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SUPERSEDING
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MILITARY SPECIFICATION

HOISTS, CHAIN OR WIRE ROPE, ELECTRIC POWER OPERATED, LUG, HOOK, OR TROLLEY SUSPENSION AND BASE MOUNTED

This specification is approved for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers electric power-driven hoists and trolleys.

1.2 Classification. Hoists shall be of the following types, as specified (see 6.2.1 and 6.5):

Type I - Lug suspension, double-acting.
Type II - Lug suspension, single-acting.
Type III - Parallel or right angle geared or plain trolley suspension.
Type V - Base-mounted (winch type).
Type VI - Two-wheel tandem trolley suspension.
Type VII - Hook suspension.
Type VIII - Powered trolley suspension.

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications and standards. Unless otherwise specified, the following specifications and standards of the issue listed in that issue of the Department of Defense Index of Specifications and Standards (DoDISS) specified in the solicitation form a part of this specification to the extent specified herein.

SPECIFICATIONS

FEDERAL
FF-B-171 - Bearings, Ball, Annular (General Purpose).
FF-B-185 - Bearings, Roller, Cylindrical; and Bearings, Roller, Self-Aligning.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, Naval Sea Systems Command, SEA 3112, Department of the Navy, Washington, DC 20362 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

FEDERAL (Continued)

QQ-A-601 - Aluminum Alloy Sand Castings.
RR-W-410 - Wire Rope and Strand.
TT-E-490 - Enamel, Silicone Alkyd Copolymer, Semigloss (For Exterior and Interior Non-Residential Use).
UU-P-268 - Paper, Kraft, Wrapping.
PPP-C-850 - Cushioning Material, Polystyrene Expanded, Resilient (For Packaging Uses).
PPP-C-1120 - Cushioning Material, Uncompressed Bound Fiber for Packaging.

MILITARY

MIL-S-901 - Shock Tests, H. I. (High-Impact); Shipboard Machinery, Equipment and Systems, Requirements for.
MIL-C-915 - Cable and Cord, Electrical, for Shipboard Use, General Specification for.
MIL-E-917 - Electric Power Equipment, Basic Requirements for (Naval Shipboard Use).
MIL-C-2212 - Controllers, Electric Motor, AC or DC, and Associated Switching Devices, Naval Shipboard.
MIL-P-3184 - Packaging of Machinery: Deck and Vehicle Mounted With Associated Equipment and Repair Parts.
MIL-R-6130 - Rubber, Cellular, Chemically Blown.
MIL-B-16392 - Brakes, Magnet, Naval Shipboard.
MIL-M-17059 - Motors, 60-Cycle, Alternating-Current, Fractional H.P. (Shipboard Use).
MIL-M-17060 - Motors, 60-Hertz, Alternating Current, Integral-Horsepower, Shipboard Use.
MIL-M-17413 - Motors Direct Current, Integral H.P. Naval Shipboard.
MIL-M-17556 - Motor, Direct-Current, Fractional HP (Shipboard Use).
MIL-R-20092 - Rubber Sheets and Molded Shapes, Cellular, Synthetic, Open Cell (Foamed Latex).
MIL-P-23236 - Paint Coating Systems, Steel Ship Tank, Fuel and Salt Water Ballast.
MIL-I-24137 - Iron Castings; Nodular Graphitic (Ductile Iron) and Nodular Graphitic (Corrosion Resisting, Austenitic, Low Magnetic Permeability) (For Shipboard Application).
MIL-P-24441 - Paint, Epoxy-Polyamide, General Specification for.
MIL-P-24441/1 - Paint, Epoxy-Polyamide, Green Primer, Formula 150, Type I.
MIL-P-24441/2 - Paint, Epoxy-Polyamide, Exterior Topcoat, Haze Gray, Formula 151, Type I.
DOD-G-24508 - Grease, High Performance, Multi-Purpose (Metric).
MIL-P-26514 - Polyurethane Foam, Rigid or Flexible, For Packaging.

STANDARDS

MILITARY

MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes.
MIL-STD-721 - Definitions of Effectiveness Terms for Reliability, Maintainability, Human Factors, and Safety.

(Copies of specifications and standards required by contractors in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting officer.)

2.2 Other publications. The following documents form a part of this specification to the extent specified herein. The issues of the documents which are indicated as DoD adopted shall be the issue listed in the current DoDISS and the supplement thereto, if applicable.

AMERICAN GEAR MANUFACTURER'S ASSOCIATION (AGMA)
American Gear Manufacturer's Association Standards

(Application for copies should be addressed to the American Gear Manufacturer's Association, 1330 Massachusetts Avenue N.W., Washington, DC 20005.)

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)
A 48 - Gray Iron Castings (DoD Adopted).
B 633 - Electrodeposited Coatings of Zinc on Iron and Steel (DoD Adopted).

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.)

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)
45 - Recommended Practice for Electric Installations on Shipboard.

(Application for copies should be addressed to the Institute of Electrical and Electronics Engineers, 345 East 47th Street, New York, NY 10017.)

STEEL STRUCTURES PAINTING COUNCIL (SSPC)
Painting Manual, Volume 2, Systems and Specifications, Surface Preparation Specification SP10 - Near White Blast Cleaning.

(Application for copies should be addressed to the Steel Structures Painting Council, 4400 5th Avenue, Pittsburgh, PA 15213.)

(Industry association specifications and standards are generally available for reference from libraries. They are also distributed among technical groups and using Federal agencies.)

2.3 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein, the text of this specification shall take precedence.

3. REQUIREMENTS

3.1 Materials.

3.1.1 General. Materials shall be free from any defects and imperfections that may affect the serviceability or appearance of the finished product. Materials shall be in accordance with the requirements specified herein. Materials not definitely specified shall be of a quality to meet the requirements specified herein.

3.1.2 Recovered materials. Unless otherwise specified herein, all equipment, material, and articles incorporated in the products covered by this specification shall be new and shall be fabricated using materials produced from recovered materials to the maximum extent practicable without jeopardizing the intended use. The term "recovered materials" means materials which have been collected or recovered from solid waste and reprocessed to become a source of raw materials, as opposed to virgin raw materials. None of the above shall be interpreted to mean that the use of used or rebuilt products is allowed under this specification unless otherwise specifically specified.

3.1.3 Magnesium. Magnesium or magnesium base alloys shall not be used in shipboard equipment.

3.1.4 Brittle material. Brittle material is defined as material showing less than 10 percent elongation in gage length during tensile testing.

3.1.4.1 Cast iron in any form shall not be used except where permitted by referenced specifications. The use of cast iron is limited to ASTM A 48, class 35, or better. Cast nodular graphitic iron or malleable iron conforming to MIL-I-24137 is acceptable for machinery equipment components.

3.1.4.2 Other brittle materials shall be used only where it is satisfactory to the contracting activity for a particular application.

3.1.5 Aluminum. Welded aluminum 6061-T6, 2XXX, and 7XXX material shall not be used for any parts. Aluminum castings shall be in accordance with QQ-A-601.

3.1.6 Metals. Metals that are usually considered to be susceptible to general corrosion attack by a sea water environment shall be processed (treated, plated, or painted) to provide corrosion resistance. In order to minimize corrosion attack due to electrolytic action between dissimilar metals in contact with each other, metal-to-metal contacts shall be limited to those metals which, when coupled, are designated by an open square, an open triangle, or an open triangle with a cross bar, as shown in the table titled "Sea Water Corrosion of Galvanic Couples" of MIL-E-917 under the following conditions:

(a) For combinations of metals subject to immersion, splashing, or spray from seawater, condition S, E, or L, as applicable, shall apply.

(b) For combinations of metals exposed to atmosphere but not subject to immersion, splashing, or spray from seawater, condition E shall apply.

If a metal is coated or plated, the metal rather than the base metal shall be considered. Metal-to-metal contact is considered to exist between parts that depend upon painting for corrosion resistance.

3.1.7 Prohibited materials. Cadmium plating or asbestos (except for brakes) in any form shall not be used.

3.2 General design. Hoist design shall provide for required selection of material, component design, and assembly tolerances to insure a hoist service life (minimum of 3000 cycles) which does not require any corrective maintenance actions. Rotating shafts shall be supported in anti-friction, lubricated, or self-lubricated bearings or bushings. Shaft bushings or bearings shall be enclosed against entry of dirt, dust, or foreign material. Rotating and sliding surfaces shall be lubricated with lubricant in accordance with DOD-G-24508. Hoists shall operate at environment temperatures of minus 20 degrees Fahrenheit ($^{\circ}$F) through 130°F. Gears shall be enclosed against dirt, dust, and water spray, in a casing that will permit ready access for examination and cleaning. Positive means of securing loose parts such as nuts, bolts, collars, and check rings within the casing shall be provided to prevent any component from working loose. Hoists shall be complete in all respects, including operating controls and other equipment that may be necessary for operation. Maximum combined stress in component parts shall not exceed 35 percent of the tensile yield strength of the material for hoist operation at rated capacity. Combined stresses in component parts shall not exceed 70 percent of its tensile yield strength, when the hoist is subjected to static or dynamic overload tests. For hoists requiring repair parts, all wear parts shall be readily accessible for replacement. Component parts for the same type hoists from the same manufacturer shall be interchangeable to the greatest extent possible. For hoist operation, a pull of not more than 1 pound per 200 pounds of total hoist load shall be exerted to initiate movement, and not more than 1 pound per 300 pounds of total hoist load shall be required for manual operation of the trolley.

3.2.1 Load chain. Hoist load chain shall be manufactured from an alloy steel electric or forge welded. Each chain link shall be of uniform size and shape and shall seat properly in the hoist chain sheave pockets. The chain shall provide a safety factor of at least 5 for the rated load based on the ultimate strength of the material. When specified (see 6.2.1), the chain shall be protected from corrosion by zinc plating in accordance with ASTM B 633, type II, class Fe/Zn 25.

3.2.2 Wire rope. Wire rope, where used for load lifting, shall be in accordance with RR-W-410. Wire rope shall provide a safety factor of at least 5 for the rated load based on the minimum breaking strength of the wire.

3.2.3 Load chain wheels. Load chain wheels shall be provided with at least four pockets accurately shaped to fit the links of the load chain, which shall operate freely and smoothly over the load wheel. Guides shall

be provided to assure that the chain enters the chain wheel in proper position. These guides, if bolted on, shall have locknuts or other means to prevent loosening under vibration. Load shaft may be integral with or rigidly connected to the load chain wheel. Welding of the wheel to the shaft is not acceptable.

3.2.4 Rope drums. Rope drums shall have machined cut grooves and rounded corners. Drum grooves shall have minimum depth equal to 40 percent of the wire rope diameter. Drums shall be fitted on each end with recessed flanges to prevent rope jamming. Drum diameter shall be not less than 20 times the diameter of the wire rope, except when extra flexible rope is used and the diameter of the drum may be 15 times the diameter of the rope. There shall be at least one and one-half full turns of rope remaining on the drum with the hook in the lowest elevation of the rated list. The wire rope shall be secured to the inside of the winding drums with sockets or dead-end clamps. The wire rope dead-end connection shall support 80 percent of hoist rated load. Drums, except those for type V hoists, shall have a rope winding guide and shall be protected both on top and side.

3.2.5 Load hooks. Load hooks shall be of drop forged heat-treated steel, and capable of withstanding the tests specified in section 4. Hooks shall conform to those shown on figure 1 as specified (see 6.2.1), and shall be fitted with a safety device, and except for the fixed eye, regular, a swivel. The safety device shall consist of a spring latch or swivel type closure, to bridge the throat opening, and shall be an integral part of the hook. Swivel shall permit 360 degree rotation of the hook with full load, without twisting the attached rope or chain. Hook throat openings shall be in accordance with the dimensions shown in table I.

TABLE I. Hook throat openings.

Rated hoist capacity (pounds)	Hook throat opening (inches) (minimum)
1,000	3/4
2,000	29/32
3,000	1
4,000	1- 1/8
5,000	1- 1/8
6,000	1- 1/2
7,500	1- 3/8
10,000	1- 5/8
11,000	2
13,000	2- 1/16
15,000	2- 1/16
17,000	2- 1/16
20,000	2- 1/4
25,000	2- 1/4
30,000	2- 3/4
40,000	3

3.2.6 Finish. Unless otherwise specified (see 6.2.1), hooks shall be zinc coated. Zinc coating shall conform to ASTM B 633, type I, class Fe/Zn 13. Safety device shall be constructed of noncorrosive material or treated for corrosion resistance.

3.2.7 Load chain container. Load chain containers, where used, shall have sufficient volume to contain the chain, and shall be located to prevent interference with the low headroom features of the hoist.

3.2.8 Gearing. Gears shall be manufactured in accordance with AGMA Standards.

3.2.9 Lubrication. Means shall be provided for lubrication of hoist and trolley moving parts using a lubricant in accordance with DOD-G-24508. Lubrication arrangements shall be such as to require infrequent attention. Where permanently lubricated bearings are used, means for external lubrication are not required. Exposed bearings shall be sealed or shielded.

3.2.10 Range of load hook (for type I, II, III, VII, and VIII hoists).

3.2.10.1 Chain hoists. Hoist shall pick up a load with the hook anywhere within a radius of 3.5 feet perpendicular to the load wheel center line and 7 feet below the wheel, without jamming or jumping the pockets of the load wheel.

3.2.10.2 Wire rope hoists. Hoist shall pick up a load with the hook within 3.5 feet perpendicular to the drum center line, at the point the rope reeves on the drum, and 7 feet below the drum, centerline.

3.2.11 Capacity, weight, headroom, and dimensions. Capacity, maximum weight, headroom, and envelop dimensions of hoists shall be as specified (see 6.2.1). Headroom is defined as follows: with the load hook in the highest position carrying full load, headroom is the distance between the saddle of the load hook and the following points:

(a) Top of the lug or centerline of suspension holes on lug suspended hoists.
(b) Bottom of the beam or rail on trolley suspended hoists.
(c) Saddle of the top hook on hook suspended hoists.

3.2.12 Electrical equipment. Motors, controllers, brakes, and power supply cable shall be in accordance with IEEE 45. When high impact, grade A shock testing in accordance with MIL-S-901 is specified (see 4.6.1 and 6.2.1), the supply cable shall be in accordance with table II.

TABLE II. Electrical equipment requirements.

Equipment	Direct current	Alternating current
Motor:		
Fractional horsepower	MIL-M-17556	MIL-M-17059
Integral horsepower	MIL-M-17413	MIL-M-17060
Controller		MIL-C-2212
Brakes	MIL-B-16392	MIL-B-16392
Power supply cable	MIL-C-915	MIL-C-915

3.2.13 Electric motors. Motor characteristics shall be as follows:

(a) Service - Navy service A or C, as specified (see 6.2.1).
(b) Horsepower - As specified (nonoverloading within hoist rating) (see 6.2.1).
(c) Speed - Constant, multispeed, or static adjustable, as specified (see 6.2.1).
(d) Duty - Intermittent or continuous, as specified (see 6.2.1).
(e) Enclosure - Totally enclosed, totally enclosed (air cooled), dripproof, spraytight, watertight, or explosion-proof, as specified (see 6.2.1).
(f) Bearings - Ball.
(g) Ambient temperature - As specified (see 6.2.1).
(h) Insulation - Class B, F, or H, as specified (see 6.2.1).
(i) Voltage - As specified (see 6.2.1).

3.2.13.1 Power supply cable. The cable supplying power to the hoist motor shall be in accordance with MIL-C-915, MIL-E-917, or commercial equivalent, of the capacity, type, and length as specified (see 6.2.1).

3.2.14 Motor controllers. Motor controller characteristics shall be as follows:

(a) Horsepower - As specified (see 6.2.1).
(b) Voltage - 115, 220, 440, as specified (see 6.2.1).
(c) Ambient temperature - As specified (see 6.2.1).
(d) Enclosure - Totally enclosed, totally enclosed (air cooled), dripproof, watertight, or explosion-proof, as specified (see 6.2.1).
(e) Control function - Motor starting and reversing.
(f) Type - Across-the-line, magnetic. Emergency run feature, if specified (see 6.2.1).
(g) Operation - Momentary-contact type pendant pushbutton with spring return to off position.
(h) Performance - Nonautomatic.
(i) Protection - Undervoltage protection.
(j) Mounting - Integral with hoist, unless otherwise specified (see 6.2.1).

3.2.14.1 Static controllers and variable speed controls. When hoists are equipped with static controllers or static variable speed controls utilizing semiconductor devices, the controllers shall be in accordance with MIL-C-2212.

3.2.15 Hoist brakes. Hoist shall be equipped with an electric brake, and except type I, a load brake. Load brake shall be provided in the gear train to prevent operation of the hoist in the lower direction unless power is applied, and it shall be independent of the electric brake. In addition to stopping and safely holding 150 percent of the hoist rated load at any operating speed, the electrical brake shall hold a static load equal to 200 percent of the hoist rating. Electric brake may be mounted at any position on the motor or hoist drive shaft. Electrical characteristics shall be as follows:

(a) Service - IEEE 45 or Navy service A, as specified (see 6.2.1).
(b) Torque - As specified (see 6.2.1).
(c) Voltage - 115, 220, 440, or special, as specified (see 6.2.1).
(d) Duty - As required to pass the tests specified in 4.2.
(e) Type of enclosure - Open, dripproof, watertight, or explosion-proof, as specified (see 6.2.1).

3.2.15.1 Electric brake release. When specified (see 6.2.1), manual release of the electric brake shall be provided to permit manual operation by the handwheel as specified in 3.2.20.

3.2.16 Operator's control station. Hoist control stations shall be of the two-element pushbutton type, and permanently marked "hoist" and "lower" to indicate hoist operation. Pushbutton controls shall be momentary contact type (spring return to the "off" position when released). Pushbutton controls shall be fully enclosed in a shock resistant watertight case with rounded corners. Enclosure shall be watertight. Pendant control stations shall be supported by a chain or cable, to prevent any load from being applied to the control cable. Length of the control cable shall be as specified (see 6.2.1).

3.2.17 Speed governor. When specified (see 6.2.1), type I hoists shall be equipped with a centrifugal type speed governor to limit lowering speed to a maximum of 80 feet per minute (ft/min). Stopping of the hoist shall be accomplished by the electric brake specified in 3.2.15.1.

3.2.18 Limit switches. On all types, except type I hoists, upper and lower limit switches shall be provided, to prevent the load hook from overtravel. Switches shall be arranged to automatically stop the hoist motor and apply the motor brake when the hook reaches its upper and lower travel limit positions. On wire rope hoists, the lower limit switch shall ensure stopping the load hook with not less than two complete turns of rope remaining on the drum.

3.2.19 Electromagnetic interference and compatibility. Hoist electrical equipment shall operate satisfactorily under the electromagnetic environment specified in table III.

TABLE III. Electromagnetic environment.

Frequency range	Units	
Communications: 250 kHz to 30 MHz	Volts per meter 50	
Radar:	Average (mW/cm^2)	Peak (mW/cm^2)
200 MHz to 225 MHz	7	1600
400 MHz to 450 MHz	5	300
850 MHz to 942 MHz	12	400
1.215 GHz to 1.365 GHz	3	3900
2.7 GHz to 3.7 GHz	78	32000
5.4 GHz to 5.9 GHz	2	1400
16.3 GHz to 33 GHz	1	1000

3.2.20 Manual operation. When specified (see 6.2.1), hoist shall be equipped with a handwheel attached to an extension of the electric motor shaft for manual operation of the hoists in the event of an electric power failure. It shall be possible to declutch the handwheel when it is not in use. An interlock shall be provided to prevent operation of the hoist electrically while the handwheel is engaged. A pull of not more than 1 pound per 200 pounds of hoist total load shall be required, to initiate movement.

3.2.20.1 Hand chain. The handwheel described in 3.2.20 shall be operated by a removable spark-resistant chain, which when fitted, will have a drop of approximately 2 feet less than the specified lift of the hoist.

3.2.21 Hoisting speed. Hoisting speeds shall be as specified (see 6.2.1).

3.2.22 Load positioning control. Hoist control system shall vertically position a load to within plus or minus 1/4 inch.

3.2.23 Lift height. Height of lift shall be as specified (see 6.2.1).

3.2.24 Interchangeability. In no case shall parts be physically interchangeable or reversible unless such parts are also interchangeable or reversible with regard to function, performance, and strength.

3.3 Type I lug suspension, double-acting.

3.3.1 Double-acting feature. The double-acting feature shall be obtained by arranging a load chain having two free ends, to operate back and forth over a power-driven chain wheel. Either end of the chain, when fitted with a load hook, shall handle the load for which the hoist is

rated. The hoist will not be required to handle load on both hooks simultaneously. Separation of the load chains, when hanging vertically, shall be a maximum, to permit free passage of the empty and loaded hooks when traveling in the hoisting or lowering directions.

3.3.2 Load hooks. Load hooks shall be readily detachable from the load chain. Load hook shall include features to allow for quick attachment to either end of the load chain. Locking pins shall be provided to insure against accidental detachment of the hooks.

3.3.3 Control stations. Controller shall be operated by two pendant type pushbutton stations, separately suspended from the hoist. Pushbuttons shall be connected in series, thus making it necessary that corresponding pushbuttons be depressed simultaneously at each station, to move the load hooks in either direction. Pushbutton controls shall be in accordance with 3.2.16. Length of one of the control cables shall be as specified (see 6.2.1). The other cable shall be of a length equal to the lift of the hoist. Each pushbutton station shall be provided with indicating lights. These lights shall be arranged to indicate to the controls operator which pushbutton has been depressed at any other station. Enclosure shall be spraytight.

3.3.4 Limit switch. A limit switch shall be provided and mounted on each load chain guide, and shall be arranged to stop the motor and set the electric brake when hoist limits are reached. Each limit switch shall be arranged for positive opening by action of the corresponding load hook. Limit switch enclosures shall be spraytight.

3.4 Type II lug suspension, single-acting.

3.4.1 Load-lifting medium. Chain shall be the load-lifting medium. Hoist shall be equipped with a metal container attached to the hoist for receiving the chain as it is reeved in by the chain wheel.

3.4.2 Control station. Control station shall be pendant type or bulkhead mounted, as specified (see 6.2.1). Pushbutton controls shall be in accordance with 3.2.16.

3.5 Type III parallel or right angle geared or plain trolley suspension.

3.5.1 Load-lifting medium. Chain or wire rope, as specified (see 6.2.1), shall be the load-lifting medium. If chain is used, the hoist shall be equipped with a metal container located on the hoist for receiving the chain as it is reeved in by the chain wheel.

3.5.2 Trolleys (geared or plain). Trolleys shall be geared or plain, as specified (see 6.2.1).

3.5.2.1 Trolley wheels. Trolleys shall be provided with at least four wheels. Trolley wheels shall be of ferrous material. Trolleys up to and including 3-ton capacity shall have wheels of solid or pressed steel with treads hardened to a minimum depth of 0.020 inch. For trolleys over 3-ton capacity, wheels shall be forged or solid with treads hardened to a minimum depth of 1/16 inch. Trolley wheels shall have treads hardened to

a minimum 285 Brinell hardness number (Bhn). Wheel shall be concentric within 0.030 inch, and cast wheels shall have machined treads. Where the wheel mounting arrangement is such that the wheels are not canted to the flange of "I" beam type trolley track, (tapered treads) wheel treads shall be a convex shape to minimize wear. Operating device for geared trolleys shall be a chain wheel equipped with an endless chain of a length as specified (see 6.2.1). Unless otherwise specified (see 6.2.1), trolley wheel spacing shall be suitable for use on applicable standard "I" beam flange size.

3.5.2.2 Trolley wheel bearings. Trolley wheels shall be equipped with anti-friction bearings in accordance with FF-B-171 or FF-B-185. Wheel bearings shall be protected to exclude foreign matter.

3.5.2.3 Trolley wheel gear and drive pinion. Trolley wheel gear and drive pinion shall be made of bronze, steel, or malleable iron.

3.5.2.4 Trolley equalizers. Means shall be provided for distributing the hoist load equally into trolley side frames.

3.5.2.5 Trolley hoist track clamps. Quick acting track clamps shall be provided for locking fully loaded hoists to the track. Clamps shall be adjustable for wear and function equally well on curved or straight track. Clamps shall function without increasing the trolley wheel shaft or wheel bearing load, and in such a manner that the stresses resulting from locking will be taken up in the trolley frame. Operation of the track clamps shall be a chain wheel equipped with hand chain. Hand pull required to set or release the track clamps shall not exceed 80 pounds. Chain drop from beam shall be approximately 2 feet less than the specified lift of the hoist. When tested as specified (see 4.6.7), track clamps shall evidence no sign of slipping or of permanent deformation.

3.5.3 Cable reel. An automatic, clock spring type cable take-up reel for ceiling mounting shall be furnished for the hoist motor power supply cable.

3.5.4 Trolley track. Trolley track for type III and type VIII hoists shall be I-beam of the weight and radius specified (see 6.2.1).

3.6 Type V base-mounted (winch type).

3.6.1 Load-lifting medium. Wire rope shall be the load-lifting medium of the hoist. Rope entry to the hoist shall be either top or bottom, as specified (see 6.2.1).

3.6.2 Mounting. Hoist shall be designed for deck, bulkhead, or overhead mounting.

3.6.3 Control station. Control station shall be as specified in 3.4.2 and in the contract or order (see 6.2.1).

3.7 Type VI two-wheel tandem trolley suspension.

3.7.1 Load-lifting medium. Close link, coil type load chain shall be the load-lifting medium.

3.7.2 Hoist trolley. Trolley shall operate on high grade plow steel, constant tensioned wire rope, as specified (see 6.2.1). The trolley shall not jump or fall from the wire rope under any condition. The trolley assembly shall be quickly removed from the rope for storage purposes. A hole shall be accessibly located at each end of the trolley structure to permit making a clevis connection, the clevis being located at the end of the ropes used to tow the trolley along the wire suspension. The trolley structure around the hole shall be reinforced so that pull on the clevis connection will not cause any permanent distortion.

3.7.3 Trolley connection to hoist. Trolley shall be pin connected to the hoist with a degree of freedom to permit the hoist to swing forward or backward in the direction of trolley travel. Hoist swing angle shall be limited by stops on the trolley, to prevent the hoist from making contact with the trolley wire suspension.

3.7.4 Range of load hook. With the arrangement specified in 3.7.3 and with the trolley oscillating about the wire rope on which it operates, it shall be possible to pick up a load from any point within a 19-inch radius, from an imaginary perpendicular, from the point of hoist suspension to a horizontal plane 7 feet below this point (an angle of approximately 15 degrees).

3.7.5 Control station. Motor controller shall be operated from a pendant suspended, retractable, three-element pushbutton station. The retractable feature shall be provided through use of a clock spring actuated cable reel, which shall be included as part of the motor control enclosure. Pushbutton enclosure shall be fitted with a handle to enable the hoist operator to conveniently hold the pushbutton station at proper operating height. Enclosure shall be fitted with an eyebolt or other means for securing a reach rope, which will be used to haul the control station down to the operator. Pushbuttons shall be in accordance with 3.2.16. When three elements are required, the pushbuttons shall be legibly and permanently marked "HOIST", "LOWER", and "EMERGENCY RUN", to indicate hoist operation. The function of the "emergency run" pushbutton shall be to by-pass the thermal overload device.

3.8 Type VII hook suspension.

3.8.1 Load lifting medium. Load lifting medium shall be chain or wire rope, as specified (see 6.2.1).

3.8.2 Mounting. Mounting hook shall have a spring loaded type safety gate resting against the tip of the hook. Safety gate shall be of sufficient strength to withstand a pull against the safety gate, equal to the weight of the fully loaded hoist.

3.9 Type VIII, powered trolley suspension.

3.9.1 Hoist trolley connection. Hoist shall be suspended from its trolley by means of a pin connection which will permit the hoist body to swing a maximum of 15 degrees fore and aft in direction of trolley travel. When the hoist is allowed to swing, it shall be so restrained that no part of the hoist will contact the load lifting medium. Trolley motor and

gearing, as specified herein, shall be attached to the hoist so as to permit the front of the hoist to approach the end of the trolley track, with the intent of bringing the hanging load chain as close to the end of the track as practicable.

3.9.2 Load attachment device. Lifting end of the load chain shall be fitted with a swivel connection device.

3.9.3 Power-operated trolley. Trolley shall be positive traversing, shall operate on a standard I-beam, and shall traverse the hoist along the track through a speed of 0 to 40 ft/min with rated load. Trolley shall drive the hoist with rated load along a track tilted and inclined plus or minus 15 degrees from horizontal. For this requirement, overloading of the trolley drive motor up to 50 percent of its rated capacity for 20 minutes, during ship rolling and pitching conditions, will be acceptable. Trolley shall successfully negotiate tilted and inclined curved track sections having a radius as specified (see 6.2.1).

3.9.4 Positive traversing feature. To provide positive traversing of the hoist, the trolley shall be equipped with a sprocket, rotating in a vertical plane, and driven by the trolley motor. Sprocket shall engage a strip of roller type chain attached to the flange of the I-beam trolley track. The roller chain shall be of the length as specified (see 6.2.1), and shall be suitable for tack welding to the flange of the I-beam. This arrangement shall ensure that the hoist and trolley, when stopped, will hold its position on the trolley track. A brake, attached to the sprocket shaft or nonoverhauling worm gears, shall be provided.

3.9.5 Hoist and trolley control station. Hoist and trolley shall be operated by a pendant type hand held or bulkhead mounted control station, as specified (see 6.2.1). Control station design shall incorporate a four-element pushbutton circuit with the dead man feature (pushbuttons automatically return to off position when released). Two pushbuttons shall be marked "Hoist" and "Lower" for hoisting and lowering operations and two pushbuttons shall be identified with arrows "←" "→" and color coded to indicate direction of trolley operation. Corresponding color coded arrows shall be affixed to the hoist and shall be visible from all operating positions of the hoist. If the control station is bulkhead mounted, the control leads shall be fed from a cable reel as specified in 3.5.3.

3.9.6 Headroom. Headroom dimension shall be as specified (see 6.2.1). Headroom is measured from the underside of the trolley track flange to the lowest point of the load attachment device (see 3.9.2) in its raised position or to the saddle of the load hook (see 3.2.11).

3.10 Availability, reliability, and maintainability. The minimum acceptable inherent availability of the hoist shall be 0.90. This requirement establishes threshold values for reliability, maintainability, and supportability of the hoist. Reliability and maintainability terms shall be in accordance with MIL-STD-721.

3.10.1 Reliability. The hoist shall operate for an average period of 3000 continuous cycles without failure. This value of 3000 mean cycles between failure (MCBF) is equivalent to 90 days of normal ship operation without hoist failure.

3.10.1.1 Reliability data. The contractor shall prepare a reliability program plan; failure mode and effects analysis (FMEA); reliability prediction report; and reliability status report in accordance with the data ordering documents (see 6.2.2), if required (see 6.2.1).

3.10.2 Maintainability. Routine corrective maintenance at the organizational level shall be accomplished by replacing complete assemblies and subassemblies. Mean time to repair (MTTR) the hoist shall be 4 hours. At least 95 percent of all corrective maintenance actions shall require no more than 10 hours to complete.

3.10.2.1 Maintainability data. The contractor shall prepare a maintainability program plan and maintainability prediction and program status reports in accordance with the data ordering documents (see 6.2.2), if required (see 6.2.1).

3.11 Painting. Exposed surfaces, except hooks, chains, and other wearing surfaces, shall be painted as specified herein. Before assembly, surfaces requiring painting shall be cleaned in accordance with SSPC SP10. Steel surfaces, except for corrosion resisting steels, shall be coated with an inorganic zinc primer conforming to MIL-P-23236, class 3 appplied at 3 to 5 mils dry film thickness (DFT). Prior to overcoating, residual deposits shall be removed by the manufacturer's recommended cleaning procedure. A coat of formula 150 which has been thinned with 1 pint of thinner per gallon, at a wet film thickness of 3 mils shall be applied, in accordance with MIL-P-24441 and MIL-P-24441/1. This shall be followed by a full coat of formula 151, in accordance with MIL-P-24441 and MIL-P-24441/2, applied at 2 to 4 mils DFT, and two coats of silicone alkyd enamel conforming to TT-E-490 (haze gray), applied at 1 to 2 mils DFT per coat. The first coat of enamel shall be applied when the formula 151 is in the tack stage. Other metals that are not inherently corrosion resistant, as defined by MIL-E-917, shall be processed (treated, plated, or painted) in accordance with MIL-E-917, to provide corrosion resistance.

3.12 Identification. Identifying information shall be cast, or applied to an identification plate in a prominent location on each hoist. The following information shall be provided:

(a) Weight.
(b) Characteristics (capacity, voltage, cycles, phase, motor/horsepower full load, revolutions per minute locked rotor amperage).
(c) Manufacturer's name and part number, serial number, or model number.
(d) Contract or order number.
(e) Date of manufacture.

3.13 Technical data. The contractor shall prepare drawings (see 3.13.1) and technical manuals in accordance with the data ordering documents included in the contract or order (see 6.2.2).

3.13.1 Drawings. When specified (see 6.2.1), drawings shall be furnished. In addition to the drawing content required by the data ordering document (see 6.2.2), the following unique features shall be included:

(a) Complete list of material.
(b) Identification of each component for replacement.
(c) Final drawings. Final drawings shall be furnished in the technical manual only (see 3.13).

3.14 Workmanship. The hoist shall withstand any operation specified herein without permanent deformation, breakage, malfunction or component interference caused by improper workmanship. Parts of the hoist, before and after painting, shall be clean and free of sand, rust, dirt, fins, pits, sprues, scale and other harmful extraneous material. Edges and surfaces exposed to operating and maintenance personnel shall be smooth and rounded so that a hazardous surface does not exist. Bolted connections shall use standard bolts and nuts. Self-locking nuts are acceptable. Threads shall have full thread engagement.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.2 Quality conformance inspection. Quality conformance inspection shall be performed on samples selected in accordance with 4.4. This inspection shall include the examination of 4.5 and the tests of 4.6.

4.3 Inspection lot. Units of the same size, type, and class offered to the Government at one time shall be considered a lot for purposes of inspection. The sample unit shall be one complete hoist unit.

4.4 Sampling.

4.4.1 Sampling for examination. A random sample of hoist units shall be selected from each lot offered to the Government in accordance with MIL-STD-105, at inspection level II. In terms of defects per 100 units, the acceptable quality level (AQL) shall be 2.5 for major defects and 4.0 for minor defects.

4.4.2 Sampling for tests. A random sample of hoist units shall be selected from each lot offered to the Government in accordance with MIL-STD-105, at inspection level S-4.

4.5 Examination. Sample units selected in accordance with 4.4.1 shall be examined to verify compliance with the nonoperational requirements of this specification. Defects shall be classified in accordance with

MIL-STD-105, and if the number of defective units is equal to or greater than the rejection number, the lot represented by the sample units shall be rejected.

4.6 Tests. Sample units selected in accordance with 4.4.2 shall be tested as specified in 4.6.1 through 4.6.12. Failure of the sample unit shall be cause for rejection of the lot.

4.6.1 High impact shock test. When specified (see 6.2.1), hoists shall undergo the high impact shock test in accordance with the requirements of MIL-S-901. Hoists shall undergo the type A test specified for a principal unit. Resilient mountings shall not be used. Trolley hoists shall be secured only by their own track clamps. Trolley hoists and hook suspension hoists shall be mounted in their normal position. Type VII hoists shall be tested in stowed position (horizontal attitude), constrained (not fastened) to prevent lateral movement, and clamped or strapped to resist vertical movement and prevent test unit from becoming a missile hazard to test personnel. Hoists shall have load hook retracted for the test. The chain shall be looped in bights not to exceed 2 feet, and secured in or lashed to the load hook during the test. Test fixture for mounting the hoist shall conform, as applicable, to the deck-platform or bulkhead mounting figures shown in MIL-S-901. A request to deviate from the test fixture, for mounting hoists differing from those specified, shall be submitted to the contracting activity. Shock tests shall comply with the requirements as specified. Separation of component parts of the hoist during the test or evidence of permanent deformation of the hoist during the post-shock inspection shall constitute failure of the hoist for grade A equipment. Separation of component parts from the hoist during the test shall constitute failure of the hoist for grade B equipment. Failure of the hoist to comply with the requirements of 3.2.12 following shock test shall constitute failure of the hoist. Failure of the hoist shall be cause for rejection of the lot.

4.6.2 Load tests. Hoist shall be subjected to load tests specified in 4.6.2.1 and 4.6.2.2. Hoist with overload protection devices shall be tested to demonstrate its ability to lift and hold a load equal to 1-1/2 times its rated capacity without slippage.

4.6.2.1 Static load test. Hoist shall support a static load of twice the maximum rated capacity for a period of 10 minutes. This load shall be suspended with the hoist load chain extended to the limit of the hoist's rated lift height. This extension may be changed to a minimum of 1 foot provided the contractor demonstrates that the entire length of chain is capable of 200 percent load. The suspended test load shall be held by the hoist brake. Evidence of failure or permanent deformation of hoist parts shall be cause for rejection of the lot.

4.6.2.2 Dynamic load test. Hoist shall be loaded to 150 percent of rated capacity and operated by hoisting and lowering the test load through the full operating range. Trolley type hoists shall be operated back and forth over a section of track, 8 or more feet in length, with the 150 percent load suspension. This test shall be performed 10 times. Hoist and trolley shall operate satisfactorily and brake shall exhibit no sign of slippage. Evidence of failure, permanent deformation, or excessive wear of hoist parts shall be cause for rejection of the lot.

4.6.3 Operating tests. Hoist shall be tested to determine that it is satisfactory for operation with rated load as follows:

(a) Hoisting speed test. Hoist shall be operated for approximately 90 percent of lift height, to verify conformance with the hoisting speed requirements.
(b) Lowering speed test. Hoist load hook shall be lowered at a maximum speed of 80 ft/min and timed to determine conformance with the speed governor requirements specified in 3.2.17.
(c) Travel limit test. Hoist shall be operated in the up and down directions so as to engage the limit switches to demonstrate hoist ability to prevent load hook overtravel.
(d) Load positioning control test. Hoist shall demonstrate its capability of accurately positioning a load. The test shall be conducted by establishing a reference height and then jogging the load to a position plus or minus 1/4 inch above and below the reference height. Repeat each test at least six times. Each positioning shall be accomplished by energizing the motor not more than six times.
(e) Performance test. Hoist shall be continuously operated at maximum speed (80 feet per second (ft/sec)) through approximately 90 percent of lift height for a period of not less than 30 minutes. During this test, the hoist shall operate satisfactorily without any indication of malfunction.

4.6.4 Manual operation test. Hoist shall be tested to demonstrate its ability to lift and lower through the full hoisting range a rated load, by means of the handwheel arrangement as specified in 3.2.20 and 3.2.20.1. When manually operating the hoist, demonstrate that the interlock prevents electrical operation.

4.6.5 Electromagnetic interference measurements. Techniques to be used for measurements and determination of the electromagnetic interference characteristics as specified in 3.2.19 and the test plan prepared by the contractor (see 4.7) shall be submitted to the contracting activity for review.

4.6.6 Geared trolley traverse test. On type III geared trolley hoists, a pull of not more than 1 pound per 200 pounds of total hoist load shall be exerted on the hand chain, to initiate movement of the hoist load and a pull of not more than 1 pound per 300 pounds to initiate hoist and trolley movement.

4.6.7 Track clamp test. Track clamps on type III hoists shall be tested by subjecting the loaded hoist to a pull equal to one-third of the rated capacity of the hoist. The pull shall be exerted in either direction parallel to the trolley track. Clamps shall hold the loaded hoist from moving in either direction, when the trolley track is in a horizontal position.

4.6.8 Fleet angle test. Hoist shall demonstrate its ability to pick up a load with the hook attached to the load at 3.5 feet out from an imaginary perpendicular 7 feet below the hoist. Chain hoists shall accomplish this without the chain jamming or jumping the pockets of the

load wheel. Wire rope hoists shall accomplish this lift without the rope jumping the grooves on the cable drum. The lift shall be conducted four times, once forward, once aft, and once on each side of the hoist (see 3.2.10.2, 3.7.4 and 4.6.9).

4.6.9 Trolley tests (type VI hoist). Hoist trolley shall be tested to demonstrate its capability of maintaining its positioning on the wire rope on which it operates under the following conditions:

(a) With the hoist attached to the trolley and the load hook empty, oscillating the suspended hoist ten times about the axis of the wire rope through an included angle of 70 degrees (35 degrees on either side).
(b) Repeat (a) with rated load.
(c) Repeat (a) with 150 percent rated load.
(d) Demonstrate the hoist capability to pick up a load in any direction that is at an angle of 15 degrees from the point of hoist suspension to a perpendicular, from the same point on the hoist (see 3.7.4).
(e) Plain trolley test. The pull required to move the capacity-loaded hoist (plain trolley suspension) along a straight portion of track shall be determined by attaching a wire rope or cord to the trolley so that the pull is exerted parallel to the track, and then over a sheave hanging from the track at a reasonable distance from the trolley, and measuring the required pull by means of weights or spring balance attached to cable or cord. Failure to comply to the requirements for maximum pull to traverse the hoist shall constitute failure of this test.
(f) Geared trolley test. The pull required on the geared trolley hand chain to move a capacity-loaded hoist (gear trolley suspension) along a straight portion of track shall be determined by attaching weights or a spring balance to the hand chain. Failure to comply to the requirements for maximum pull to traverse the hoist shall constitute failure of this test.
(g) Hand operation. The hoist and the trolley of types III, VI, and VIII shall be operated by hand on straight and curved track with rated load. A pull of not more than 1 pound per 200 pounds of hoist load shall be required to initiate movement, and not more than 1 pound per 300 pounds of hoist load shall be required to sustain movement.

4.6.10 Mounting hook test (type VII hoist). Safety gate of the mounting hook as specified (see 3.8.2) shall demonstrate its ability to hold a load equal to the weight of the fully loaded hoist. This hook shall be attached to a padeye of sufficient strength and a cable shall be rigged through the hook and safety gate to a load equal to the weight of the fully loaded hoist. Safety gate shall hold this load (without assistance from the hook) without any distortion and shall operate properly upon removal of the load.

4.6.11 Trolley tests (type VIII hoist). Powered trolley hoists shall be subjected to the following tests to determine capability of trolley operation:

(a) Traversing speed test. The power-operated trolley shall traverse the hoist with rated load along a horizontal trolley track, simulating a ship at an even keel to verify compliance with the traversing speed specified.

(b) Trolley drive test (rolling conditions). The trolley shall traverse the loaded hoist on a trolley track inclined at an angle of 15 degrees from a horizontal centerline, to verify satisfactory operation during ship rolling. The trolley will not be required to operate at a specified speed on this incline but shall move along steadily.

(c) Trolley brake test. With the hoist fully loaded and the trolley on an inclined and tilted track at an angle of 15 degrees, it shall be demonstrated that when stopped, the trolley shall maintain its position on the track by means of the braking arrangement specified in 3.9.4.

4.6.12 Endurance test (all types). Hoists shall be subjected to 3,000 cycles of continuous operation. A cycle of operation is defined as the lifting and lowering through the full hoisting range a rated load at the specified lifting and lowering speeds. In the event that a failure should occur during this test, the contractor shall investigate the cause, and initiate a design study to identify a design change. A report (see 4.7) covering the failure and proposed correction shall be submitted to the contracting activity. Upon review of the proposed corrections by the contracting activity, the test unit and all remaining units shall be modified and the endurance test continued (see 3.10). After completion of the above tests, gears, chain, bearings, chain sprockets, brakes, and other wearing parts shall be examined for excessive wear. Excessive wear is defined as that which is sufficient to impair safe operation of the hoist. Excessive wear shall constitute: increase in chain wheel pocket dimension in excess of 10 percent, increase in clearance tolerance between shaft and bearing in excess of 15 percent, life-lubricated bearings requiring lubrication, load-brake lining reduced in excess of 50 percent of useful life, reduction of bar diameter of link chain in excess of 10 percent, reduction of wall thickness for rollers and pins of roller chain in excess of 10 percent, and reduction in gear tooth thickness of reduction gear drive in excess of 10 percent. Evidence of excessive wear shall be cause for rejection.

4.7 Test plan and test report. The contractor shall prepare a test plan and test report in accordance with the data ordering documents included in the contract or order (see 6.2.2).

4.8 Inspection of packaging. Sample packages and packs and the inspection of the preservation-packaging, packing and marking for shipment and storage shall be in accordance with the requirements of section 5 and the documents specified therein.

5. PACKAGING

(The preparation for delivery requirements specified herein apply only for direct Government acquisitions. For the extent of applicability of the preparation for delivery requirements of referenced documents listed in section 2, see 6.4.)

5.1 Preservation-packaging, packing, and marking. The equipment, accessories, manuals, and data shall be preserved-packaged level A or C, packed level A, B, or C as specified (see 6.2.1), and marked in accordance with MIL-P-3184, and as specified herein.

5.2 Cushioning and wrapping materials. Use of excelsior, newspaper, shredded paper (all types, including wax paper), and similar hygroscopic or nonneutral materials and all types of loose-fill materials for applications such as cushioning, filler, stuffing, and dunnage for materials destined for shipboard stowage and use, is prohibited. The exception, vermiculite, is approved for packaging applications of liquid (chemical, petroleum, etc.) products. Cushioning and wrapping materials selected shall incorporate properties/characteristics for resistance to fire. Examples are as follows:

UU-P-268 - Paper, kraft wrapping type II, grade C or D
PPP-C-850 - Polystyrene, expanded grade SE, type I or II only
PPP-C-1120 - Bound fiber, uncompressed type III or IV, class C
MIL-R-6130 - Cellular rubber, grade A
MIL-R-20092 - Cellular rubber, class 1 or 4
MIL-P-26514 - Polyurethane foam (rigid or flexible)

6. NOTES

6.1 Intended use. Hoist covered by this specification are intended for general material handling.

6.1.1 Hoist type selection. The following is provided as guidance in the selection of the type of hoist. Lug suspended hoists are attached by bolts to either the overhead or a trolley. Double-acting hoists have a load chain with two free ends and a detachable hook. A load can be lifted from either end but not both ends at once. Single-acting hoists have only one free end with the other end attached to the hoist. Plain trolley hoists are moved (traversed) by pulling or pushing the load and are intended for loads of less than 3 tons, infrequent motion, and short distances. Geared trolley hoists are traversed by a hand chain and wheel (parallel or at right angles to the track) and are intended for infrequent use or short distances where a plain trolley is impractical. Powered trolley hoists are intended for heavier loads, longer distances, and more usage than plain or geared trolley hoists. Base-mounted hoists are mounted on the deck, bulkhead, or overhead. Hook-suspended hoists have a hook on top of the hoist to allow a portable hoist to be hung anywhere. Two-wheel tandem trolley hoists are used on a single wire rope which is used in place of a track or rail.

6.2 Ordering data.

6.2.1 Acquisition requirements. Acquisition documents should specify the following:

(a) Title, number, and date of this specification.
(b) Type of hoist required (see 1.2).
(c) Whether zinc plating is required for load chain (see 3.2.1).
(d) Type of load hook required (see 3.2.5).
(e) If zinc coating of hooks is not required (see 3.2.6).
(f) Capacity, maximum weight, headroom, and dimensions of hoist required (see 3.2.11 and 3.9.6).
(g) Whether shock is required (see 3.2.12 and 4.6.1).
(h) Electric motor requirements (see 3.2.13).
(i) Capacity, type, and length of cable (see 3.2.13.1).
(j) Motor controller requirements (see 3.2.14).
(k) Electric brake requirements (see 3.2.15).
(l) Whether manual brake release is required (see 3.2.15.1).
(m) Length of control cable (see 3.2.16 and 3.3.3).
(n) Whether speed governor is required (see 3.2.17).
(o) Whether manual operation is required (see 3.2.20).
(p) Hoisting speed (see 3.2.21).
(q) Height of lift (see 3.2.23).
(r) Type of control station required on type II, V, and VIII hoists (see 3.4.2, 3.6.3, and 3.9.5).
(s) Type of load lifting medium required on type III and VII hoists (see 3.5.1 and 3.8.1).
(t) Geared or plain trolley on type III hoists (see 3.5.2).
(u) Chain for operation of geared trolley (see 3.5.2.1).
(v) If trolley wheel spacing is other than specified (see 3.5.2.1).
(w) Weight and radius of I-beam for type III and VIII hoists (see 3.5.4 and 3.9.3).
(x) Type V hoist load lifting medium requirements (see 3.6.1):
    (1) Length of wire rope.
    (2) Rope entry.
(y) Type VI hoist trolley requirements (see 3.7.2):
    (1) Size and type of wire rope.
    (2) Speeds and acceleration rates.
    (3) Load pull on clevis connection.
(z) Length of roller chain (see 3.9.4).
(aa) Whether reliability and maintainability tasks are required (see 3.10.1.1 and 3.10.2.1).
(bb) If drawings are required (see 3.13.1).
(cc) Level of preservation-packaging and packing required (see 5.1).

6.2.2 Data requirements. When this specification is used in an acquisition which incorporates a DD Form 1423, Contract Data Requirements List (CDRL), the data requirements identified below shall be developed as specified by an approved Data Item Description (DD Form 1664) and delivered in accordance with the approved CDRL incorporated into the contract. When

the provisions of DAR 7-104.9(n)(2) are invoked and the DD Form 1423 is not used, the data specified below shall be delivered by the contractor in accordance with the contract or purchase order requirements. Deliverable data required by this specification is cited in the following paragraphs.

Paragraph	Data requirement title	Applicable DID No.	Option
3.10.1.1	Reliability program	DI-R-7079	------
3.10.2.1	Plan, maintainability program	UDI-R-23558	------
3.13	Manual, technical, preliminary	DI-M-2043	Type I of MIL-M-15071 Level 3
3.13 and 3.13.1	Drawings, engineering and associated lists	DI-E-7031	Design activity designation - contractor Drawing number - contractor Parts list - integral
4.7	Production inspection reports	DI-T-4904	------

(Data item descriptions related to this specification, and identified in section 6 will be approved and listed as such in DoD 5000.19L., Vol. II, AMSDL. Copies of data item descriptions required by the contractors in connection with specific acquisition functions should be obtained from the Naval Publications and Forms Center or as directed by the contracting officer.)

6.2.2.1 The data requirements of 6.2.2 and any task in section 3, 4, or 5 of the specification required to be performed to meet a data requirement may be waived by the contracting/acquisition activity upon certification by the offeror that identical data were submitted by the offeror and accepted by the Government under a previous contract for identical item acquired to this specification. This does not apply to specific data which may be required for each contract, regardless of whether an identical item has been supplied previously (for example, test reports).

6.3 Provisioning. Provisioning Technical Documentation (PTD), spare parts, and repair parts should be furnished as specified in the contract.

6.3.1 When ordering spare parts or repair parts for the equipment covered by this specification, the contract should state that such spare parts and repair parts should meet the same requirements and quality assurance provisions as the parts used in the manufacture of the equipment. Packaging for such parts should also be specified.

6.4 Sub-contracted material and parts. The preparation for delivery requirements of referenced documents listed in section 2 do not apply when material and parts are acquired by the contractor for incorporation into the equipment and lose their separate identity when the equipment is shipped.

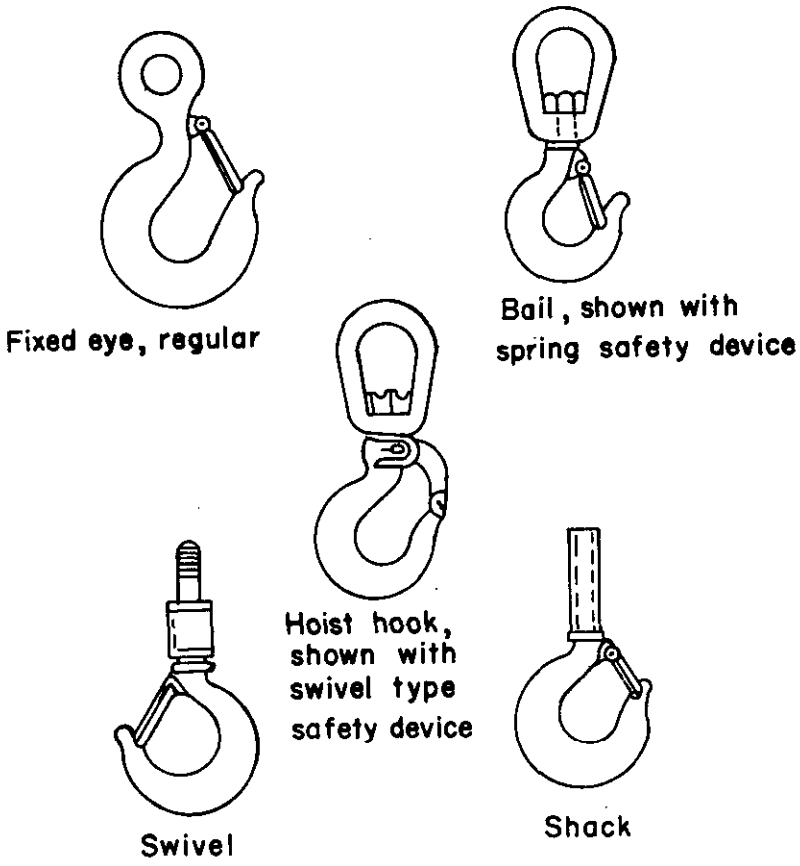
6.5 Cross reference of classification. The following is a cross reference of classifications between MIL-H-15317B and this revision:

MIL-H-15317B	MIL-H-15317C
Type I	Type I
Type II	Type II
Type III	Type III
Type IV	Deleted
Type V	Type V
Type VI	Type VI
--------	Type VII (new)
--------	Type VIII (new)

6.6 Changes from previous issue. Asterisks are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

Custodians:
Navy - SH
Army - ME
Review activity:
DLA - CS
User activities:
Navy - MC, OS

Preparing activity:
Navy - SH
(Project 3950-0205)



SH 12005

FIGURE 1. Illustrating types of hoist hooks (shown with safety latch).

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

OMB Approval
No. 22-R255

INSTRUCTIONS: The purpose of this form is to solicit beneficial comments which will help achieve procurement of suitable products at reasonable cost and minimum delay, or will otherwise enhance use of the document. DoD contractors, government activities, or manufacturers/vendors who are prospective suppliers of the product are invited to submit comments to the government. Fold on lines on reverse side, staple in corner, and send to preparing activity. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements. Attach any pertinent data which may be of use in improving this document. If there are additional papers, attach to form and place both in an envelope addressed to preparing activity.

DOCUMENT IDENTIFIER AND TITLE

MIL-H-15317C

NAME OF ORGANIZATION AND ADDRESS

CONTRACT NUMBER

MATERIAL PROCURED UNDER A

☐ DIRECT GOVERNMENT CONTRACT ☐ SUBCONTRACT

1. HAS ANY PART OF THE DOCUMENT CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE?

A. GIVE PARAGRAPH NUMBER AND WORDING.

B. RECOMMENDATIONS FOR CORRECTING THE DEFICIENCIES

2. COMMENTS ON ANY DOCUMENT REQUIREMENT CONSIDERED TOO RIGID

3. IS THE DOCUMENT RESTRICTIVE?

☐ YES ☐ NO *(If "Yes", in what way?)*

4. REMARKS

SUBMITTED BY *(Printed or typed name and address - Optional)*

TELEPHONE NO.

DATE

DD FORM 1 JAN 72 1426 REPLACES EDITION OF 1 JAN 66 WHICH MAY BE USED

S/N 0102-014-1802