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

Approved by the ANSI Board of Standards Review on 10 May 2019

Rig/2006-2011r8

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The ESTA Technical Standards Program

The ESTA Technical Standards Program was created to serve the ESTA membership and the entertainment industry in technical standards related matters. The goal of the Program is to take a leading role regarding technology within the entertainment industry by creating recommended practices and standards, monitoring standards issues around the world on behalf of our members, and improving communications and safety within the industry. ESTA works closely with the technical standards efforts of other organizations within our industry, including USITT and VPLT, as well as representing the interests of ESTA members to ANSI, UL, and the NFPA. The Technical Standards Program is accredited by the American National Standards Institute.

The Technical Standards Council (TSC) was established to oversee and coordinate the Technical Standards Program. Made up of individuals experienced in standards-making work from throughout our industry, the Council approves all projects undertaken and assigns them to the appropriate working group. The Technical Standards Council employs a Technical Standards Manager and Assistant to coordinate the work of the Council and its working groups as well as maintain a “Standards Watch” on behalf of members. Working groups include: Control Protocols, Electrical Power, Event Safety, Floors, Fog and Smoke, Followspot Position, Photometrics, Rigging, and Stage Machinery.

ESTA encourages active participation in the Technical Standards Program. There are several ways to become involved. If you would like to become a member of an existing working group, as have over four hundred people, you must complete an application which is available from the ESTA office. Your application is subject to approval by the working group and you will be required to actively participate in the work of the group. This includes responding to letter ballots and attending meetings. Membership in ESTA is not a requirement. You can also become involved by requesting that the TSC develop a standard or a recommended practice in an area of concern to you.

The Rigging Working Group, which authored this Standard, consists of a cross section of entertainment industry professionals representing a diversity of interests. ESTA is committed to developing consensus-based standards and recommended practices in an open setting.
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<th>INVESTOR ($3,000–$9,999; &gt;100 employees/members)</th>
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## INVESTOR ($1,500–$4,999; 20–100 employees/members)
- American Society of Theatre Consultants
- Area Four Industries
- BMI Supply
- City Theatrical Inc.
- H&H Specialties, Inc.
- InterAmerica Stage, Inc.
- Lycian Stage Lighting
- Morpheus Lights
- Niscon Inc.
- Syracuse Scenery and Stage Lighting
- Tomcat
- XSF Xtreme Structures and Fabrication

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- Bruce Darden
- Guangzhou Ming Jing Lighting Equipment Co.
- Indianapolis Stage Sales & Rentals, Inc.
- K5600, Inc.
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- Robert Scales
- Stephen Vanciel
- Suga Koubou Co., Ltd.
- VU-Industry Vision Technology
- Xpro Light

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- Harlequin Floor
- Them Stage Equipment
- USAI Lighting

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- Guangzhou YaFeng Optoelectronic Equipment Co.
- High Output
- InCord
- iWeiss
- LA ProPoint, Inc.
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- Stage Equipment & Lighting
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- Zhuhai Shengchang Electronics Co.

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- Tony Giovannetti
- Pat Grenfell
- Mitch Hefter
- John Huntington
- Beverly and Tom Inglesby
- Eddie Kramer
- Jason Kyle
- LuxBalance Lighting
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- Skjonberg Controls Inc.
- Stage Labor of the Ozarks
- Tracy Underhill
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The Rigging Working Group members when this document was approved by the working group on 04 March 2019 are shown below.

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Ian Bevan; Walt Disney Parks & Resorts; P; U
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1 Scope
This standard establishes requirements for the design, manufacture, installation, inspection, and maintenance of powered hoist systems for lifting and suspension of loads for performance, presentation, and theatrical production.

This standard does not apply to the structure to which the hoist is attached, attachment of loads to the load carrying device, or systems for flying people. Excluded are welded link chain hoists, and manually powered hoists, including auxiliary drill operation. (See Annex note.)

The provisions of this standard are not intended to prohibit any design, materials, or methods of fabrication, provided that any such alternative is at least the equivalent of that described in this standard in quality, strength, and effectiveness. (See Annex note.)

2 References
All equipment shall be manufactured 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.

Aluminum Design Manual, 2015 edition¹
American Welding Society standards²
ANSI/AISC 360-16 Specification for Structural Steel Buildings
ANSI B11.TR3 2000 (R2015) Risk Assessment and Risk Reduction
ANSI E1.2 2012 Design, Manufacture and Use of Aluminum Trusses and Towers
ANSI Z535
1 - Safety Color Code-2017
2 - Environmental and Facility Safety Signs-2011 (R2017)
3 - Criteria for Safety Symbols-2011 (R2017)
4 - Product Safety Signs and Labels-2011 (R2017)
6 - Product Safety Information re Product Manuals, Instruction and Other Collateral Materials-2011 (R2017)
NFPA 79: Electrical Standard for Industrial Machinery, 2015 edition⁴

3 Definitions

3.1 characteristic load. The maximum force applied to a component of a hoist system resulting from normal intended operating conditions while the system is at rest or in motion. This includes the apportioned fractions of the working load limit (WLL), self-weight including that due to load carrying devices and lifting media, and the forces due to inertia in normal use. (See Annex note.)

3.2 competent person. A person who is capable of identifying existing and predictable hazards in the workplace and who is authorized to take prompt corrective measures to eliminate them.

² American Welding Society  8669 NW 36th Street #130, Miami, FL 33166, www.aws.org
³ National Fire Protection Society  1 Batterymarch Park Quincy, MA 02169-7471, www.nfpa.org
⁴ National Fire Protection Society  1 Batterymarch Park Quincy, MA 02169-7471, www.nfpa.org