety - Part 23: Large Data Storage Equipment
Reaffirmation and Continuance of the First Edition of the Standard for Information Technology Equipment - Safety - Part 23: Large Data Storage Equipment, UL 60950-23, as an American National Standard


This proposal includes revisions to 6.10.4, 11.6 and addition of new Annex DVE for permanently installed equipment.

UL 61010-2-010-2015, Standard for Safety for Electrical Equipment for Measurement, Control, and Laboratory Use - Part 010: Particular Requirements for Laboratory Equipment for Heating of Materials


UL 61010-2-020-2016, Standard for Safety Requirements for Measurement, Control, and Laboratory Use - Part 2-020: Particular Requirements for Laboratory Centrifuges


UL 61010-2-201-2014, Standard for Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use - Part 2-201: Particular Requirements for Control Equipment

This is an identical adoption of IEC 61010-2-101 which specifies safety requirements and related verification tests for control equipment of the following types: programmable controllers (PLC and PAC); the components of Distributed Control Systems (DCS); the components of remote I/O systems; industrial PC (computers) and Programming and Debugging Tools (PADTs); Human-Machine Interfaces (HMI); any product performing the function of control equipment and/or their associated peripherals, which have as their intended use the control and command of machines, automated manufacturing and industrial processes.

UL 61010-2-201-2017, Standard for Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use - Part 2-201 Particular Requirements for Control Equipment This proposal represents the addition of requirements for the durability of Markings for Open Equipment to Clause 5.3 of UL 61010-2-201 as a National Difference.

UL 61058-1-2013, Switches for Appliances - Part 1: General Requirements

1. National Differences for the use of thermostat material. 2. RTI clarification text and instructions on thickness of material. 3. Clarification of DVB-4.1.

UL 61131-2-2008 (R2017), Standard for Safety for Programmable Controllers - Part 2: Equipment Requirements and Tests The intent of this proposal is to seek reaffirmation of UL 61131-2 as an American National Standard.
UL 61215-1-1-2017, Standard for Terrestrial photovoltaic (PV) modules - Design qualification and type approval - Part 1-1: Special requirements for testing of crystalline silicon photovoltaic (PV) modules

1. First Edition of the UL IEC-Based Standard for Terrestrial photovoltaic (PV) modules - Design qualification and type approval - Part 1-1: Special requirements for testing of crystalline silicon photovoltaic (PV) modules, UL 61215-1-1, with no US National Differences.

UL 61215-1-2017, Standard for Terrestrial photovoltaic (PV) modules - Design qualification and type approval - Part 1: Test requirements


UL 61215-2-2017, Standard for Terrestrial photovoltaic (PV) modules - Design qualification and type approval - Part 2: Test procedures


UL 61215-2012 (R2016), Standard for Crystalline Silicon Terrestrial Photovoltaic (PV) Modules - Design Qualification and Type Approval

Reaffirmation and Continuance of the First Edition of the Standard for Crystalline Silicon Terrestrial Photovoltaic (PV) Modules - Design Qualification and Type Approval, UL 61215, as an American National Standard

UL 6142-2012, Standard for Safety for Small Wind Turbine Systems

Document (dated 12-2-2011) is recirculating changes to the proposed first edition of UL 6142, originally published on 9-16-11, which consists of requirements for small wind turbine systems and electrical subassemblies intended for use in stand-alone (not grid-connected) or utility interactive applications.


This part of IEC 61496 specifies general requirements for the design, construction and testing of ELECTROSENSITIVE PROTECTIVE EQUIPMENT (ESEP) for the safeguarding of machinery. Special attention is directed to functional and design requirements that ensure an appropriate safety related performance is achieved.


This part of IEC 61496 specifies requirements for the design, construction and testing of ELECTROSENSITIVE PROTECTIVE EQUIPMENT (ESEP) for the safeguarding of machinery, employing ACTIVE OPTO-ELECTRONIC PROTECTIVE DEVICES (AOEPDs) for the sensing function. Special attention is directed to features that ensure an appropriate safety-related performance is achieved.

UL 61646-2012 (R2016), Standard for Thin-Film Terrestrial Photovoltaic (PV) Modules - Design Qualification and Type Approval

Reaffirmation and Continuance of the First Edition of the Standard for Thin-Film Terrestrial Photovoltaic (PV) Modules - Design Qualification and Type Approval, UL 61646, as an American National Standard

UL 618-2010 (R2015), Standard for Safety for Concrete Masonry Units

The following is being proposed: 1. Reaffirmation and Continuance of the Ninth Edition of the Standard for Concrete Masonry Units, UL 618, as an American National Standard

UL 61800-5-1-2015, Standard for Safety for Adjustable Speed Electrical Power Drive Systems; Part 5-1: Safety Requirements - Electrical, Thermal and Energy


Revises the following proposals as the result of comments received: Revision to the conductor temperature limit during the Temperature Test, Table 15DV based on comments received.

UL 61800-5-1-2017a, Standard for Safety for Adjustable Speed Electrical Power Drive Systems; Part 5-1: Safety Requirements - Electrical, Thermal and Energy

Proposed revisions cover: Revision to Annex DVC for accessible secondary circuits; Revision to the conductor temperature limit during the Temperature Test; Revision to the plenum rated drive requirements; Addition of Thermal Memory Retention Tests in Table 17DV; Revision to output/output wiring for Breakdown of Components Tests; Clarification of the Breakdown of Components Test - High fault currents specification; Revisions to Table 28DV; Revision to the semiconductor fuse marking; Elimination of 30 A ground fuse in Short Circuit Testing; Clarification for Speed Sensitivity Test; and Editorial corrections.


Covers revision to the proposed first edition of UL 61800-5-2, based on comments received.

UL 61800-5-2-2012a, Standard for Safety for Adjustable Speed Electrical Power Drive Systems; Part 5-2: Safety Requirements - Functional

Covers revision to the proposed first edition of UL 61800-5-2, based on comments received.


This Standard applies to electromechanical elementary relays for incorporation into low voltage equipment (circuits up to 1000 V alternate current or 1500 V direct current). It defines the basic functional and safety requirements and safety-related aspects for applications in all areas of electrical engineering or electronics, such as: general industrial equipment, electrical facilities, electrical machines, electrical appliances for household and similar use, and business equipment, building automation equipment, automation equipment, electrical installation equipment, medical equipment, control equipment, telecommunications, vehicles, transportation.

UL 61965-2009 (R2014), Standard for Safety for Mechanical Safety for Cathode Ray Tubes


This standard specifies the requirements for flexible cords, elevator cables, electric vehicle cables, and hoistway cables rated 600 V maximum and intended for use in accordance with CSA C22.1, Canadian Electrical Code (CEC), Part I and CAN/CSA-C22.2 No. 0, General Requirements - Canadian Electrical Code, Part II, in Canada, NOM-001-SEDE, La Norma de Instalaciones Electricas (Mexican Electrical Code [MEC]), in Mexico, and NFPA 70, National Electrical Code (NEC), in the United States.


Recirculation of changes to the proposed new edition of UL 62. Revised proposals to update titles of ANCE standards, editorial changes, and clarifications.

UL 62093-2017, Standard for Balance-of-System Components for Photovoltaic Systems - Design Qualification Natural Environments

UL 621 - 2017, Standard for Safety for Ice Cream Makers (UL proposal 12/09/16)
The following changes in requirements to UL 621, they are:
1. Proposal to add UL 60335-1 based requirements for the Evaluation of Electronic Circuits.

UL 62108-2017, Standard for Concentrator Photovoltaic (CPV) Modules and Assemblies - Design Qualification and Type Approval


UL 62275-2016, Standard for Safety for Cable Management Systems - Cables Ties for Electrical Installations (Proposal dated 5-29-15)
The proposed second edition of UL 62275, which is a trinational IEC adoption with modifications, is proposed.

UL 62275-2016a, Standard for Safety for Cable Management Systems - Cables Ties for Electrical Installations (Proposal dated 12-18-15)
This recirculation proposal provides revisions to the UL 62275 proposed new edition dated 5-29-15.

The proposed second edition of the Standard for Audio/video, information and communication technology equipment - Part 1: Safety requirements, UL 62368-1. This new edition is based on the Second Edition of IEC 62368-1: Technical changes to the IEC Standard have been incorporated into the new edition of the UL Standard. National Differences from the First Edition of UL 62368-1 were reviewed and updated in the new edition.

UL 626-2012, Standard for Safety for Water Fire Extinguishers
These 10/21/11 UL 626 proposals include:
clarification of the cylinder requirements with DOT and TDGR specifications and deletion of the carbide precipitation test

1. Proposed Addition of Clause 8.20V To Require Markings On Tools Be Written In The Official Language Of The Country In Which The Tool Is Sold


UL 62841-2-14-2016, Electric Motor-Operated Hand-Held Tools, Transportable Tools And Lawn And Garden Machinery - Safety - Part 2 -14: Particular Requirements for Hand-Held Planers


UL 62841-2-4-2015, Standard for Safety for Electric Motor-Operated Hand-Held Tools, Transportable Tools And Lawn And Garden Machinery - Safety - Part 2-4: Particular Requirements for Hand-Held Sanders and Polishers Other Than Disc Type


UL 62841-2-8-2016, Standard for Safety for Electric Motor-Operated Hand-Held Tools, Transportable Tools And Lawn And Garden Machinery - Safety - Part 2-8: Particular Requirements For Hand-Held Shears and Nibblers


UL 62841-3-1-2016, Standard for Safety for Electric Motor-Operated Hand-Held Tools, Transportable Tools and Lawn and Garden Machinery - Safety - Part 3-1: Particular Requirements for Transportable Table Saws
1. Proposed Adoption Of The First Edition Of IEC 62841-3-1, Standard For Electric Motor-Operated Hand-Held Tools, Transportable Tools And Lawn And Garden Machinery - Safety - Part 3-1: Particular Requirements For Transportable Table Saws, As The First Edition Of UL 62841-3-1 2. Proposed Addition Of Active Injury Mitigation System (AIMS Requirements For Table Saws

UL 62841-3-10-2016, Standard for Electric Motor-Operated Hand-Held Tools, Transportable Tools and Lawn and Garden Machinery - Safety - Part 3-10: Particular Requirements for Transportable Cut-Off Machines

UL 62841-3-10-2016, Standard for Electric Motor-Operated Hand-Held Tools, Transportable Tools and Lawn and Garden Machinery - Safety - Part 3-10: Particular Requirements for Transportable Cut-Off Machines
UL 62841-3-4-2016, Standard For Electric Motor-Operated Hand-Held Tools, Transportable Tools And Lawn And Garden Machinery - Safety - Part 3-4: Particular Requirements For Transportable Bench Grinders


UL 62841-3-6-2016, Standard For Electric Motor-Operated Hand-Held Tools, Transportable Tools And Lawn And Garden Machinery - Safety - Part 3-6: Particular Requirements For Transportable Diamond Drills With Liquid System


1. Proposed Addition Of Clause 1DV To Modify The Scope Of The Standard By Specifying A 400 mm Saw Blade Diameter 2. Proposed Revision To Table 4, Required Performance Levels, And Deletion Of Table 4DV To Align With Changes In IEC Corrigendum 1 Of IEC 62841-3-9 3. Proposed Revision To The Marking Requirements in Clause 8.3 To Align With Changes In IEC Corrigendum 2 Of IEC 62841-3-9

UL 634-2015, Standard For Safety for Connectors and Switches for Use with Burglar-Alarm Systems

This covers updates, revisions and clarifications for magnetically operated switches.

UL 635-2012 (R2016), Standard for Safety for Insulating Bushings

UL 635 covers insulating bushings and accessories for insulating bushings used for the following purposes in electrical equipment: a) Insulating bushings used for the protection of cables, flexible cords, and insulated wires, where routed through internal or external walls of electrical equipment; b) Insulating bushings used to provide strain-relief for flexible cord and single conductor insulated wiring and to protect such cords or wiring; and c) Accessories to insulating bushings used to supplement the characteristics of the bushing.

UL 636-2008 (R2013), Standard for Safety for Holdup Alarm Units and Systems

These requirements cover holdup alarm systems of the remote-station type intended for installation in banks, stores, cashiers’ cages, pay offices, and the like to provide a means of transmitting a silent call for help in the event of interior robbery. These systems are divided into the following three classes: Bandit-Resisting Enclosure and Alarm, Semiautomatic Alarm, and Manual Alarm.

UL 639-2012, Standard for Safety for Intrusion-Detection Units

Revision to the Corrosion Test is being proposed.

UL 639-2012a, Standard for Safety for Intrusion-Detection Units

Revision to the Corrosion Test based on comments received.

UL 641-2009 (R2013), Standard for Safety for Type L Low-Temperature Venting Systems

UL proposes a reaffirmation for ANSI approval of UL 641.

UL 6420-2012, Standard for Safety for Equipment Used for System Isolation and Rated as a Single Unit

Covers revisions to the proposed first edition of UL 6420 based on comments received.

UL 644-2014, Standard for Safety for Container Assemblies for LP-Gas (Proposal dated 2/14/14)

Recirculation of changes to 1.3 and 3.2 originally proposed 11-1-13.

UL 651-2016, Standard for Safety for Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings

Document dated 4-1-2016 proposes the exemption of permanency of printing requirements for Schedule 40 and 80 conduit when markings are laser-printed and the removal of the reference to ASTM D648, which has been withdrawn.

UL 651A-2017, Standard for Safety for Schedule 40 and 80 High Density Polyethylene (HDPE) Conduit

1. Correction to explanatory or approximate impact weight value stated in parentheses.

UL 66-2011 (R2016), Standard for Safety for Fixture Wire


UL 668-2016, Standard for the Safety of Hose Valves for Fire-Protection Service (Proposal Dated 05/27/2016)

To allow for grooved inlets and alternative thread types where the valve is used in areas specifying different threading.

UL 67-2016, Standard for Safety for Panelboards (proposal dated 04-22-16)

Revisions to Service Barrier Requirements (Section 5.4)

UL 67-2016a, Standard for Safety for Panelboards (proposal dated 09-30-16)

The following changes in requirements are being proposed: 1) Revisions to Increase Voltage from 600 to 1000 V; and 2) Correction to Spacing Requirements for (Snap) Switches.

UL 6703-2017, Standard for Connectors for Use in Photovoltaic Systems

1. Expansion of UL 6703 Scope to include single-pole devices up to 1500 V dc or less

UL 674-2017, Standard for Safety for Electric Motors and Generators for Use in Hazardous (Classified) Locations (Proposal dated 02-17-17)

This proposal provides revisions to the Thermocouple Requirements.

UL 676-2015, Standard for Safety for Underwater Luminaires and Submersible Junction Boxes

Proposals regarding requirements for (1) flexible cord and connectors, (2) permitted cord size for low voltage luminaires, (3) drainage and water entry openings, (4) decelerating unit construction, (5) marking of isolated low voltage luminaires, and (6) submersible luminaires.

UL 676-2015a, Standard for Safety for Underwater Luminaires and Submersible Junction Boxes

Proposals for marking of isolated low voltage luminaires and for submersible luminaires


These requirements cover emergency vault ventilators and vault-ventilating ports for installation in a wall. Emergency vault ventilators are intended to provide fresh air to persons locked in the vault by accident or during a robbery. Vault-ventilating ports are intended for connection to an outside ventilating system that provides circulating air while the vault is open.

UL 681-2014, Standard for Safety for Installation and Classification of Burglar and Holdup Alarm Systems

Provides criteria for the installation of protective wiring and devices for burglar alarm systems covering premises, stockrooms, alarmed areas, safes, vaults, night depositories, automated teller machines, and other security containers. The amount of alarm protection installed in a system is designated as the extent of protection. These requirements also cover the installation of holdup alarm initiating devices used to send holdup or duress signals to an off premises location.

[Footer Information]
UL 687-2011 (R2015), Standard for Safety for Burglary Resistant Safes (Proposal Dated 9/25/15)


UL 69-2013, Standard for Safety for Electric-Fence Controllers
1. Revision to scope. 2. Software managed outputs. 3. Addition and revision of requirements to relocate component standard references from Appendix A into the body of the standard as component requirements.

UL 69-2013a, Standard for Safety for Electric-Fence Controllers
1. Revision to scope. 2. Software managed outputs. 3. Addition and revision of requirements to relocate component standard references from Appendix A into the body of the Standard as component requirements.

UL 69-2013b, Standard for Safety for Electric-Fence Controllers
Direct Plug-In Electric Fence Controllers

UL 696-2010 (R2015), Standard for Safety for Electric Toys
These requirements cover electrically-operated toys. The package for the toy is considered part of the toy. An electric product is considered a toy if it is designed, manufactured, or marketed as a plaything for children under the age of 3. For a toy that mimics the form or function of an established general-use appliance, the established requirements shall be considered. These requirements do not cover toys for outdoor use, sewing machines, flatirons, toys that operate with water, toys that operate with a gas or liquid under pressure toy transformers, or toys intended to operate from the secondary of a toy transformer at a potential of 30 volts rms or less.

UL 697-2012 (R2016), Standard for Safety for Toy Transformers
UL proposes to reaffirm the ANSI approval of UL 697.

UL 697-2012a, Standard for Safety for Toy Transformers (proposal dated 2-17-12)
This recirculation proposal provides revisions to the UL 697 proposal dated 12-9-11.

UL 698A-2012 (R2016), Standard for Safety for Industrial Control Panels Relating to Hazardous (Classified) Locations (proposal dated 9-30-16)

UL 6A-2014, Standard for Safety for Electrical Rigid Metal Conduit - Aluminum, Red Brass and Stainless Steel
Document (dated 3-28-2014) proposes marking limitations on small trade size elbows and nipples and revisions to conduit with a protective coating for use with threaded couplings.

UL 7001-2015, Sustainability Standard for Household Refrigeration Appliances
The following changes in requirements to the Standard for Sustainability for Household Refrigeration Appliances, AHAM 7001/CSA R7001/UL 7001, are being proposed: 1. Addition of note to 9.5.2.1 (b) to provide guidance and clarification to the standard’s text. 2. Editorial revisions to address administrative requirements listed in the standard.

UL 7003-2016, Standard for Sustainability for Household Clothes Washers
This Standard covers clothes washing appliances for household and residential style commercial use (e.g., a coin-operated appliance in an apartment building) included within the scope of the U.S. Department of Energy (DoE) and Natural Resources Canada (NRCan) minimum energy performance requirements. This includes the following product categories: a) top loading, compact [less than 45L (1.6 cu. ft. capacity)]; b) top loading, standard; c) front loading, standard; and, d) front loading, compact [less than 45L (1.6 cu. ft. capacity)].

UL 7004-2017, Standard for Sustainability for Household Cooking Appliances
This Standard covers: a) built-in cook tops: i) electric powered: 1) radiant; 2) halogen; 3) coil; 4) induction; and 5) grill; ii) gas powered: 1) sealed burner; and 2) open burner; b) built-in ovens: i) electric powered: 1 single cavity; and 2) multiple cavity; ii) gas powered: 1) single cavity; and 2) multiple cavity; and c) ranges: i) electric powered: 1) free standing; 2) built-in; 3) single cavity; and 4) multiple cavity; ii) gas powered: 1) free standing; 2) built-in; 3) single cavity; and 4) multiple cavity; iii) hybrid gas/electric: 1) free standing; 2) built-in; 3) single cavity; and 4) multiple cavity.

UL 7005-2017, Standard for Sustainability for Household Clothes Drying Appliances
This Standard covers: a) electric clothes dryers; and b) gas clothes dryers.

UL 705-2016, Standard for Safety for Power Ventilators
1. Addition of a New Appendix to Provide Examples of Controls Intended to be Used as Operating or Protective Controls.

UL 705-2016a, Standard for Safety for Power Ventilators
1. Addition of a New Appendix to Provide Examples of Controls Intended to be Used as Operating or Protective Controls.

UL 705-2016b, Standard for Safety for Power Ventilators

UL 710-2012 (R2017), Standard for Exhaust Hoods for Commercial Cooking Equipment
UL proposes a reaffirmation for ANSI approval of UL 710.

UL 711 CAN/ULC-S508-2009 (R2013), Standard for Safety for Nonmetallic-Sheathed Cables (Proposal dated 07-03-15)
This proposal includes reorganization of UL 719.

UL 72-2015, Standard for Tests for Fire Resistance of Record Protection Equipment
Revisions to update the document with current practices as well as include new diagrams that are helpful to the user in setting up and conducting the testing.

UL 723-2013, The Standard for Safety for Test of Surface Burning Characteristics of Building Materials
These 4/12/13 UL 723 proposals: replace “inorganic reinforced cement board” with “fiber-cement board” throughout the standard; include changes to the referenced mounting methods in 4.3, and revises A1.4 to add more details for fiber-cement board.

UL 729-2008 (R2016), Standard for Safety for Oil-Fired Floor Furnaces
Reaffirm UL 729 as an American National Standard. UL 729 covers oil-fired floor furnaces.

UL 73-2012, Motor-Operated Appliances
Covers: (1) Date code marking on attachment plug blade for insect and rodent control equipment; and (2) Addition and revision of requirements for battery-operated products with rechargeable and automatic flashlights and lanterns.

UL 73-2012a, Motor-Operated Appliances
1. New requirements for insect and rodent control appliances which generate ultraviolet (UV) radiation.

UL 730-2008 (R2016), Standard for Safety for Oil-Fired Wall Furnaces
Reaffirm UL 730 as an American National Standard. UL 730 covers oil-fired, vented, fan-type wall furnaces.
UL 731-2004 (R2016), Standard for Safety for Oil-Fired Unit Heaters
Reaffirm UL 731 as an American National Standard.
UL 731 covers oil-fired unit heaters.

UL 732-1997 (R2013), Standard for Safety for Oil-Fired Storage Tank Water Heaters
UL proposes a reaffirmation for ANSI approval for UL 732.

UL 737-2011 (R2015), Standard for Safety for Fireplace Stoves
Reaffirmation of ANSI approval is proposed for UL 737.

This proposal for UL 746A covers the Addition of UV/Water Program Investigation (Code E) for Color/Pigmentation Variations to Table 9.1.

UL 746A-2017a, Standard for Safety for Polymeric Materials - Short Term Property Evaluations
This proposal for UL 746A covers the following topics:
a) Clarification of Thickness Requirement for Comparative Tests (Other than Flammability) in Table 9.2 and b) Inclusion of Material Grouping Scheme in UL 746A for Comparative Tracking Index (CTI) Test Method as per IEC 60112 Based on IEC 60664.

UL 746B-2016, Standard for Safety for Polymeric Materials - Long Term Property Evaluations
The following items are proposals for UL 746B:
- Removal of Two-Component Variable from Silicone Rubber Material Specified in Table 7.1;
- Assignment of a Generic Thermal Index Temperature of 95°C to PPA in Table 7.1; and
- Fixed Temperature Evaluation for Exceptionally Durable Materials Specified in Paragraph 13.4 and new Table 13.2 and new Paragraph 13.4.1.

UL 746B-2016a, Standard for Safety for Polymeric Materials - Long Term Property Evaluations
The following topics are covered in this recirculated proposal for UL 746B:
- Assignment of a Generic Thermal Index Temperature of 85°C to PPA in Table 7.1 and
- Fixed Temperature Evaluation for Exceptionally Durable Materials Specified in Paragraph 13.4 and new Table 13.2 and new Paragraph 13.4.1.

UL 746C-2017, Standard for Safety for Polymeric Materials - Use in Electrical Equipment Evaluations
This proposal represents a clarification of HWI PLC-0 Determination in Table 6.1.

UL 746C-2017a, Standard for Safety for Polymeric Materials - Use in Electrical Equipment Evaluations
This proposal covers considerations for parts made by Additive Manufacturing technology.

UL 746D-2014, Standard for Safety for Polymeric Materials - Fabricated Parts
The following changes in requirements to UL 746D are being proposed:
1. Revision in Recycled Plastics Section 10.3.3 (g) to reflect ignition test (GWIT)

This covers proposed changes to the following topics based on comments received:
a) Split ANSI Grade CEM-3 into Grades CEM-3.0 and CEM-3.1; and b) Expansion of the Ash Content Range for Types FR-4.0 and FR-4.1 in Table 8.2.

UL 746F-2016, Standard for Safety for Polymeric Materials - Flexible Dielectric Film Materials for Use in Printed-Wiring Boards and Flexible Materials Interconnect Constructions
The following items are the proposed new and revised requirements for UL 746F:
a) Addition of requirements for an Alternate Condition for Flammability samples to new Paragraphs 4.3 and 4.4;
b) Addition of references to Section 7 and Table 7.1 of UL 746B, and to Section 8 of UL 746F, to Paragraph 8.1.1; c) Addition of requirements to clarify the required samples for IR testing of Non-Homogenous Films to Table 8.2; d) Addition of requirements for sample thickness tolerance to a new Table 8.6; e) Replacement of references to Thermal Shock with references to Thermal Stress throughout UL 746F; and f) Deletion of the reference to Coverlay Test from Paragraph 12.3.2.

UL 749-2017, Standard for Safety for Household Dishwashers
UL proposes a new edition of UL 749.

UL 749-2017a, Standard for Safety for Household Dishwashers (Proposal dated 10-7-16)
This Recirculation proposal provides revisions to the UL 749 proposal dated 2015-11-20.

UL 751-2016, Standard for Safety for Refrigerated Vending Machines
1. Proposed Addition And Revision Of Requirements To Provide An Alternate Method of Evaluating Protective Electronic Circuits And Controls 2. Proposed Addition Of Requirements To Address Vending Machines With Remote Operation Or Monitoring Functionality

UL 752-2006 (R2015), Standard for Safety for Bullet Resisting Equipment (Proposal dated 9/25/15)
These requirements cover materials, devices, and fixtures used to form bullet-resisting barriers which protect against robbery, holdup, or armed attack such as those by snipers. This standard can also be used to determine the bullet resistance of building components that do not fit the definition of equipment, such as windows, walls, or barriers made out of bullet resistant materials.

The requirements cover alarm accessories for automatic water-supply control valves for use in automatic sprinkler equipment for fire protection service. Accessories may include water motors and gongs, pressure-operated switches, and other electrical and nonelectrical attachments, components, or units commonly used with alarm, dry-pipe and pre-action valves. The electrical alarm accessories for automatic water-supply control valves are intended for fire-protective signaling use in ordinary locations in accordance with the National Electrical Code, ANSI/NFPA 70.

UL 758-2016, Standard for Safety for Appliance Wiring Material (Proposals Dated 1/29/16)
Proposed Change to the Note in Table 14.1; Proposed Change to Correct the EP References in Table 7.1; Proposed Change to Add 3508#176;C Class 10 Nickel Coated Copper Conductor to Table 5.2

UL 758-2016a, Standard for Safety for Appliance Wiring Material (Proposal Dated 6/24/16)
Addition of Mixed Conductor, New 5.7.9.1

Norm Conformity with the Standard for Conductors of Insulated Cables, IEC 60228

UL 758-2017a, Standard for Safety for Appliance Wiring Material (Proposal dated 2/10/17)
Norm Conformity with the Standard for Conductors of Insulated Cables, IEC 60228

Addition of Nickel to Table 5.3

1. Production-Line Dielectric Test and DC Dielectric Voltage-Withstand Test Potentials, Revised 49.1 and 49.2; and Revised Table 49.1 2. Addition of Stability Factor Test to Table 3.9

UL 763-2014, Standard for Motor-Operated Commercial Food Preparing Machines
1. Filtered Ventilation Openings 2. Leakage Current Limit for Stationary Ice/Beverage Dispensers with EMI Suppression Filtering

UL 763-2014a, Standard for Motor-Operated Commercial Food Preparing Machines
1. Filtered Ventilation Openings 2. Leakage Current Limit for Stationary Ice/Beverage Dispensers with EMI Suppression Filtering
UL 768-2013, Standard for Safety for Combination Locks (Proposal Dated 12-02-11 & 4-26-13)

Recirculation of changes to the Removal of the Requirement for Three Separate Experts for the Manipulation Tests, Revised 10.5.2 and 10.5.5. Removal of the Requirement for Three Separate Experts for the Manipulation Tests, Revised 10.5.2

The requirements cover the construction and security of night depository entrances. The units are intended to permit the deposit of cash, checks, and similar items, from outside a building into a chute connected to a depository within the building. A night depository is intended primarily for protection against theft of deposits by: a) Fishing the deposits from the depository; b) Trapping the deposits by preventing them from entering the depository, and then extracting the deposits; and c) Entering the night depository by force with the aim of common burglary tools.

UL 773A-2016, Standard for Safety for Nonindustrial Photoelectric Switches for Lighting Controls

Requirements cover controls of the light or presence-sensitive types, or both, for indoor or outdoor service; intended for the control of loads up to a maximum of 20 A and maximum 347 V; installations on 50 Hz or 60 Hz systems or DC up to 60 V; and intended to be installed in accordance with the NEC, NFPA 70, the CEC Part I, CSA C22.2 No. 0, and NOM 001 SEDE. These requirements do not cover devices: that are locking type, used for area or roadway lighting fixtures; that monitor or control safety critical loads or personal protection circuits; intended to be installed in areas designated hazardous locations; or intended to be installed for manufacturing process control.

UL 773A-2016a, Standard for Safety for Nonindustrial Photoelectric Switches for Lighting Control

Requirements cover controls of the light or presence-sensitive types, or both, for indoor or outdoor service; intended for the control of loads up to a maximum of 20 A and maximum 347 V; installations on 50 Hz or 60 Hz systems or DC up to 60 V; and intended to be installed in accordance with the NEC, NFPA 70, the CEC Part I, CSA C22.2 No. 0, and NOM 001 SEDE. These requirements do not cover devices: that are locking type, used for area or roadway lighting fixtures; that monitor or control safety critical loads or personal protection circuits; intended to be installed in areas designated hazardous locations; or intended to be installed for manufacturing process control.

UL 778-2017, Standard for Safety for Motor-Operated Water Pumps

These requirements cover submersible and nonsubmersible motor-operated pumps intended to be used in ordinary locations in accordance with the National Electrical Code, NFPA 70.

UL 779-2011 (R2016), Standard for Safety for Electrically Operated Pumps for Petroleum Dispensing Products

This proposal is being issued to revise the Moist Ammonia-Air Stress Cracking Test.

UL 789-2003 (R2017), Standard for Safety for Indicator Posts for Fire-Protection Service

UL proposes a reaffirmation of UL 789.

UL 79-2016, Standard for Safety for Power-Operated Pumps for Petroleum Dispensing Products

This proposal is being issued to revise the Moist Ammonia-Air Stress Cracking Test.

UL 790-2014, Standard Test Methods for Fire Tests of Roof Coverings

Revisions to a) the Scope to clarify that the standard covers relative fire characteristics; b) to several sections covering a) the required number of assemblies to be tested and b) that the requirements shall be applied in sequence; c) that clarify sample preparation; d) to clarify that the spread of flame observations are made during the test, not after the test has ended; e) of the burning-brand test covering the placement of the Class A and Class B brands; and f) to the test report to require that the climatic conditions for the weathering exposure shall be reported. New requirement covering conditioning of the self-sealing shingle test decks.


The following topics for the Standard for Test Methods for Fire Tests of Roof Coverings UL 790 are being recirculated. Revisions to the Scope to clarify that the standard covers relative fire characteristics so as not to be confused with the term fire resistance. Revisions to several sections covering a) the required number of assemblies to be tested and b) that the requirements shall be applied in sequence. Addition of a new requirement covering conditioning of the self-sealing shingle test decks at a temperature of 135 to 140°F (57 to 60°C) for a continuous period of 16 hours. Revisions of the burning-brand test covering the placement of the Class A and Class B brands.

UL 793-2017, Standard for Automatically Operated Roof Vents for Smoke and Heat

1. Proposed revision to Section 5, Assembly 2. Proposed revision to Section 12, Fire Resistance Test
UL 797A-2017, Standard for Safety for Electrical Metallic Tubing - Aluminum and Stainless Steel

1. Removal of the term "mandrel"

UL 79A-2016, Standard for Safety for Power-Operated Pumps for Gasoline and Gasoline/Ethanol Blends with Nominal Ethanol Concentrations up to 85 Percent (E0 - E85)

This proposal is being issued to revise the Moist Ammonia-Air Stress Cracking Test.

UL 79B-2016, Standard for Safety for Power-Operated Pumps for Diesel Fuel, Biodiesel Fuel, Diesel/Biodiesel Blends with Nominal Biodiesel Concentrations up to 20 Percent (B20), Kerosene, and Fuel Oil

Power-Operated Pumps for Diesel Fuel, Biodiesel Fuel, Diesel/Biodiesel Blends with Nominal Biodiesel Concentrations up to 20 Percent (B20), Kerosene, and Fuel Oil

UL 8-2016, Standard for Water Based Agent Fire Extinguishers

It is being proposed to remove the requirement that a siphon tube not be displaced from the vertical axis during assembly.

UL 80-2009 (R2014), Standard for Safety for Steel Tanks for Oil-Burner Fuels and Other Combustible Liquids, Bulletin dated November 22, 2013

Reaffirmation and Continuance of the Twelfth Edition of the Standard for Safety for Steel Tanks for Oil-Burner Fuels and Other Combustible Liquids

UL 810-2014, Standard for Safety for Capacitors

1. Revision to Dielectric Voltage-Withstand Test. 2. Revision to Sample Preparation.

UL 810A-2012 (R2017), Standard for Safety for Electrochemical Capacitors


UL 810B-2016, Standard for DC Power Capacitors

The following topic for the Standard for DC Power Capacitors, UL 810B, is being recirculated: 1. The proposed first edition of the Standard for DC Power Capacitors, UL 810B. This standard covers dc power capacitors with or without integral protection intended to reduce the risk of rupture and venting of the capacitor enclosure under internal fault conditions. These requirements apply to capacitors that are intended for use in dc power electronic applications such as switching circuits, dc filtering, and renewable energy systems.

UL 814-2011 (R2015), Standard for Safety for Gas-Tube-Sign Cable (Proposal dated 8/21/15)

These requirements cover single-conductor, 18 - 10 AWG, gas-tube-sign cables with temperature ratings of 105°C - 250°C (221°F - 482°F), and ratings of 5000 volts, 10000 volts, or 15000 volts. The cables are for use with gas-tube systems for signs, outline lighting, and interior lighting in accordance with the National Electrical Code and the Standard for Electrical Signs, UL 48.


This Recirculation proposal provides revisions to the UL 817 proposal dated 2015-07-10.

UL 817-2016c, Standard for Safety for Cord Sets and Power-Supply Cords (Proposal dated 12-04-15)

This proposal includes an increase in the ampacity rating for an 18 and 17 AWG seasonal-use cord set


1. Addition of Requirements for Tamper Resistant Features, New Supplement SE

UL 817-2017a, Standard for Safety for Cord Sets and Power-Supply Cords

Various changes to the Standard for Cord Sets and Power-Supply Cords are being proposed.

UL 82-2016, Standard for Safety for Electric Gardening Appliances

The proposal is to add the following: 1.) New and revised requirements for extended-reach pole pruners 2.) New and revised requirements for cordless brushcutters

UL 82-2016b, Electric Gardening Appliances

The following changes in requirements to the UL 82, are being proposed: 1a. Proposed Revisions To Reduce The Tip Speed Measurement For Trimmers.

UL 823-2007 (R2016), Standard for Safety for Electric Heaters for Use in Hazardous (Classified) Locations (Proposal dated 02-26-16)


UL 827-2016, Standard for Safety for Central-Station Alarm Services

Document dated 4-29-16 proposes requirements that include equivalent options for communication services providers and an alternate approach to Central Station automation system resiliency -- performance based expression of requirements

UL 827-2016a, Standard for Safety for Central-Station Alarm Services

Document dated 8-5-16 recirculates changes that were originally proposed on 4-29-16, including requirements for equivalent options for communication services providers and an alternate approach to Central-Station automation system resiliency.

UL 83-2014, Standard for Safety for Thermoplastic-Insulated Wires and Cables

Proposed New Edition of UL 83

UL 83-2014a, Standard for Safety for Thermoplastic-Insulated Wires and Cables

1. Proposed New Edition of UL 83

UL 83-2014b, Standard for Safety for Thermoplastic-Insulated Wires and Cable (recirculation dated 04-19-13)

This recirculation proposal provides revisions to the UL 83 recirculation dated 04-19-13


This proposal includes revisions to Section 5 Special Designations


UL proposes the first edition of UL 83A which specifies the requirements for 600 V, single-conductor, fluoropolymer-insulated wires and cables in accordance with NFPA 70, National Electrical Code (NEC).

UL 840-2012 (R2016), Standard for Insulation Coordination Including Clearances and Creepage Distances for Electrical Equipment

Reaffirmation of ANSI Approval for UL 840

UL 842-2015, Standard for Safety for Valves for Flammable Fluids

This proposal corrects the requirement for Fuel H in paragraph 26.1.1.

UL 842A-2015, Standard for Safety for Valves for Gasoline and Gasoline/Ethanol Blends with Nominal Ethanol Concentrations up to 85 Percent (E0 - E85)

These requirements cover valves that are intended to be used for the control of fluids and their vapors for gasoline and gasoline/ethanol blends with nominal ethanol concentrations up to 85 percent (E0 - E85).

UL 842B-2015, Standard for Safety for Valves for Diesel Fuel, Biodiesel Fuel, Diesel/Biodiesel Blends with Nominal Biodiesel Concentrations up to 20 Percent (B20), Kerosene, and Fuel Oil

These requirements cover valves that are intended to be used for the control of fluids and their vapors for diesel fuel, biodiesel fuel, diesel/biodiesel blends with nominal biodiesel concentrations up to 20 percent (B20), kerosene, and fuel oil.
UL 844-2016, Standard for Safety for Luminaires for Use in Hazardous (Classified) Locations (Proposal dated 01-22-16)

This proposal includes revisions to add glass requirements for Class I, Division 1 to Section 10.

UL 845-2011, Standard for Safety for Motor Control Centers

The following changes are being proposed: Addition of 4.2, Revision of 6.3. 3. Revision of 6.3.50, Addition of 6.3.62, Revision of wording in Tables 7, 8, and 9, Revision of 8.1.7.0 and addition of 8.2.2.5.6, Revision of 8.2.4.1, Revision to 8.2.10.3, Addition of 8.2.13.15 and 8.2.13.16, Revision of clauses to reference Table 17, Addition of 8.2.20.7 (d), Revision of 8.2.26.11, Revision of 8.2.31.3.1, Revision of 9.3.18, 15. Revision of 9.10.3.3, 9.10.10.5, and 8.3.10, Revision of 9.10.7, Revision of 9.12.1.6, Revision of 9.12.6.3 and addition of 9.12.6.4, Revision of Table 19, Revision of Table 20, Revision of Table 22, Revision of Table 24, Revisions to Table 27.

UL 852-2010 (R2014), Standard for Safety for Metallic Sprinkler Pipe for Fire Protection Service

UL 852 covers metallic pipe intended for use in water based fire protection systems for water distribution or valve trim applications.

UL 854-2014, Standard for Safety for Service-Entrance Cables (Proposal dated 08-22-14)

This proposal includes revisions to Tables 14.1, 14.2 and 14.4 to allow XL composite insulation as an inner layer

UL 857-2011 (R2016), Standard for Safety for Busways

The intent of this proposal is to seek reaffirmation of UL 857 as an American National Standard.

UL 858-2017, Standard for Safety for Household Electric Ranges


UL 858-2017a, Standard for Safety for Household Electric Ranges


This proposal includes (1) Addition of requirements for personal grooming appliances incorporating button or coin cell batteries of lithium technologies (2) New and revised references and relocated Section 33.

UL 864-2014, Standard for Control Units and Accessories for Fire Alarm Systems


UL 864-2014a, Standard for Control Units and Accessories for Fire Alarm Systems


UL 867-2016, Standard for Safety for Electrostatic Air Cleaners (Proposal dated 7-29-16)

This proposal includes (1) Addition of requirements for household appliances incorporating button or coin cell batteries (2) Addition of grounding symbol

UL 870-2016, Wireways, Auxiliary Gutters, and Associated Fittings

1. Protection from Sharp Edges.

UL 875-2016, Standard for Safety for Electric Dry-Bath Heaters (Proposal dated 8-19-2016)

The following is proposed: 1. Add requirements for electronic circuits 2. Allow the use of UL 840 to evaluate clearance and creepage distances 3. Update requirements for switches 4. Add reference to requirements for the Button or Coin Cell Batteries of Lithium Technologies

UL 8750-2016, Standard for Safety for Light Emitting Diode (LED) Equipment for Use in Lighting Products

The following changes in requirements to the Standard for Light Emitting Diode (LED) Equipment for Use in Lighting Products, UL 8750, are being proposed: 1. Add Supplement SE - Requirements for Class P LED Drivers

UL 8750-2016a, Standard for Safety for Light Emitting Diode (LED) Equipment for Use in Lighting Products

The following topics for the Standard for Light Emitting Diode (LED) Equipment for Use in Lighting Products, UL 8750, are being recirculated: 1. Add Supplement SE - Requirements for Class P LED Drivers

UL 8750-2016b, Standard for Safety for Light Emitting Diode (LED) Equipment for Use in Lighting Products

The following changes in requirements to the Standard for Light Emitting Diode (LED) Equipment for Use in Lighting Products, UL 8750, are being proposed: 1. Revise potting compound requirements

UL 8752-2012, Standard for Safety for Organic Light Emitting Diode (OLED) Panels

The following topics for the Standard for Organic Light Emitting Diode (OLED) Panels, UL 8752/ULC-S8752, are being recirculated: 1. The Proposed First Edition of the Joint UL/ULC Standard for Organic Light Emitting Diode (OLED) Panels, UL 8752/ULC-S8752

UL 8752-2013, Standard for Safety for Organic Light Emitting Diode (OLED) Panels

The following changes in requirements to the Standard for Organic Light Emitting Diode (OLED) Panels, UL 8752/ULC-S8752, are being proposed for the United States and Canada: 1. Limit the scope of the standard to lighting applications 2. Clarify polymeric materials - Relative Thermal Index requirements for larger OLED panels 3. Allow for more than one power input connector in OLED panels 4. Provide alternate method for证券ness of soldered printed wiring board connections 5. Eliminate dual language for electrical input rating
UL 8753-2013, Standard for Safety for Field-Replaceable Light Emitting Diode (LED) Light Engines
The following topics for the Standard for Field-Replaceable Light Emitting Diode (LED) Light Engines, UL 8753/ULC-S8753, are being recirculated: 1. The Proposed First Edition of the Joint UL/ULC Standard for Field-Replaceable Light Emitting Diode (LED) Light Engines, UL 8753/ULC-S8753

UL 8753-2013a, Standard for Safety for Field-Replaceable Light Emitting Diode (LED) Light Engines
The following topics for the Standard for Field-Replaceable Light Emitting Diode (LED) Light Engines, UL 8753/ULC-S8753, are being recirculated: 1. The Proposed First Edition of the Joint UL/ULC Standard for Field-Replaceable Light Emitting Diode (LED) Light Engines, UL 8753/ULC-S8753

UL 8754-2014, Standard for Safety for Holders, Bases, and Connectors for Solid-State (LED) Light Engines and Arrays
The following changes in requirements to the Standard for Holders, Bases, and Connectors for Solid-State (LED) Light Engines and Arrays, UL 8754/ULC-S8754, are being proposed: 1. Revise Relative Thermal Index (RTI) requirements for polymeric materials used in Limited Application Devices (LAD). 2. Add exception to loading test for solid-state assembly holders. 3. Clarify requirements for lead pull tests for factory assembled solid-state assembly holders. 4. Clarify product marking allowances for lampholders

UL 879-2009 (R2014), Electric Sign Components

UL 879A-2016, Standard for Safety for LED Sign and Sign Retrofit Kits
The following changes in requirements to the Standard for LED Sign and Sign Retrofit Kits, UL 879A, are being proposed: 1. Deletion of Supplement SA 2. Markings for Kit Installation Instructions

UL 87A-2016, Standard for Safety for Power-Operated Dispensing Devices for Gasoline and Gasoline/Ethanol Blends with Nominal Ethanol Concentrations up to 85 Percent (EO-EB)
This proposal is being issued to revise the Moist Ammonia-Air Stress Cracking Test.

UL 87B-2016, Standard for Safety for Power-Operated Dispensing Devices for Diesel Fuel, Biodiesel Fuel, Diesel/Biodiesel Blends with Nominal Biodiesel Concentrations up to 20 Percent (B20), Kerosene, and Fuel Oil
The following topics are being proposed: 1) Revise the Moist Ammonia-Air Stress Cracking Test and 2) Addition of the Blending Cycling Test.

UL 884-2016, Standard for Safety for Underfloor Raceways and Fittings
Bulletin dated March 18, 2016 proposes the addition of a test program for epoxy coatings and revisions to installation instructions and corrections to Table 6.1.

UL 887-2004 (R2013), Standard for Safety for Delayed-Action Timelocks
The requirements cover delayed-action timelocks intended for attachment on the doors of safes, chests, vaults, and the like, to provide a means for locking the door for a predetermined length of time as protection against burglary or robbery or both. The timelocks covered by these requirements may be automatic, manual, or both, in operation depending upon their design.

UL 891-2012, Standard for Safety for Switchboards
Multiple changes are being proposed including: Revision based on panelboard changes in the 2008 NEC; Update wire bending space for compact stranded AA-8000 aluminum to match UL 67 and the National Electrical Code NFPA 70; Clarifying intent of front and rear accessible definitions; Update wire bending requirements to match the exception in UL 1558 for LV Switchgear; Add required Latch Pull Test to Enclosure Type test requirements; 6. 80% marking requirement location category identification; Clarifying requirements for the "service equipment" intended for use with multiple sources; Mounting orientation of circuit breakers or switches; etc.

UL 891-2012a, Standard for Safety for Switchboards (Proposal dated 03-30-12)
This recirculation proposal provides revisions to the identified Summary of Topics previously proposed in UL's bulletin dated 07-09-10.

UL 896-2004 (R2016), Standard for Safety for Oil-Burning Stoves
Reaffirm UL 896 as an American National Standard. UL 896 covers oil-burning flue-connected room heaters and ranges.

1. Revision to Minimum Qualifications for the Test Furnace. 2. Revision of Figure 3.3 - “T” Shaped Pressure Sensing Probe

This proposal provides clarification of test duct air flow.

UL 900-2012a, Standard for Safety for Air Filter Units 9 (Proposal bulletin dated 12/16/11)
This recirculation proposal includes revisions to 7.27 and Section 9 for Test Duct Air Flow.

UL 907-2006 (R2014), Standard for Safety for Fireplace Accessories
UL proposes a reaffirmation for ANSI approval of UL 907.

UL 913-2015, Standard for Safety for Intrinsicly Safe Apparatus and Associated Apparatus for Use in Class I, II, III, Division 1, Hazardous (Classified) Locations (Ballot dated 03-27-15)
Revisions to paragraph 7.1.4 to update the group listings to include Group E.

UL 913-2015a, Standard for Safety for Intrinsicly Safe Apparatus and Associated Apparatus for Use in Class I, II, III, Division 1, Hazardous (Classified) Locations (Proposal Ballot dated 05-01-15)
Revisions to Paragraphs 7.1.2, 9.4, and deletion of Table 7.1 per 2014 NEC

UL 913-2015b, Standard for Safety for Intrinsicly Safe Apparatus and Associated Apparatus for Use in Class I, II, III, Division 1, Hazardous (Classified) Locations (Ballot dated 08-28-15)
Revisions to clarify the issue of temperature classification for Class II and III intrinsically safe apparatus

UL 920001-2011 (R2015), Standard for Performance Requirements for Toxic Gas Detectors (proposal dated 05-08-15)

UL 921-2016, Standard for Safety for Commercial Dishwashers
It covers electric dishwashers rated 600 V or less; the gas-handling, burning, and control features of gas-fired dishwashers having inputs of 400,000 Btu (420 MJ) per hour or less, limited to 0.5 psig (3.45 kPa) inlet pressure, for use with natural, manufactured, mixed, propane, liquefied petroleum gases or LP gas-air mixtures. These requirements cover dishwashers intended for use in commercial establishments where they are not intended to be accessible to the public.

UL 923-2015a, Standard for Safety for Microwave Cooking Appliances
1. Addition of Requirements for Polymeric Materials
2. Standardization of UL 923 for Commercial Microwave Ovens with UL 197 for Commercial Electric Cooking Appliances
3. Deletion of the Maximum Temperature Rise of Diods

UL 923-2015b, Standard for Safety for Microwave Cooking Appliances

UL 923-2015c, Standard for Safety for Microwave Cooking Appliances
1. Addition of Requirements for Polymeric Materials

UL 923-2017, Standard for Safety for Microwave Cooking Appliances
1. Proposal to clarify the strain relief test requirement. 2. Proposal to add requirement of ISM band of microwave ovens. 3. Proposal to add requirements for electronic circuits.
UL 923-2017a, Standard for Safety for Microwave Cooking Appliances
1. Proposal to clarify the strain relief test requirement

Proposals for the addition of a definition and requirements for directly controlled luminaires, test switch exemption for equipment with self-test/self-diagnostic capability, clarification of battery standard references and compliance, separate shipment of batteries, revision to the battery discharge test, adjustment of the emergency luminaire and battery pack maximum mounting height identification, simplify the damp and wet location equipment humidity conditioning, clarify the indoor wet location equipment marking, and clarifications for minimum light output (Supplement SG).

UL 924-2017a, Standard for Safety for Emergency Lighting and Power Equipment
Proposals for the addition of a definition and requirements for directly controlled luminaires, clarification of battery standard references and compliance, separate shipment of batteries, adjustment of the emergency luminaire and battery pack maximum mounting height identification, and clarifications for minimum light output (Supplement SG).

UL 935-2014, Standard for Safety for Fluorescent-Lamp Ballasts
The following changes in requirements to the Standard for Fluorescent-Lamp Ballasts, UL 935, are being proposed: 1. Add requirements for ballasts intended to be dimmed using solid-state dimming controls electrically wired in series with the mains supply 2. Revise the arcing test method in Section 30

UL 935-2014a, Standard for Safety for Fluorescent-Lamp Ballasts
The following topics for the Standard for Fluorescent-Lamp Ballasts, UL 935, are being recirculated: 2. Revise the arcing test method in Section 30

This proposal covers the alignment of the Flame Spread Index Calculation provided in Section 10 of UL 94 with ASTM E 162-08.

UL 943-2016, Standard for Safety for Ground-Fault Circuit-Interrupters

UL 943B-2011 (R2016), Standard for Safety For Appliance Leakage-Current Interrupters
These requirements cover appliance leakage-current interrupters (ALCIs), intended for use only in 2- or 3-wire alternating-current circuits wherein one of the wires is grounded in accordance with the National Electrical Code, ANSI/NFPA 70. They are intended to interrupt the electric circuit to the load when a fault current to ground exceeds some predetermined value that is less than that required to operate the overcurrent protective device of the supply circuit. An ALCI trips when the current to ground reaches a value in the range of 4 - 6 mA.

UL 9540-2016, Standard for Safety for Energy Storage Systems and Equipment
1. The proposed first edition of the Standard for Energy Storage Systems and Equipment, UL 9540, including applicable requirements for Canada. These requirements cover energy storage systems that are intended to receive electric energy and then to store the energy in some form so that the energy storage system can provide electrical energy to loads or power conversion equipment when needed. The types of energy storage covered under this standard include electrochemical, chemical, mechanical and thermal.

UL 959-2006 (R2014), Standard for Safety for Medium Heat Appliance Factory-Built Chimneys
UL proposes a reaffirmation for ANSI approval of UL 959.

UL 96-2016, Standard for Safety for Lightning Protection Components
2. Copper alloys and content.

UL 961-2014, Standard for Safety for Electric Hobby and Sports Equipment
Cover electrically-powered hobby and sports equipment rated 250 volts or less, intended for the home entertainment and amusement of adults, in accordance with NFPA 70. These requirements do not cover toys and games intended to be used by children, amusement machines, or photographic equipment. A product that contains features, characteristics, components, materials, or systems new or different, and that involves a risk of fire or of electric shock or injury to persons shall be evaluated using appropriate additional component and end-product requirements, to maintain the level of safety as originally anticipated by the intent of this standard.

UL 962-2017, Standard for Household and Commercial Furnishings

UL 962-2017a, Standard for Household and Commercial Furnishings
The following topics for the Standard for Standard for Household and Commercial Furnishings, UL 962, are being recirculated: 1. Addition of Production Line Tests.

UL 969-2014a, Standard for Safety for Marking and Labeling Systems
The following topics for the Standard for Marking and Labeling Systems, UL 969, are being proposed: 6. Revise requirements for exposure conditions in Section 7

UL 969-2014b, Standard for Safety for Marking and Labeling Systems
The following changes in requirements to the Standard for Marking and Labeling Systems, UL 969, are being proposed: 1) Correction to the conversion of the adhesion value from lb/in to N/mm in Table 4.1. 2) Correction to the tolerance for standard atmosphere in Table 7.2.

UL 969-2017, Standard for Safety for Marking and Labeling Systems
1. Deletion of the pocket knife show in Figure 4.1. 2. Addition of Hydraulic Fluid Immersion as an additional exposure condition.

The requirements cover clear, translucent, or opaque glazing material intended for indoor and outdoor use principally as a substitute for plate glass show windows or show case panels. The material is intended to resist burglars attacks of the &\#178; hit and run&\#178; type. These requirements do not cover the glazing (mounting) methods used for the installation of burglary resisting glazing material.

UL 977-2012 (R2016), Standard for Safety for Fused Power-Circuit Devices (Proposal dated 06-03-16)

UL 98-2016, Standard for Safety for Enclosed and Dead-Front Switches (Proposal dated 02 -20-15)
The Proposed Fourteenth Edition of the Standard for Enclosed and Dead-Front Switches

UL 982-2016, Standard for Safety for Motor-Operated Household Food Preparing Machines
ANSI Z80.24-2007 (R2012), Information Interchange for Ophthalmic Optical Equipment
This International Standard establishes a method by which machines and computer software systems used in the fabrication of ophthalmic lenses can exchange information.

ANSI Z80.27-2014, Aqueous Shunts for Glaucoma Application
This standard applies to the physical and mechanical properties and performance of finished aqueous shunts, their biocompatibility properties, and describes elements of a clinical protocol that may be used to assess the clinical performance of these devices for treatment of glaucoma.

ANSI Z80.28-2016, Methods of Reporting Optical Aberrations of Eyes
This standard specifies standardized methods for reporting the optical aberrations of eyes.

ANSI Z80.29-2015, Accommodative Intraocular Lenses
This standard applies to any ocular implant whose primary indication is the correction of aphakia and is designed to provide vision over a continuous range of distances by affecting a change in the vergence power of the eye resulting from the implant design that changes eye optical power or implant position in response to a stimulus. For the purposes of this standard, these implants are referred to as accommodative intraocular lenses (AIOLs).

ANSI Z80.3-2015, Nonprescription Sunglass and Fashion Eyewear Requirements
This standard applies to all nonprescription sunglasses and fashion eyewear, normally used for casual, dress, and recreational purposes, having lenses of substantially plano power. This standard specifically excludes products covered by ANSI Z87.1, ANSI Z80.1, ASTM F803, and high-impact resistance eyewear designed exclusively for designated sports use. Sunglass needs for aphakics may not be met by this standard.

ANSI Z80.30-2010, Toric Intraocular Lenses
This standard applies to any monofocal intraocular lens (IOL) whose primary indication is the correction of astigmatism either with the correction of aphakia or the modification of the refractive power of a phakic eye. It does not include IOLs used to correct presbyopia

This Standard specifies the minimum requirements for complete single-vision ready-to-wear near-vision spectacles with positive power, without regard to luminous transmittance, available directly to the public without the prescription of a licensed professional.

ANSI Z80.36-2016, Light Hazard Protection for Ophthalmic Instruments
280.36 specifies fundamental requirements for optical radiation safety for ophthalmic instruments and is applicable to all current ophthalmic instruments that direct optical radiation into or at the eye. It is also applicable to all new and emerging ophthalmic instruments that direct optical radiation into or at the eye, as well as to those portions of therapeutic or surgical systems that direct optical radiation into or at the eye for diagnostic, illumination, measurement, imaging, or alignment purposes.

ANSI Z80.5-2010, Frames
This standard shall apply to the manufacture of all frames intended for street wear as ophthalmic eyewear with prescription lenses, excluding spectacle, cialty and novelty products such as lorgnettes and monocles. Specifically excluded are products designed to be occupational eyewear as defined in American National Standard Practice for Occupational and Educational Eye and Face Protection, ANSI Z87.1-2003, and frames for non-prescription sunglasses, and fashion eyewear as defined in American National Standard Requirements for Non-prescription Sunglasses and Fashion Eyewear, Z80.3-2009, and sport frames as defined in ASTM F803.

ANSI Z80.7-2013, Intraocular Lenses
This standard applies to monofocal intraocular lenses (IOLs) whose primary indication is the correction of aphakia. This standard addresses the vocabulary, optical properties and test methods, mechanical properties and test methods, biocompatibility, sterility, shelf-life and transport stability, and clinical investigations necessary for this type of device.

ANSI Z80.9-2010 (R2015), Devices for Low Vision
This Standard applies to optical and electro-optical devices specified by the manufacturer for use by visually impaired persons as low-vision devices. It specifies optical and mechanical requirements and test methods. It includes devices with optical and/or electrical and/or electronic components used for image capture or display.

ANSI/ISO 12870-2016, Spectacle Frames-Requirements and Test Methods
This International Standard specifies fundamental requirements for unglazed spectacle frames designed for use with all prescription lenses. It is applicable to frames at the point of sale by the manufacturer or supplier to the retailer. This International Standard is applicable to all spectacle frame types, including rimless mounts, semi-rimless mounts and folding spectacle frames. It is also applicable to spectacle frames made from natural organic materials. This International Standard is not applicable to complete custom-made spectacle frames or to products designed specifically to provide personal eye protection.

ANSI/ISO 7998-2016, Spectacle Frames- Lists of Equivalent Terms and Vocabulary
This International Standard defines commonly used terms relating to frames for spectacles and Eyeglasses.

ANSI/ISO 8624-2016, Spectacle Frames- Measuring System and terminology
This International Standard specifies a measuring system for spectacle frames. It applies to fronts which are intended to be symmetrical.

VITA (VMEbus International Trade Association (VITA))
ANSI/VITA 1-1994 (S2011), VME64
The VME64 specification establishes a framework for 8-, 16-, 32, and 64-bit parallel-bus computer architectures that can implement single and multiprocessor systems. It is based on the VMEbus specification released by the VMEbus Manufacturers Group (now VITA) in August of 1982. This bus includes the initial four basic subusses: (1) data transfer bus, (2) priority interrupt bus, (3) arbitration bus, and (4) utility bus. Other architectures with other subusses are possible within this VME framework.

ANSI/VITA 1.1-1997 (S2011), VME64 Extensions Provides extensions to ANSI/VITA 1, VME64.

ANSI/VITA 1.3-1997 (S2011), VME64x 9U x 400mm Format Specifies the mechanical circuit board format for 9U x 400mm circuit boards compatible with ANSI/VITA 1, and ANSI/VITA 1.1.

ANSI/VITA 1.5-2003 (S2014), 2eSST This standard defines a transfer protocol, based upon source synchronous concepts, that currently permits the VMEbus to operate at rates up to 320MB/sec.

ANSI/VITA 1.6-2000 (S2011), Keying for Conduction Cooled VME64x
This standard is an extension of the VME64x Standard, ANSI/VITA 1.1-1997, approved October 7, 1998. It defines a keying system that can be added to VME64x boards and backplanes in a conduction cooled environment (IEEE 1101.2) where keying as defined in the VME64 Extensions standard cannot be applied.

ANSI/VITA 1.7-2003 (S2014), Increased Current DIN Connector
This standard describes increased current levels, test methods, test data and compliance criteria for 3-row DIN and 5-row DIN connectors when used in VME, VME64 and VME64 Extension P1/P11 and P2/P12 pin out arrangements.

ANSI/VITA 12-1997 (S2012), M-Module Defines minimum mechanical and electrical characteristics of M-Modules, a method of implementing modular circuit boards with specific functions that can be used to add functionality to other larger printed circuit boards.
ANSI/VITA 17-1998 (S2011), Front Panel Data Port Specifications
This standard provides a specification of the protocol and mechanical characteristics of the Front Panel Data Port. This extension to the VME standard consists of a multidrop synchronous parallel non-addressable bus connection between multiple boards in a single chassis. The connection is made to a connector on the front panel of each board by means of an eighty conductor ribbon cable.

ANSI/VITA 17.1-2015, Serial Front Panel Data Port
Revise ANSI/VITA 17.1 to support higher data rates.

ANSI/VITA 20-2005 (R2011), Conduction Cooled PMC
This standard defines the methodology and implementation details to allow the creation of conduction cooled PMC modules to ensure electrical and physical compatibility with various host card modules onto which conduction cooled PMCs are mounted.

ANSI/VITA 23-1998 (S2011), VME64 Extensions for Physics and Other Applications
This document is intended to be used internationally in physics applications and in other fields with similar requirements. It provides implementation rules, recommendations, and guidelines that enhance the use of the VMEbus standard as specified in ANSI/VITA 1-1994, VME and ANSI/VITA 1.1, VME64 Extensions.

This standard describes a packet network protocol called Myrinet for communications between VME modules using interconnects either on a front panel or on a backplane. Networks may be module to module, subrack to subrack, and/or chassis to chassis.

ANSI/VITA 3-1995 (S2011), Board Level Live Insertion
This standard recommends practices to implement board level live insertion with existing VMEbus boards.

ANSI/VITA 30-2000 (S2011), 2mm Equipment Practice for Eurocard Systems
This standard defines an equipment practice based on a combination of 2 mm connectors, per IEC 61076-4-101, and subracks, racks and printed boards based on the Euroboard form factors.

ANSI/VITA 30.1-2008 (R2014), 2mm Connector Practice on Conduction Cooled Euroboards
This specification is applicable to, but not limited to, the CompactPCI bus standard, an internal interconnect (backplane) bus intended for connecting individual processing, memory, communications and I/O elements to additional resources.

ANSI/VITA 31.1-2003 (S2014), Gigabit Ethernet on VME64x Backplanes
This standard defines a pinout and interconnection methodology for implementing a 10/100/1000BASE-T Ethernet switched network on a VME64x backplane.

ANSI/VITA 32-2003 (S2014), Processor PMC
This standard incorporates a set of extensions to the IEEE 1386.1 PMC (PCI Mezzanine Card) standard which creates a new class of CPU-based PMC cards referred to in this standard as Processor PMC cards - standard retains electrical signaling compatibility with existing PMC cards.

ANSI/VITA 35-2000 (S2011), PMC-P4 Pin Out Mapping to VME-P0 and VME64x-P2
This standard defines pin assignments for PMC P4 connector to VME P0 and P2 connectors.

ANSI/VITA 38-2003 (S2013), System Management on VME
This standard describes a methodology for using IPMI for System Management of VME systems.

ANSI/VITA 39-2003 (S2014), PCI-X for PMC and Processor PMC
This standard integrates the PCI-X capability from PCI to PMC-based products, including standard PMCs as well as Processor PMCs.

ANSI/VITA 4-1995 (S2011), IP Modules
This standard defines a mezzanine board for use on VMEbus and other printed circuit boards.

ANSI/VITA 4.1-1996 (S2011), IP I/O Mapping to VME64x
This standard defines the pin assignments from IP Modules to the VME64x P0 and P2 connectors.

ANSI/VITA 40.0-2006 (R2011), VXS VMEbus Switched Serial Standard
This standard defines switched serial interconnects for VMEbus, coincident with the VMEbus parallel bus.

This standard describes a method for using the InfiniBand protocol on ANSI/VITA 41.0, VXS.

ANSI/VITA 41.2-2006 (R2011), VXS 4X Serial RapidIO Protocol Layer Standard
This standard describes a method for implementing Serial Rapid I/O on ANSI/VITA 41.0, VXS.

ANSI/VITA 41.6-2009 (R2016), VXS 1X Gigabit Ethernet Control Channel Layer Standard
This protocol layer document builds upon the VXS-based standard by describing how VXS boards may communicate using the existing data plane protocols with provisions for a separate control plane.

ANSI/VITA 42.0-2016, XMC Switched Mezzanine Card Auxiliary Standard
This specification defines an open standard for supporting high-speed, switched interconnect protocols on an existing, widely deployed form factor. This revision defines the use of the original Paste-On-Pad (POP) vs the preferred solderball connectors.

This standard defines the implementation of Parallel RapidIO on VITA 42.0, XMC.

ANSI/VITA 42.2-2006 (R2012), XMC Serial RapidIO Protocol Layer Standard
This standard defines the implementation of Serial RapidIO on VITA 42.0, XMC.

ANSI/VITA 42.3-2014, XMC PCI Express Protocol Layer Standard
This standard describes a method for implementing PCI Express on the VITA 42.0, XMC mezzanine form factor.

ANSI/VITA 42.6-2009 (R2015), XMC 10 Gigabit Ethernet 4-Lane Protocol Layer Standard
This protocol layer standard builds on the XMC base standard by describing how XMC carriers and XMC mezzanine cards may communicate in a standard way using the XAUI protocol.

ANSI/VITA 46.0-2013, VPX Baseline Standard
This standard describes VITA 46.0, VPX, for embedded systems, an evolutionary step forward for the provision of high-speed interconnects in modular embedded applications.

ANSI/VITA 46.1-2007 (R2013), VMEbus Signal Mapping on VPX
This standard defines a signal mapping for the VMEbus on ANSI/VITA 46.0, VPX Baseline Standard.

ANSI/VITA 46.10-2009 (R2015), Rear Transition Module for VPX
Define a rear transition module (RTM) for VPX applications.

ANSI/VITA 46.11-2015, System Management on VPX
This document defines a framework for System Management in VPX systems. It enables interoperability within the VPX ecosystem at the Field Replaceable Unit (FRU), chassis and system levels. The framework is based on the Intelligent Platform Management Interface (IPMI) specification and leverages many concepts and definitions from the AdvancedTCA® (ATCA®) specification by PICMG®.

ANSI/VITA 46.3-2012, Serial RapidIO on VPX Fabric Connector
The objectives of this standard are to assign Serial RapidIO ports to the VPX P1/J1 connector and to provide rules and recommendations for the use of the assigned Serial RapidIO ports.

ANSI/VITA 46.4-2012, PCIExpress (R) on the VPX Fabric Connector
Standardizes the implementation of the PCI Express (R) Fabric in the VITA46 environment and define the mapping of the PCI Express (R) Links on the VPX Connector.

ANSI/VITA 46.6-2013, Gigabit Ethernet Control Plane on VPX
The objectives of this standard are to assign Gigabit Ethernet Port mappings for the purpose of Control Plane communication onto the VPX connectors for both 3U and 6U form factors and to provide rules and recommendations for the interoperable implementation and use of said Gigabit Ethernet Port mappings.
ANSI/VITA 46.7-2012, Ethernet on VPX Fabric Connector

The objectives of this standard are to assign backplane Ethernet links to the VPX P1/P1 connector and to provide rules and recommendations for the use of Ethernet over backplane media.

ANSI/VITA 46.9-2010, PMC/XMC Rear I/O Fabric Signal Mapping on 3U and 6U VPX Modules Standard

This VITA 46 (VPX) subsidiary standard defines PMC or XMC mezzanine rear I/O pin mappings to VITA 46.0 plug-in module backplane connectors.

ANSI/VITA 47-2007, Environments, Design and Construction, Safety, and Quality for Plug-In Units Standard

This standard defines environmental, design and construction, safety, and quality requirements for commercial-off-the-shelf (COTS) plug-in units (cards, modules, etc.) intended for mobile applications.


Each of the lower level standards focuses on a specific cooling method and will define the mechanical requirements that are needed to ensure mechanical interchangeability in the sub-rack. This standard utilizes a common circuit board for all the cooling methods and incorporates the features required to achieve 2 Level Maintenance compatibility.

ANSI/VITA 48.1-2010, Mechanical Specification for Microcomputers Using REDI Air Cooling

To define the mechanical requirements that are needed to ensure the mechanical interchangeability of air cooled 3U and 6U plug-in units and define the features required to achieve 2 Level Maintenance compatibility.

ANSI/VITA 48.2-2010, Mechanical Specification for Microcomputers Using REDI Conduction Cooling Applied to VITA VPX

To define the mechanical requirements that are needed to ensure the mechanical interchangeability of conduction cooled 3U and 6U plug-in units and defines the features required to achieve 2 Level Maintenance compatibility.

ANSI/VITA 48.5-2010, Mechanical Standard for Electronic Plug-in units Using Air Flow Through Cooling

This standard establishes the design requirements for an air-flow-through cooled plug-in unit with a 6U form factor.

ANSI/VITA 48.7-2014, Mechanical Standard for Electronic Plug-In Units using Air Flow-by Cooling Technology

VITA 48.7 defines a detailed mechanical implementation for Air Flow-By cooling and sealing technologies applied to plug-in modules, backplanes, and sub-racks as defined in VITA 46/48.


Develop an open standard for the design requirements of an air-flow-through (AFT) cooled plug-in module having a 3U or 6U form factor, while retaining the VITA 46 connector layout. Both 3U and 6U standard form factors are offered using 3 defined pitch spacings, with an option to have alternate air flow intake and exhaust paths. The intention of this standard is to optimize SWAP.

ANSI/VITA 49.0-2015, VITA Radio Transport (VRT) Standard

Updates were made to clarify terminology related to timestamps, fix minor rule/observation conflicts in section 7.1.5, and to correct examples in Appendix D. A semantic change was made to the rules for Class Identifiers to permit a ‘de facto’ definition of &R8221; practice already in common use. An optional ‘Pad Bit Count’ &R8221; field was introduced to allow the number of pad bits at the end of the Data Packet to be reported and optional support was added for IEEE 754 half-precision floating-point values.

ANSI/VITA 49.1-2015, VITA Radio Link Layer Standard

Updates were made to the CRC computation examples in Appendix A to better-clarify the CRC computation used.

ANSI/VITA 49a-2015, Spectrum Survey Interoperability Specification

This document specifies an interoperability specification that is applicable to spectrum-survey applications. It is intended to foster high-throughput and adaptable processing in a large-scale environment. It specifically considers the needs of devices based around 32-64-bit general-purpose processors (GPP) and FPGAs that utilize Internet Protocol (IP) as the underlying transport between processing devices.

ANSI/VITA 5.1-1999 (S2011), Raceway Interlink

This standard provides a specification of the data link protocol and physical interface of a high performance extension to the VMEbus standard. This extension consists of high bandwidth, low latency interconnects across a VMEbus computer chassis backplane using the P2 connector. Bi-directional connectivity between boards in a VMEbus chassis is achieved through the use of a network of crossbar switches with point-to-point interconnects.

ANSI/VITA 5.10-2012, Reliability Prediction

This document provides a framework for electronics equipment reliability standards, and establishes a reliability Community of Practice. It addresses the limitations of existing prediction practices with a series of subsidiary specifications that contain the ‘best practices’ within industry for performing electronics reliability analysis. The development of VITA 5.10 and the subsidiary specifications is an effort to give harmony, consistency and repeatability to reliability practices.

ANSI/VITA 5.11-2013, Reliability Prediction MIL-HDBK-217 Subsidiary Specification

This specification provides standard defaults and methods to adjust the models in MIL-HDBK-217F Notice 2. This is not a revision of MIL-HDBK-217F Notice 2 but a standardization of the inputs to the MIL-HDBK-217F Notice 2 calculations to give more consistent results.

ANSI/VITA 5.2-2016, Physics of Failure Reliability Predictions

Establish uniform practices, take advantage of current developments, and clarify reliability prediction expectations using physics of failure methodologies. Revision 2015: Include Arrhenius, Equation, Revised Boltzmann’s constant usage, other editorial edits.

ANSI/VITA 5.3-2010 (R2016), Qualification and Environmental Stress Screening in Support of Reliability Predictions

This standard provides rules, permissions, and observations to assure that cost-effective qualification and environmental stress screening support valid reliability predictions and enhance electronics reliability. It includes a discussion of the systems engineering relationships between qualification, environmental stress screening, and reliability.

ANSI/VITA 5.4.0-2010, Standard for Commercial Technology Market Surveillance

This document defines an open standard for identification of obsolescence issues of commercial technologies at the lowest replaceable unit (LRU) level.

ANSI/VITA 57.1-2010, FPGA Mezzanine Card (FMC) Standard

This specification describes FMC IO modules and introduces an electro-mechanical standard that creates a low overhead protocol bridge between front panel IO, on the mezzanine module, and an FPGA processing device on the carrier card, which accepts the mezzanine module.

ANSI/VITA 58.0-2009 (R2014), Line Replaceable Integrated Electronics Chassis Standard

This standard provides common design and performance requirements for a family of integrated electronic chassis incorporating updated industry standard high speed electronic assemblies and designed for rugged environments.


This standard identifies requirements unique to a liquid cooled electronic chassis which supplement the general requirements identified in the Integrated Electronic Chassis Standard, ANSI/VITA 58.0.

ANSI/VITA 6-1994 (S2011), Signal Computing System Architecture (SCSA)

This standard defines an isochronous backbone bus for telephony applications on the VMEbus P2 connector.
ANSI/VITA 6.1-1996 (S2011), SCSA Extensions
This standard provides feature extensions to the ANSI/VITA 6 standard.

ANSI/VITA 60-2012, Alternative Connector for VPX
This proposed standard will provide an alternative connector for use on VPX modules.

ANSI/VITA 61.0-2014, XMC 2.0
This specification, based upon VITA 42.0 XMC, defines an open standard for supporting high-speed, switched interconnect protocols on an existing, widely deployed form factor, but utilizing an alternate, ruggedized, high-speed mezzanine interconnect known as VITA 61 XMC 2.0.

ANSI/VITA 62-2016, Power Supply Standard
This proposed standard will provide guidelines to building a power supply module that can be used to power a VPX chassis. The module will fit within the standard envelope defined for VPX modules using the VITA 48 specifications.

ANSI/VITA 63-2015, Hyperboloid Alternative Connector for VPX
VITA 63, Hyperboloid Alternative Connector for VPX, provides an alternative connector to the one specified in the VITA 46.0 VPX Baseline Standard.

ANSI/VITA 65-2012, OpenVPX
Define a set of system specifications and practices for VPX modules.

ANSI/VITA 65.1-2017, OpenVPX System Standard - Profile Tables
To standardize variations of Slot, Backplane, and Modules Profiles. As part of the Slot Profile Description, there are also some Connector Modules defined. This document is primarily tables which are referenced by VITA 65.0.

ANSI/VITA 66.0-2016, Optical Interconnect on VPX - Base Standard
This standard defines a family of blind mate Fiber Optic interconnects for use with VPX backplanes and plug-in modules.

ANSI/VITA 66.1-2012, Optical Interconnect on VPX - MT Variant
Defines a family of blind mate Fiber Optic interconnects for use with VPX backplanes and plug-in modules.

ANSI/VITA 66.2-2013, Optical Interconnect on VPX - ARINC 801 Termini Variant
The objective of this standard is to define a family of blind mate Fiber Optic interconnects for use with VPX backplanes and plug-in modules.

ANSI/VITA 66.3-2012, Optical Interconnect on VPX - Mini Expanded Beam Variant
The objective of this standard is to define a family of blind mate Fiber Optic interconnects for use with VPX backplanes and plug-in modules.

ANSI/VITA 66.4-2016, Optical Interconnect on VPX - Half Width MT Variant
The objective of this standard is to define a family of blind mate Fiber Optic interconnects for use with VPX backplanes and plug-in modules.

ANSI/VITA 67.0-2012, Coaxial Interconnect on VPX - Base Standard
The objective of this standard is to establish a structure for implementing blind mate analog coaxial interconnects with VPX backplanes and plug-in modules, and to define a specific family of interconnects and configurations within that structure.

ANSI/VITA 67.1-2012, Coaxial Interconnect on VPX, 3U, 4 Position SMPM Configuration
Details the configuration and interconnect within the structure of VITA 67.0 enabling a 3U VITA 46 interface containing multi-position blind mate analog connectors with up to 4 SMPM contacts.

ANSI/VITA 67.2-2012, Coaxial Interconnect on VPX, 8 Position SMPM
Details the configuration and interconnect within the structure of VITA 67.0 enabling a VITA 46 interface containing multi-position blind mate analog connectors with up to 8 SMPM contacts each able to be located in positions P2/PJ to P6/J6.

ANSI/VITA 76-2016, High Performance Cable Standard
Develop a standard cable scheme to implement copper to copper or copper to optical cabling for box to box interconnects.

ANSI/VITA 78-2015, SpaceVPX System Specification
This standard describes an open standard for creating high performance fault tolerant interoperable backplanes and modules to assemble electronic systems for spacecraft and other high availability applications. Such systems will support a wide variety of use cases across the aerospace community. This standard leverages the OpenVPX standards family and the commercial infrastructure that supports these standards.

WCMA (Window Covering Manufacturers Association)

ANSI/WCMA A100.1-2014, Standard for Safety of Cored Window Covering Products
A revision is being made to Appendix E, Figure E1, Row 3 only. This Standard applies to all interior drapery hardware and window covering products that incorporate bead chains, cords, or any type of flexible looped device in their operation.

ANSI/WCMA A101.1-2008, Corded Horizontal Louver Blinds with Metal Slat
This Standard contains minimum requirements for corded horizontal louver blinds made with metal slats.

WDMA (Window and Door Manufacturers Association)

WDMA 1.S.1A-11, Industry Standard for Interior Architectural Wood Flush Doors, defines the aesthetic grades and performance duty level requirements for interior wood flush doors used in commercial construction. It provides standard requirements and tests to ensure all products complying with the standard are evaluated on an equal basis, and provides a logical system of references, key to a guide specification checklist, to facilitate thorough, precise and accurate architectural specifications. This ballot includes revisions resulting from the previous balloting of this document.

WDMA 1.S.6A-11, Industry Standard for Interior Architectural Wood Stile and Rail Doors, defines the aesthetic grades and performance duty level requirements for interior wood stile and rail doors used in commercial construction. It provides standard requirements and tests to ensure all products complying with the standard are evaluated on an equal basis, and provides a logical system of references, key to a guide specification checklist, to facilitate thorough, precise and accurate architectural specifications. This ballot includes revisions resulting from the previous balloting of this document.

WMA (World Millwork Alliance)

ANSI/WMA 100-2016, Standard Method of Determining Structural Performance Ratings of Side-Hinged Door Systems and Procedures for Component Substitution
The AMD 100 was developed by WMA, formerly Association of Millwork Distributors (AMD), to provide door pre-hangers and distributors a means by which to test and rate the structural performance of a side-hinged exterior door system, and qualify components for substitution in that rated system. This review is limited in scope to additional revisions herein attached that have been incorporated in lieu of comments received during the initial ballot and public review period.

WMMA (ASC O1) (Wood Machinery Manufacturers of America)

ANSI O1.1-2013, Standard for Woodworking Machinery Safety Requirements
Covers the safety requirements for the design, installation, care and use of woodworking machinery and accessory equipment, used in industrial and commercial applications, having a total connected power of 5 hp (3.7 kw) or greater, or having 3-phase wiring.

ANSI WMMA O1.1-3-2014, Safety Requirements for CNC Machining Centers for the Woodworking Industry
Safety Requirements for CNC Machining Centers for the Woodworking Industry
ANSI Wmma O1.4-2015, Safety Requirements for Shapers

ANSI/Wmma O1.1-2015, Safety Requirements for Fixed Angle Jump Saws

X12 (ASC X12 Incorporated)

ANSI X12.1-2008 (R2013), Transaction Set Tables

This American National Standard is a compilation of transaction sets in the X12 family of American National Standards for electronic data interchange. A transaction set is the collection of data that is exchanged in order to convey meaning between the parties engaged in electronic data interchange. The ASC X12 Family of Standards is distributed as a single package. X12.1 is contained within the transaction Set Tables section.

ANSI X12.22-2008 (R2013), Segment Directory

This American National Standards contains the format and definitions of the segments used to construct the transaction sets of the X12 series of American National Standards on electronic data interchange. The ASC X12 Family of Standards is distributed as a single package. X12.22 is contained within the Segment Directory section.

ANSI X12.3-2008 (R2013), Data Element Dictionary

This draft proposed American National Standard contains the specifications of the data elements used to construct the segments that comprise the transaction sets of the X12 series of American National Standards for electronic data interchange. The ASC X12 Family of Standards is distributed as a single package. X12.3 is contained within the Data Element Dictionary section.

ANSI X12.5-2004 (R2013), X12.5 Interchange Control Structures

This draft proposed American National Standard defines the control segments used to envelope one or more encoded business transactions including the EDI (Electronic Data Interchange) encoded transaction of Accredited Standards Committee X12. The acknowledgment for the interchange control segment envelope is also provided. The ASC X12 Family of Standards is distributed as a single package. X12.5 is contained within the Control Standards section.

ANSI X12.56-2004 (R2013), Interconnect Mailbag Control Structures

This draft proposed American National Standard defines the control segments used to start and end a mailbag containing EDI data to be exchanged between two interconnecting entities. The purpose of this standard is to provide control structures and an audit mechanism to facilitate the exchange and receipt acknowledgment of EDI data between interconnecting entities. The ASC X12 Family of Standards is distributed as a single package. X12.56 is contained within the Control Standards section.

ANSI X12.58-2004 (R2013), Security Structures

This draft proposed American National Standard defines the data formats for authentication, encryption and assurances in order to provide integrity, confidentiality, and verification and non-repudiation of origin for two levels of exchange of Electronic Data Interchange (EDI) formatted data defined by Accredited Standards Committee ASC X12. The ASC X12 Family of Standards is distributed as a single package. X12.58 is contained within the Control Standards section.

ANSI X12.59-2004 (R2013), Implementation of EDI Structures - Semantic Impact

This draft proposed American National Standard is to describe the semantic relationships inherent in the implementation of those X12 structures where the relative positioning of segments provides semantic information in their implementation. This information may include the meaning that is to be associated with data due to their positioning within the exchange of X12 information, and the data relationships that can be inferred from the data structure. The ASC X12 Family of Standards is distributed as a single package. X12.59 is contained within the Control Standards section.

ANSI X12.6-2004 (R2013), X12.6 Application Control Structure

This draft proposed American National Standard defines the structure of business transactions for computer-to-computer interchange for use within the context of an Electronic Data Interchange (EDI) environment. This includes the control segments used to bound loops of data segments, transaction sets, and groups of related transaction sets. The ASC X12 Family of Standards is distributed as a single package. X12.6 is contained within the Control Standards section.


The Context Inspired Component Architecture (CICA) offers a method for building electronic business messages. The method presented employs a hierarchy of components designed to capture semantic business concepts in a manner that facilitates re-use. The architecture is syntax neutral by design. A complete set of attributes for describing the components and relationships of this architecture is defined. A specific syntactic representation for XML (Extensible Markup Language as defined by the W3C) is presented. The method represents CICA messages and components in XML Schema as defined by the W3C XML Schema 1.0 (XSD).


These design rules have been developed to assist in establishing uniformity in CICA business document development and maintenance efforts. The design rules are to be used as stated. There shall be no deviation from them, with all new development and maintenance expected to utilize them. These design rules and guidelines are based upon X12.7 Context Inspired Component Architecture (CICA) Technical Specification and XML Syntax Representation. If there is conflict between this document and X12.7, X12.7 takes precedence.