



ANSI E1.4-2014
Entertainment Technology —
Manual Counterweight Rigging Systems

Rig/2013-2026r1

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The Rigging Working Group, which authored this Standard, consists of a cross section of entertainment industry professionals representing a diversity of interests. PLASA is committed to developing consensus-based standards and recommended practices in an open setting.

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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

(This foreword is not a normative part of the standard.)

Prior to the ANSI approval of E1.4-2009, no American National Standards had existed covering the design and manufacture of products for lifting and holding scenic, lighting and masking elements, or which concern actors and technicians involved in the theatrical and entertainment industry. 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 the work of the sub-committees for Manual Counterweight Flying Systems and Rope and Sandbag Flying Systems. The results of the work of these two committees were combined and formed 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 PLASA 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.

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 (now PLASA)
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

(a) This standard applies to arrangements of rigging hardware for the raising, lowering, and suspension of scenery, properties, lighting, and similar loads. The single purchase, double purchase, and rope and sandbag systems illustrated in the Figures section describe three common arrangements used over performance areas.

(b) The use of rope, as well as rope and sandbags, is a variation of manual counterweight rigging. Where equipment for rope or rope and sandbag rigging differs from equipment used in regular counterweight rigging, differences will be noted.

(c) This standard applies to rigging hardware only, and 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.

1.2 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 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.

1.3 Exclusion

This standard does not apply to raising or lowering people, or to any powered equipment.

1.4 Intent

The purpose of this standard is to establish the minimum requirements to safeguard the public health, safety and general welfare through structural strength and safety to life and property from hazards attributed to Manual Counterweight Rigging Systems.

1.5 Alternative materials, design and methods of construction and equipment

The provisions of this standard are not intended to prevent the installation of any material or to prohibit any design or method of fabrication not specifically prescribed by this standard, provided that any such alternative material, design or method of fabrication is satisfactory and complies with the intent of the provisions of this standard, and that the material, method or work offered is, for the purpose intended, at least the equivalent of that prescribed in this standard in quality, strength, and effectiveness.

2 Definitions

2.1 Arbor guide: See **Guide shoe**.

2.2 Arbor pit: A pit that extends below the stage floor to allow extended travel of counterweight arbors.

2.3 Batten: A pipe, tube, or other singular structural shape that is secured to the lift lines. Battens are used for flying scenery, curtains, lighting and audio equipment, adjustable architectural/acoustical decor, or combination thereof. Battens are typically installed parallel to the proscenium, horizontal, and extend beyond the width of the proscenium opening.

2.4 Batten clamp: A piece of rigging hardware, typically consisting of two pieces of metal bolted around a batten and having a hole for the attachment of a hanging chain, turnbuckle assembly, or rope.

2.5 Belaying pin: A pin that is inserted in a pin rail hole, and is used for securing rope lift lines or spot lines.