AMERICAN NATIONAL STANDARD

ANSI/ISA-12.20.01-2009 (R2014)

General Requirements for Electrical Ignition Systems for Internal Combustion Engines in Class I, Division 2 or Zone 2, Hazardous (Classified) Locations

Approved 29 August 2014

ANSI/ISA-12.20.01-2009 (R2014)
General Requirements for Electrical Ignition Systems for Internal Combustion Engines in Class I, Division 2 or Zone 2, Hazardous (Classified) Locations

ISBN: 978-0-876640-94-4

ISA
67 Alexander Drive
P.O. Box 12277
Research Triangle Park, North Carolina 27709

UL Standard for Safety for General Requirements for Electrical Ignition Systems for Internal Combustion Engines in Class I, Division 2 or Zone 2, Hazardous (Classified) Locations, ANSI/UL 122001

First Edition, Dated 29 August 2014

Summary of Topics

Adoption of ANSI/ISA-12.20.01, General Requirements for Electrical Ignition Systems for Internal Combustion Engines in Class I, Division 2 or Zone 2, Hazardous (Classified) Locations as an ANSI/UL 122001, First Edition to reflect the reaffirmation of ANSI approval. No changes in requirements have been made.

As noted in the Commitment for Amendments statement, UL and ISA are committed to updating this co-designated standard jointly after processing according to the standards development procedures by UL.

The revisions are substantially in accordance with Proposal(s) on this subject dated 27 June 2014.

The requirements in this Standard are now in effect, except for those paragraphs, sections, tables, figures, and/or other elements of the Standard having future effective dates as indicated in the preface. The prior text for requirements that have been revised and that have a future effective date are located after the Standard, and are preceded by a ″SUPERSEDED REQUIREMENTS″ notice.

This page intentionally left blank.

ISA – The International Society of Automation
ANSI/ISA-12.20.01-2009 (R2014)
First Edition

Underwriters Laboratories Inc.
ANSI/UL 122001
First Edition

General Requirements for Electrical Ignition Systems for Internal Combustion Engines in Class I, Division 2 or Zone 2, Hazardous (Classified) Locations

29 August 2014

ANSI/UL 122001-2009 (R2014)

This page intentionally left blank.

Commitment for Amendments

This Standard is issued jointly by ISA and Underwriters Laboratories Incorporated (UL). Comments or proposals for revisions on any part of the standard may be submitted to ISA or UL at any time. Revisions to this Standard will be made only after processing according to the standards development procedures by UL. ISA and UL will issue revisions to this Standard by means of a new edition or revised or additional pages bearing their date of issue.

ISBN: 978-0-876640-94-4 Copyright © 2014 By ISA

The most recent designation of ANSI/ISA-12.20.01 as a Reaffirmed American National Standard (ANSI) occurred on 29 August 2014.

This ANSI/UL Standard for Safety consists of the First Edition. The most recent designation of ANSI/UL 122001 as a Reaffirmed American National Standard (ANS) occurred on 29 August 2014. ANSI approval for a standard does not include the Cover Page, Transmittal Pages, Title Page (front and back), or the Preface.

Comments or proposals for revisions on any part of the Standard may be submitted to UL at any time. Proposals should be submitted via a Proposal Request in UL's On-Line Collaboration Standards Development System (CSDS) at http://csds.ul.com.

The purchase UL Standards, visit Comm 2000 at http://www.comm-2000.com/help/how_to_order.aspx or call toll-free 1-888-853-3503.

This page intentionally left blank.

Foreword ISA

The following nonsubstantive changes in the main text were made to correct grammatical errors in ANSI/ISA-12.20.01-2009 (R2014) and do not affect the meaning of the text. UL will process these changes during the next technical update to ANSI/UL 122001-2009 (R2014).

- In 6.6, fifth paragraph, the sentence “All flexible secondary leads ~~utilized on skid~~ shall demonstrate compatibility with all compounds in Table 3.” was modified to read “All flexible secondary leads shall demonstrate compatibility with all compounds in Table 3.”

- In 6.7, second paragraph, the sentence “The instructions must include directions for use of a engine spark plug thread port “Go–No-Go” gauge that will indicate if the port is compatible with the specific spark plug.” was modified to read “The instructions must include directions for use of an engine spark plug thread port “Go–No-Go” gauge that will indicate if the port is compatible with the specific spark plug.”

- In 11.1.2, second paragraph, the sentence “The radius of the surface of the emery cloth is to be cloth is to be 90 mm ± 6 mm (3.5 inches ± 0.25 inch).” was modified to read “The radius of the surface of the emery cloth is to be 90 mm ± 6 mm (3.5 inches ± 0.25 inch).”

- In 11.10, first paragraph, the sentence “A representative sample of the ignition system including all components and wiring that is intended to be installed in a Class I, Division 2 or Zone 2 hazardous (classified) location shall be placed in an flammable atmosphere as indicated in Table 5 below.”.was modified to read “A representative sample of the ignition system including all components and wiring that is intended to be installed in a Class I, Division 2 or Zone 2 hazardous (classified) location shall be placed in a flammable atmosphere as indicated in Table 5 below.”

- In 11.15, second paragraph, the sentence “The points of impact shall be the places considered to be the weakest and shall be on the external parts which maybe exposed to impact.” was modified to read “The points of impact shall be the places considered to be the weakest and shall be on the external parts which may be exposed to impact.”

This page intentionally left blank.

Contents

This page intentionally left blank.

General Notes

This is the common ISA and UL Standard for the General Requirements for Electrical Ignition Systems for Internal Combustion Engines in Class I, Division 2 or Zone 2, Hazardous (Classified) Locations. It is the first edition of ANSI/ISA-12.20.01 and the first edition of ANSI/UL 122001. The document is a modification of the ISA document to create the equivalent UL version and maintain the ANSI approval of this standard.

ANSI/ISA-12.20.01 and ANSI/UL 122001 contain identical requirements, and identical publication dates.

This common Standard was prepared by ISA – The International Society of Automation on 4 May 2009 but is now being maintained by Underwriters Laboratories (UL).

Note: Although the intended primary application of this Standard is stated in its Scope, it is important to note that it remains the responsibility of the users of the Standard to judge its suitability for their particular purpose.

UL Effective Date

The requirements in this standard are effective 29 August 2014.

A UL effective date is one established by Underwriters Laboratories Inc. and is not part of the ANSI approved standard.

This page intentionally left blank.

Preface ISA

This preface, as well as all footnotes and annexes, is included for information purposes and is not part of ANSI/ISA-12.20.01-2009 (R2014).

This document has been prepared as part of the service of ISA towards a goal of uniformity in the field of instrumentation. To be of real value, this document should not be static but should be subject to periodic review. Toward this end, the Society welcomes all comments and criticisms and asks that they be addressed to the Secretary, Standards and Practices Board; ISA; 67 Alexander Drive; P. O. Box 12277; Research Triangle Park, NC 27709; Telephone (919) 549-8411; Fax (919) 549-8288; E-mail: standards@isa.org.

The ISA Standards and Practices Department is aware of the growing need for attention to the metric system of units in general, and the International System of Units (SI) in particular, in the preparation of instrumentation standards. The Department is further aware of the benefits to USA users of ISA standards of incorporating suitable references to the SI (and the metric system) in their business and professional dealings with other countries. Toward this end, this Department will endeavor to introduce SI-acceptable metric units in all new and revised standards, recommended practices, and technical reports to the greatest extent possible. *Standard for Use of the International System of Units (SI): The Modern Metric System*, published by the American Society for Testing & Materials as IEEE/ASTM SI 10-97, and future revisions, will be the reference guide for definitions, symbols, abbreviations, and conversion factors.

It is the policy of ISA to encourage and welcome the participation of all concerned individuals and interests in the development of ISA standards, recommended practices, and technical reports. Participation in the ISA standards-making process by an individual in no way constitutes endorsement by the employer of that individual, of ISA, or of any of the standards, recommended practices, and technical reports that ISA develops.

CAUTION — ISA DOES NOT TAKE ANY POSITION WITH RESPECT TO THE EXISTENCE OR VALIDITY OF ANY PATENT RIGHTS ASSERTED IN CONNECTION WITH THIS DOCUMENT, AND ISA DISCLAIMS LIABILITY FOR THE INFRINGEMENT OF ANY PATENT RESULTING FROM THE USE OF THIS DOCUMENT. USERS ARE ADVISED THAT DETERMINATION OF THE VALIDITY OF ANY PATENT RIGHTS, AND THE RISK OF INFRINGEMENT OF SUCH RIGHTS, IS ENTIRELY THEIR OWN RESPONSIBILITY.

PURSUANT TO ISA'S PATENT POLICY, ONE OR MORE PATENT HOLDERS OR PATENT APPLICANTS MAY HAVE DISCLOSED PATENTS THAT COULD BE INFRINGED BY USE OF THIS DOCUMENT AND EXECUTED A LETTER OF ASSURANCE COMMITTING TO THE GRANTING OF A LICENSE ON A WORLDWIDE, NON-DISCRIMINATORY BASIS, WITH A FAIR AND REASONABLE ROYALTY RATE AND FAIR AND REASONABLE TERMS AND CONDITIONS. FOR MORE INFORMATION ON SUCH DISCLOSURES AND LETTERS OF ASSURANCE, CONTACT ISA OR VISIT WWW.ISA.ORG/STANDARDSPATENTS.

OTHER PATENTS OR PATENT CLAIMS MAY EXIST FOR WHICH A DISCLOSURE OR LETTER OF ASSURANCE HAS NOT BEEN RECEIVED. ISA IS NOT RESPONSIBLE FOR IDENTIFYING PATENTS OR PATENT APPLICATIONS FOR WHICH A LICENSE MAY BE REQUIRED, FOR CONDUCTING INQUIRIES INTO THE LEGAL VALIDITY OR SCOPE OF PATENTS, OR DETERMINING WHETHER ANY LICENSING TERMS OR CONDITIONS PROVIDED IN CONNECTION WITH SUBMISSION OF A LETTER OF ASSURANCE, IF ANY, OR IN ANY LICENSING AGREEMENTS ARE REASONABLE OR NON-DISCRIMINATORY.

ISA REQUESTS THAT ANYONE REVIEWING THIS DOCUMENT WHO IS AWARE OF ANY PATENTS THAT MAY IMPACT IMPLEMENTATION OF THE DOCUMENT NOTIFY THE ISA STANDARDS AND PRACTICES DEPARTMENT OF THE PATENT AND ITS OWNER.

ADDITIONALLY, THE USE OF THIS DOCUMENT MAY INVOLVE HAZARDOUS MATERIALS, OPERATIONS OR EQUIPMENT. THE DOCUMENT CANNOT ANTICIPATE ALL POSSIBLE APPLICATIONS OR ADDRESS ALL POSSIBLE SAFETY ISSUES ASSOCIATED WITH USE IN HAZARDOUS CONDITIONS. THE USER OF THIS DOCUMENT MUST EXERCISE SOUND PROFESSIONAL JUDGMENT CONCERNING ITS USE AND APPLICABILITY UNDER THE USER'S PARTICULAR CIRCUMSTANCES. THE USER MUST ALSO CONSIDER THE APPLICABILITY OF ANY GOVERNMENTAL REGULATORY LIMITATIONS AND ESTABLISHED SAFETY AND HEALTH PRACTICES BEFORE IMPLEMENTING THIS DOCUMENT.

THE USER OF THIS DOCUMENT SHOULD BE AWARE THAT THIS DOCUMENT MAY BE IMPACTED BY ELECTRONIC SECURITY ISSUES. THE COMMITTEE HAS NOT YET ADDRESSED THE POTENTIAL ISSUES IN THIS VERSION.

The following members of ISA Subcommittee ISA12.20 developed this document.

NAME	COMPANY
D. Burns, Chair	Shell Exploration & Production Company
M. Coppler, Managing Director	Ametek Inc.
D. Adams	CSA International
D. Bishop	David N Bishop Consultant
K. Blanchard	Stitt Spark Plug Company
R. Fontaine	FM Approvals
G. Kraus	Downin's Inc.
R. Lecuyer	RDK Associates Inc.
R. Ramsey	El Paso Corporation
D. Schmitt	FW Murphy
R. Seitz	Artech Engineering
T. Smith	Altronic Inc.
M. Spencer	Columbia Gas Transmission
R. Strube	Intertek Testing Services
K. Young	Northern Natural Gas

The following members of ISA Committee ISA12 participated in the development of this document.

NAME	COMPANY
T. Schnaare, Chair	Rosemount Inc.
W. Lawrence, Co-Chair	FM Approvals
M. Coppler, Managing Director	Ametek Inc.
N. Abbatiello	Optimation Technology
D. Ankele	Underwriters Laboratories Inc.
D. Bishop	David N Bishop Consultant
H. Bockle	R. Stahl Inc.
K. Boegli	Phoenix Contact Inc.
W. Brown	Maverick Engineering
D. Burns	Shell Exploration & Production Company
R. Buschart	Cable Tray Institute
R. Cardinal	Bently Nevada LLC
C. Casso	Nabors Industries
J. Cospolich	Waldemar S Nelson & Company Inc.
S. Czaniecki	Intrinsic Safety Concepts Inc.
J. Dolphin	Professional Testing
T. Dubaniewicz	NIOSH
U. Dugar	Mobil Chemical Company

A. Engler	Det Norske Veritas
W. Fiske	Intertek Testing Services
G. Garcha	GE Energy
D. Hohenstein	Pepperl + Fuchs Inc.
D. Jagger	Bifold-Fluid Power
J. Johnscher	Adalet PLM
F. Kent	Honeywell Inc.
J. Kovscek	Industrial Scientific Corporation
J. Kuczka	Killark
B. Larson	Turck Inc.
E. Massey	Rockwell Automation
A. Mobley	3M Company
A. Page	MSHA Approval & Certification Center
P. Schimmoeller	CSA International
R. Seitz	Artech Engineering
D. Wechsler	Dow Chemical Company

This standard was approved for publication by the ISA Standards and Practices Board on 10 February 2009.

NAME	COMPANY
J. Tatera	Tatera & Associates Inc.
P. Brett	Honeywell Inc.
M. Coppler	Ametek Inc.
E. Cosman	The Dow Chemical Company
B. Dumortier	Schneider Electric
D. Dunn	Aramco Services Co.
R. Dunn	DuPont Engineering
J. Gilsinn	NIST/MEL
E. Icayan	ACES Inc.
J. Jamison	Husky Energy Inc.
D. Kaufman	Honeywell
K. P. Lindner	Endress + Hauser Process Solutions AG
V. Maggioli	Feltronics Corp.
T. McAvinew	Jacobs Engineering Group
G. McFarland	Emerson Process Mgmt. Power & Water Sol.
R. Reimer	Rockwell Automation
N. Sands	DuPont
H. Sasajima	Yamatake Corp.
T. Schnaare	Rosemount Inc.
I. Verhappen	MTL Instrument Group
R. Webb	ICS Secure LLC
W. Weidman	Worley Parsons
J. Weiss	Applied Control Solutions LLC
M. Widmeyer	Consultant
M. Zielinski	Emerson Process Management

This page intentionally left blank.

1 Purpose

This standard is intended to enhance the safety of personnel by providing minimum requirements for electrical ignition systems for spark-ignited reciprocating internal combustion engines, parts of which are installed or operated in Class I, Division 2 or Zone 2 hazardous (classified) locations.

2 Scope

This standard provides minimum construction and test requirements in addition to manufacturer installation and maintenance recommendations for the safe operation of ignition systems and components for spark-ignited reciprocating internal combustion engines in Class I, Division 2, Group C or D or Class I, Zone 2, Group IIB or IIA, hazardous (classified) locations. These requirements apply to systems rated for normal operation with secondary voltages less than or equal to 35 kV.

This standard is intended to cover only ignition systems of reciprocating internal combustion engines that are stationary when in operation. This does not include any application where the engine would be in motion (vehicles) while operating. Applications addressed by the scope of this document include but are not limited to gas compressors, electric power generators, and pumps.

This standard applies to ignition systems suitable for use in an ambient temperature range of -40°C to +70°C (-40°F to +158°F).

3 References

ANSI NFPA 70, National Electrical Code®

ANSI/ISA-12.12.01, Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations

ANSI/ISA-60079-0, Electrical Apparatus for Use in Class I, Zones 0, 1 & 2 Hazardous (Classified) Locations: General Requirements

ANSI/ISA-60079-1, Electrical Apparatus for Use in Hazardous (Classified) Locations: Type of Protection - Flameproof “d”

ANSI/ISA-60079-15, Electrical Apparatus for Use in Hazardous (Classified) Locations: Type of Protection “n”

ANSI/UL 1203, UL Standard for Safety Explosion-Proof and Dust-Ignition-Proof Electrical Equipment for Use in Hazardous (Classified) Locations

ANSI/UL2556, Wire and Cable Test Methods

SAE J2031, High Tension Ignition Cable

4 Definitions

4.1 alarm:
an audible, visual, or physical presentation designed to alert the user that a specific parameter has been reached or exceeded.

4.2 ambient temperature:
the temperature of the air in the immediate vicinity of the device, equipment or component.