



ANSI E1.4-3 – 2020
Entertainment Technology—Manually Operated Hoist Rigging Systems

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Interest category codes:

CP = custom-market producer DE = designer
DR = dealer rental company G = general interest
MP = mass-market producer U = user

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Foreword

Prior to final approval of ANSI E1.4-2009, no American National Standard had addressed safety of counterweight rigging systems for the entertainment industry. The first documented recognition that safety standards were needed occurred in the early 1960's, when the United States Institute for Theatre Technology (USITT) established its Codes Commission to monitor and report on development of national codes that might be applicable to the entertainment industry. This commission eventually expanded its scope to include the Health & Safety subcommittee. By 1965 USITT had acknowledged that industry standards were necessary to ensure safety in the industry. The first formal, documented effort to accomplish this goal spawned from a Theatre Architecture Commission panel discussion at the 1980 USITT Conference in Kansas City, Missouri. In order to improve the level of safety and to establish a minimum standard for the manufacture of rigging equipment for use in the entertainment industry, the United States Institute for Theatre Technology, Inc. (USITT) established its Rigging and Stage Machinery Standards Committee, with the mission of creating a comprehensive set of standards for this purpose. To further this goal, sub-committees were established to write standards in several areas that combine to achieve a set of standards to fully describe the mechanical equipment used in theatres. This document is an evolution of work first started by separate sub-committees for Manual Counterweight Flying Systems and for Rope and Sandbag Flying Systems. The resulting efforts were combined to form the basis of this document.

It was originally intended that this document be accepted as a standard of USITT and that it ultimately become an American National Standard. In order for the latter to happen, the USITT draft document was turned over to ESTA's Technical Standards Program (now the ESTA Technical Standards Program). It has been further developed by the Rigging Working Group within that program. Members of the Rigging Working Group include appropriately qualified people who represent the broader industry of people who specify, manufacture, sell, and use this equipment, so that all interests are recognized and the standards represent a great depth of knowledge and experience in regards to the equipment.

In 2014, the RWG approved expansion of E1.4's scope, into a suite of four related standards, which are currently in development. This standard represents the 3rd installment in that set.

This document establishes minimum standards for equipment. However, the proper installation and operation of this equipment are equally important. Equipment shall be installed, operated and maintained under the supervision of a competent person. Further, the selection of the proper equipment for any application shall be entrusted only to experienced personnel with the proper knowledge and training to recognize and understand all of the hazards and functional requirements involved in the particular installation.

This standard represents equipment manufactured under the constraints of current technology. It is not intended to restrict further developments or enhancements. Revisions of this standard will be considered by the committee in the light of further advances in technology, changes in entertainment requirements, and operating practices. Future revisions will not imply that previous editions of the standard were inadequate. Nor is it the intention of this standard to suggest that equipment manufactured before the creation of this standard is inherently inadequate.

Reference standards organizations

The following standards organizations have developed specific standards documents that may pertain to certain normative requirements of this standard. It is not intended to identify all such organizations, or their respective standards, nor is it intended to imply that compliance with any such standard constitutes an exemption from any legal, jurisdictional, or OSHA-related safety requirements that may exist.

- AISI - American Iron and Steel Institute, Inc.
- ANSI - American National Standards Institute
- ASME - American Society of Mechanical Engineers
- ASTM - American Society for Testing and Materials
- AWS - American Welding Society
- ESTA - Entertainment Services and Technology Association
- IFI - Industrial Fasteners Institute
- ISO - International Organization for Standardization
- NACM - National Association of Chain Manufacturers
- SAE - Society of Automotive Engineers

1 Scope

1.1 General

This standard applies to permanently installed, manually operated hoists used as part of rigging systems for raising, lowering, and suspension of scenery, properties, lighting, and similar loads. This standard establishes requirements for the design, manufacture, installation, inspection, and maintenance of manually operated hoist systems for lifting and suspension of loads for performance, presentation, and theatrical production.

1.2 Building Structures

This standard applies to the mechanical hoist and rigging hardware only, not to the structure from which it is supported. While not part of this standard, the ability of the building structure to support the intended loads shall be considered in the design and application of rigging systems.

1.3 Annex note references

This document uses annex notes to provide additional reference information about certain specific section requirements, concepts, or intent. Subject matter with a corresponding annex note reference is identified by the asterisk (*) symbol and the text "See Annex note;" the associated reference text is found in the Annex A section, identified with the referring text section number, e.g. an Annex Note to section 3.2 will be identified in the annex section as A.3.2.

1.4 Exclusions

1.4.1 Performer flying

This standard does not apply to performer flying, or to raising or lowering people.

1.4.2 Powered rigging

This standard does not apply to any equipment used in permanently powered rigging systems.

1.4.3 Other rigging

This standard does not apply to E1 Entertainment Technology equipment covered under the scope of other existing standards.

1.5 Intent

The purpose of this standard is to establish minimum performance requirements for manually operated hoists used in rigging systems. This standard establishes safeguards to public health, safety and general welfare with the intent to minimize hazards associated with Manually Operated Rigging Systems.

1.6 Alternative designs

This standard is not intended to prevent or limit alternative designs, materials, or technology. Alternative designs, materials or technology shall comply with the intent of this standard, and with the requirements of any other standard deemed applicable by a qualified person.

2 References

All equipment shall be manufactured and installed to comply with this standard and any applicable codes or jurisdictional regulations where the requirements of such codes or regulations are more stringent.

The following documents are referenced. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document, including any amendments, shall apply.

ANSI E1.2-2012 Design, Manufacture and Use of Aluminum Trusses and Towers

ANSI E1.4-1-2016 Manual Counterweight Rigging Systems

ANSI E1.6-1-2019 Entertainment Technology--Powered Hoist Systems

ANSI Z535.1-2017, Safety Colors

ANSI Z535.2-2011 (R2017), Environmental and Facility Safety Signs

ANSI Z535.3-2011 (R2017), Criteria for Safety Symbols

ANSI Z535.4-2011 (R2017), Product Safety Signs and Labels