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10.0 RIGGING HARDWARE

10.1 SCOPE

This chapter provides requirements that apply to the construction, installation, operation, inspection, and maintenance of detachable rigging hardware used for lifting purposes in conjunction with equipment described in other sections of this manual. This hardware includes shackles, links, rings, swivels, turnbuckles, eyebolts, hoist rings, wire rope clips, wedge sockets, and rigging blocks. The proper and safe use of rigging hardware is governed by the American Society of Mechanical Engineers (ASME) standards and the Occupational Safety and Health Administration (OSHA) regulations. This section implements required criteria from DOE/RL-92-36 and the following standards: ASME B30.26-Rigging Hardware and OSHA 29 CFR 1926.251-Rigging Equipment for Material Handling.

This chapter implements the following criteria and the applicable national standards and/or federal specifications that are mandatory per ASME B30.26-Rigging Hardware:

Chapter 26.1 Shackles – Selection, Use, and Maintenance

Chapter 26.2 Adjustable Hardware – Selection, Use, and Maintenance

Chapter 26.3 Compression Hardware – Selection, Use, and Maintenance

Chapter 26.4 Links, Master Link Subassemblies, Rings, and Swivels

Chapter 26.5 Rigging Blocks – Selection, Use, and Maintenance

Chapter 26.6 Detachable Load-Indicating Devices – Selection, Use, and Maintenance

Each chapter above includes the following sections:

- Scope
- Types, Materials, and Assembly (26.3)
- Design Factor
- Rated Loads
- Proof Test
- Identification
- Effects of Environment
- Training
- Inspection, Repair, and Removal, Calibration (26.6)
- Operating Practices

10.2 GENERAL REQUIREMENTS

Contractors should access ASME via one of the following options:

1. IHS Engineering Standards, Regulations and Technical Specifications at <http://www.ihs.com/>. The contractor must have paid for access to the specific standard. For access contact The Hanford Technical Library, 277 University Dr, Richland, WA (372-7430). To print IHS file go to <http://www.ihs.com/>
2. Thomson Reuters TECHSTREET ENTERPRISE at techstreet.subscriptions@thomsonreuters.com. The contractor must have paid for access to the specific standard.

3. To purchase standards directly from ASME go to <http://www.asme.org>
4. To access the OSHA standard go to the following link:
 - 29 CFR 1926.251 Rigging Equipment for Material Handling
http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10686

10.3 IMPLEMENTATION

Contractors shall be compliant to OSHA, ASME, DOE/RL-92-36 and the Rigging Hardware manufacturers' requirements. It is the responsibility of the user of this manual to implement all of the requirements from listed sources. When two standards set forth inconsistent requirements, the user shall adhere to the standard containing the most stringent requirements. ASME standards provide the most comprehensive information. Users should contact a Hanford Site Hoisting Rigging Committee (HSHRC) representative or send an email to ^Hanford Hoisting and Rigging for a formal interpretation. See Chapter 17.0 for process to be followed when requesting an interpretation. Notify the Hanford Site Hoisting and Rigging Committee if any inconsistent standards are identified.

It is not the intent of this manual to require retrofitting of existing equipment. However, when any hoisting or rigging equipment is modified, its performance requirements shall be reviewed relative to the requirements within the current manual. The need to meet the current requirements shall be evaluated by a qualified person selected by the owner (user).

10.4 INCONSISTENT STANDARDS

1. ASME B30-26-1.5.2 Shackle Pin Identification specifies each shackle pin shall have durable markings by the manufacturer to show the name or trademark of manufacturer and the grade, material type, or load rating.
2. OSHA does not address stamped identification of shackle pins.

Therefore, follow the requirements of ASME B30-26-1.5.2.

10.5 TEMPERATURE LIMITATIONS

The working temperature limits listed for carbon steel shall not be exceeded without the manufacturer's written approval. For hardware manufactured from other materials consult manufacturer.

HARDWARE TYPE	TEMPERATURE LIMIT	REFERENCE
Wire Rope Clips	-40°F to +400°F	ASME B30.26
Wedge Sockets	-4°F to +400°F	ASME B30.26
Shackles	-40°F to +400°F	ASME B30.26
Turnbuckles	-40°F to +400°F	ASME B30.26
Eyebolts	+30°F to +275°F	ASME B30.26
Eye Nuts	-40°F to +400°F	ASME B30.26
Swivel Hoist Rigs	-20°F to +400°F	ASME B30.26
Detachable Load Indicating Devices	+14°F to +104°F	ASME B30.26
Links, Rings and Swivels	-40°F to +400°F	ASME B30.26
Rigging Blocks	0°F to +150°F	ASME B30.26

10.6 HANFORD SPECIFIC REQUIREMENTS

10.6.1 Manufacturer-Installed Lift Points

All manufacturer-installed lift points shall be inspected and evaluated by a qualified person before use for cracks, deformation, excessive wear, or damage. When questions arise regarding the use of manufacturer-installed lift points, the equipment custodian or cognizant engineer shall be consulted.

10.6.2 Proof Testing

Rigging hardware used in critical lifts shall be proof tested (load tested) in accordance with the requirements of ASME B30.26, and tagged or marked with proof test date. Proof test shall never be less than minimum requirements defined in ASME B30.26. See Figure 10.1 example.

Dynamometers and Precision Load-Position Devices (hydro-set) shall have the following requirements.

- a. Load test at maximum capacity.
- b. Shall have a minimum design factor of 4:1 based on yield of strength of materials.
- c. Shall be load tested to 100% of rated capacity
- d. Shall be calibrated per the contractor's requirements at least annually.

Figure 10.1 Load test tag used for date record

