NOTICE OF INACTIVATION FOR NEW DESIGN

INCH-POUND

MIL-H-904J
NOTICE 1
18 February 2003

MILITARY SPECIFICATION

HOISTS, CHAIN, HAND-OPERATED, HOOK AND TROLLEY SUSPENSION

MIL-H-904J is inactive for new design and is no longer used, except for replacement purposes. Future acquisitions for new design of MIL-H-904J should be made under ASME HST-3, "Performance Standard for Manually Lever Operated Chain Hoists".

The Qualified Products List (QPL) associated with this inactive for new design specification will be maintained until acquisition of the product is no longer required, whereupon the specification and QPL will be cancelled.

(Copies of ASME publications are available from ASME International, Three Park Avenue, New York, NY 10016-5990, or www.asme.org.)

Custodians:
Navy – SH
Air Force – 99

Preparing activity:
Navy – SH
(Project 3950-0335)

Review activities:
Navy – CG, MC, SA, YD
Air Force – 84
DLA - CC
Misc - MP

INCH-POUND

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SUPERSEDING
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MILITARY SPECIFICATION

HOISTS, CHAIN, HAND-OPERATED, HOOK AND TROLLEY SUSPENSION

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

1. SCOPE

1.1 Scope. This specification covers hand-operated chain hoists.

1.2 Classification. Chain hoists must be classified as specified in 1.2.1 through 1.2.3 (see 6.2):

1.2.1 Classes. Hoists shall be of the following classes:

Class 1 - Cast steel, forged steel, and malleable or high strength cast iron used for general material handling.

Class 2 - Light weight materials which have been selected for the primary purpose of producing a light net weight unit consistent with required strength and service for general material handling.

Class 3 - Free of cast iron load bearing parts, used for special purpose services (such as reactor component hang).

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 55Z3, Department of the Navy, Washington, DC 20362-5101 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A FSC 3950

1.2.2 Types. Chain hoists shall be of the following types. Type H shall be as specified (see 6.2).

Type C - Link chain, hook suspension
Type D - Link chain, plain trolley suspension
Type E - Link chain, geared trolley suspension
Type F - Link chain, low headroom, plain trolley suspension.
Type G - Link chain, low headroom, geared trolley suspension
Type H - Link chain, or roller chain, hook suspension, lever operated, fixed or convertible capacity.

1.2.3 Capacities. Hoist capacities shall be as specified (see 1.2).

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation (see 6.2).

SPECIFICATIONS

FEDERAL

PPP-F-320 Fiberboard; Corrugated and Solid, Sheet Stock (Container Grade), and Cut Shapes

QQ-B-728 Bronze Manganese; Rod, Shapes, Forgings, and Flat Products (Flat Wire, Strip, Sheet, Bar, and Plate)

TT-E-490 Enamel, Silicone Alkyd Copolymer, Semigloss (for Exterior and Interior Use)

MILITARY

MIL-S-901 Shock Tests, HI (High-Impact); Shipboard Machinery, Equipment and Systems, Requirements for

MIL-E-917 Electric Power Equipment, Basic Requirements (Naval Shipboard, Use)

MILITARY (Continued)

MIL-H-3280	Hoists, Chain, Manually Operated, Packaging of
MIL-L-17331	Lubricating Oil, Steam Turbine and Gear, Moderate Service
MIL-L-19140	Lumber and Plywood, Fire-Retardant Treated
MIL-P-23236	Paint Coating Systems, Fuel and Salt Water Ballast Tanks; (Metric)
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-C-24707/5	Iron Castings, Nodular Graphitic (Ductile Iron) and Nodular Graphitic (Corrosion Resisting Austenitic, Low Magnetic Permeability) (For Shipboard Application)

STANDARDS

MILITARY

MIL-STD-278	Welding and Casting Standard
MIL-STD-792	Identification Marking Requirements for Special Purpose Components

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Standardization Documents Order Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

2.1.2 Other Government publication. The following other Government publication forms a part of this document to the extent specified herein. Unless otherwise specified, the issue is that cited in the solicitation.

PUBLICATION

NAVAL SEA SYSTEMS COMMAND (NAVSEA)

NAVSHIPS 0900-LP-003-8000	Surface Inspection Acceptance Standards for Metals

(Application for copies should be addressed to the Naval Publications and Forms Center, (ATTN: NPODS), Standardization Document Order Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

2.2 Non-Government publications. The following documents form a part of this document to the extent specifies herein. Unless otherwise specified, the issues of the document which are DOD adopted are those listed in the issue of the DODIS specified in the solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS are the issues of the documents cited in the solicitation (see 6.2).

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

A 48	Standard Specification for Gray Iron Castings; (DOD adopted)
B 26	Standard Specification for Aluminum-Alloy Sand Castings; (DOD adopted)
B 108	Standard Specification for Aluminum-Alloy Permanent Mold Castings; (DOD adopted)
B 633	Standard Specification for Electrodeposited Coatings, of Zinc on Iron and Steel; (DOD adopted)
B 695	Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel

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

STEEL STRUCTURES PAINTING COUNCIL (SSPC)

SP 10	Near-White Blast Cleaning; (DOD adopted)

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

(Non-Government standards and other publications am normally available from the organizations that prepare or distribute the documents. These documents also may be available in or through libraries or other informational services.)

2.3 Order of precedence. In the event of a conflict between the text of this document and the references herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Qualification and first article. Qualification and first article requirements, as applicable, shall be as specified (see 3.1.1 and 3.1.2).

3.1.1 Qualification. Class 1 and class 2 hoists of each type and capacity furnished under this specification shall be products which are authorized by the qualifying activity for listing on the applicable qualified products list at the time of award of contract (see 4.3 and 6.5).

3.1.2 First article. When specified (see 6.2), a sample shall be subjected to first article inspection (see 6.6). First article inspection is not required for hoists on the qualified products list.

3.2 Materials. Material used shall be as specified in 3.2.1 through 3.13.

3.2.1 Class 3 hoists. Metal castings, weldments, and steel forgings used for load bearing parts on class 3 hoists shall be inspected as specified (see 4.4.1). Cast iron shall not be used for bearing parts. Cast iron for non-load bearing parts shall be in accordance with MIL-C-24707/5 or ASTM A 48, class 35 or better. Aluminum castings for load bearing or non-load bearing parts shall be in accordance with ASTM B 26 or ASTM B 108, type UNS A03560, temper T6.

3.2.2 Recovered materials. Unless otherwise specified herein, all equipment, material, and articles incorporated in the products covered by this specification shall be new and may 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 material. 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.

3.2.3 Prohibited material. Material prohibited for equipment used aboard ship shall be as follows:

a. Cadmium in any form
b. Asbestos
c. Magnesium or magnesium based alloys (does not include steel or aluminum which contain less than 0.1 percent magnesium).

3.3 Construction (see 6.3). The hoist construction shall ensure trouble-free hoist service life. 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 foreign matter. Rotating and sliding surfaces shall be lubricated. The hoist shall include a brake to provide positive control of the hoist load at all times. Hoists shall operate at environment temperatures of 0 through 130 degrees Fahrenheit. Metals susceptible to corrosion attack in a seawater environment shall be treated, plated, or painted to provide corrosion resistance. Chain replacement shall be accomplished by use of simple hand tools. Chain hoists shall have a spur or helical geared reduction mechanism. Lever hoists may be direct drive or ratchet and pawl drive. Gears shall be enclosed against foreign matter (such as dirt, dust, and water spray) in a casing that will permit ready access for inspection and cleaning. Positive means of securing loose parts such as nuts, bolts, collars, and check rings shall be provided to prevent any component working loose. The hoists shall be complete in all respects, including operating controls and other equipment that may be necessary for operation. The maximum combined stress in component parts shall not exceed 70 percent of the yield strength of the material (see 4.7.1 and 4.7.2). For all classes of hoists at rated load, the safety factor for load bearing parts shall be a minimum of 3, based on the yield strength of the materials used; or a minimum safety factor of 5, based on the ultimate strength, whichever provides the lowest design stress. For hoists requiring repair parts, all wear parts shall be readily accessible for replacement. Equivalent spares for the same class and type hoists shall be interchangeable.

3.3.1 High-impact shock. When specified (see 6.2), the hoist shall withstand the grade A or B high-impact shock test as specified in MIL-S-901 (see 4.7.9). When specified (see 6.2), unloaded hoists, when stowed (not operating) on the rail, shall withstand high impact shock in accordance with grade A of MIL-S-901, without permanent deformation or degradation of any operating functions. It will be permissible for trolley hoist to drift along track under shock conditions, provided no damage to trolley hoist or brake results and brake holds hoist to rail after shock. Drift shall be not greater than 1 inch. Motor shall be bolted to the frame.

3.3.2 Load in and band chain. Load chain shall be alloy steel and hand chain shall be carbon steel or alloy steel. Chain finish shall be as specified in 3.3.2.3.

3.3.2.1 Load chain. The load chain shall be of a hardness and strength to withstand the applicable tests specified in 4.7.1 through 4.7.9 and a safety factor of 5 for the rated load of the hoist, based on the ultimate strength of the material.

3.3.2.1.1 Load chain (link chain type). The load chain links shall be electric- or forge-welded. Each link shall be of uniform size and shape, free from scale and laminations at the welds, and shall seat properly in the hoist chain sheave pockets. The chain shall be free from any tendency to snarl. The ends of the load chain shall be securely attached to the load

block or hook swivel (except multiple reeved) and to the hoist, or provided with a means to prevent the end of the chain passing through the hoist. The ends of the load chain shall also permit ready replacement of the chain.

3.3.2.2.1 Load chain (roller chain type). The load roller chain shall be a free-roller chain which is readily replaceable. Material for pins, bushings, roller, and sidebars of roller chains shall be carbon or alloy steel and shall be of a hardness and strength to withstand the applicable tests specified in 4.7.1 through 4.7.9 and a safety factor of 5 for the rated load of the hoist, based on the ultimate strength of the material.

3.3.2.2 Hand chain. The hand chain shall be endless link chain and shall have a drop which is approximately 2 feet less then the specified lift of the hoist. The hand chain shall have a minimum rated strength of at least three times the maximum chain pull required to lift the rated load. Connecting links are permitted. The hand chain shall be of a hardness and strength to withstand the applicable tests specified in 4.7.1 through 4.7.9. The hand chain wheel shall be compatible with the chain material selected.

3.3.2.3 Finish. The link load chain, the link hand chain, and the hook safety device shall be protected by electro-deposited zinc to resist corrosion. Zinc coating shall conform to type I, class Fe/Zn 13 of ASTM B 633 or type I, class 25 of ASTM B 695. The plating process shall be such that there will be no impairment in free movement of any chain link after plating. The roller chain shall have a blue oxide finish supplemented by a coating of combination lubricant and rust preventative.

3.3.3 Load chain sprocket and shaft. The load chain sprocket for link chain hoists shall have pockets accurately shaped to fit the links of the load chain. The load chain sprocket for roller chain hoists shall accommodate the links of the roller chain. The load chain sprocket may be integral with or rigidly connected to the load chain shaft. Welding of the load chain sprocket to the shaft is not permitted.

3.3.3.1 Chain guides. Enclosed chain guides shall be provided to assure that the hoist load chain enters the sprocket in the proper position to prevent misalignment or jamming of the hoist load chain and sprocket. These guides, if bolted on, shall have locknuts or other means to prevent loosening under vibration.

3.3.4 Hand chain wheels. Hand chain wheels shall have accurately shaped pockets to fit the hand chain. The wheels shall be equipped with a chain guide that will permit operation of the hand chain from an angle 10 degrees out from either side of the chain wheel without slipping or jumping the wheel rim.

3.3.5 Hooks, yokes, crossheads, and bars. Hooks shall withstand the applicable tests specified in 4.7.1 through 4.7.9. Except for the type I hook, the hook shank and the bearing surface of the hook, the swivel, the yoke, the crosshead, and bars shall be finished in such a manner as to permit rotating of the unloaded hoist or load hook without twisting the chain. Positive means shall be a provided to prevent the load hook from loosening due to rotation of the load.

3.3.5.1 Hooks. The load and hoist-support shall be forged steel and shall conform to type I, II, III, or IV of figure 1. Unless otherwise specified (see 6.2), load and hoist support hooks shall be fitted with a swivel and a hook throat opening safety device. The safety device shall consist of a spring latch (style 1) or swivel closure (style 2) to bridge the throat opening and shall be attached to, or be integral with, the hook types shown on figure 1. Hook throat openings shall conform to the dimensions shown in table I. The safety device shall be constructed of non-corrosive metal or metal with a corrosion-resistant finish as specified in 3.3.2.3.

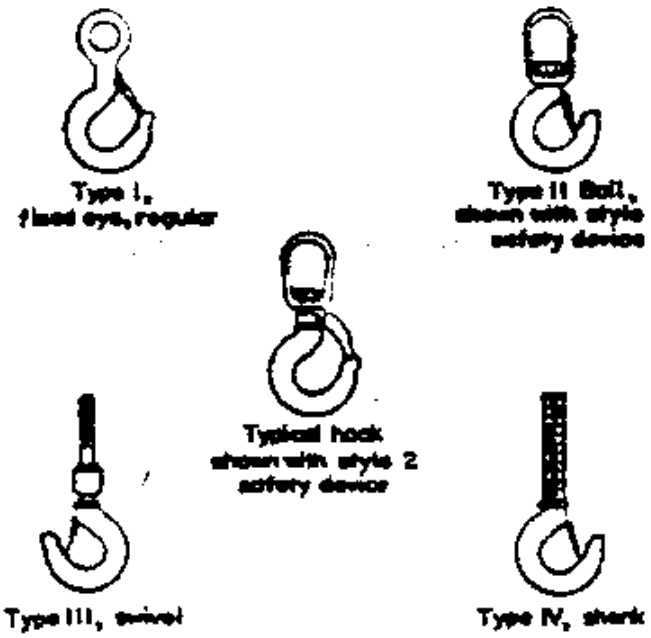

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FIGURE 1. *Types of hoist hooks (shown with safety devices, style 1 and style 2).*

TABLE I. Hook throat openings.

Hoist rated load, tons [1] (min)	Hook with safety device, throat opening, inches (min)
1/4 - 3/4	3/4
1	29/32
1-1/2	1
2 - 3	1-1/8
4	1-3/8
5 - 6	1-5/8
7 - 12	2-1/16
12-1/2 - 14	2-1/4
15 - 19	2-3/4
20	3

[1] 2,000 pounds per ton.

3.3.6 Hoist brake. Hoist construction shall provide for automatic brake operation to secure a suspended load if the hand chain is released or operating mechanism fails. Lowering shall be possible only by manual operation of the hoist (hand chain or hand lever). The brake device shall be self-adjusting for the service life of the brake lining. The brake shall support the required hoist loads with no evidence of permanent deformation or excessive wear (see 4.7 and 4.7.3). The brake device and brake surfaces shall be protected against the retention of dirt, dust, and water.

3.3.7 Trolleys (plain and geared). Trolley requirements shall be as specified in 3.3.7.1 through 3.3.7.7.

3.3.7.1 Wheels. Trolleys shall be provided with at least four steel wheels. Trolleys up to and including 3-ton capacity shall have wheels of steel with treads hardened to a minimum depth of 0.020 inch. For trolleys over 3-ton capacity, wheels shall be forged or solid steel with treads hardened to a minimum depth of 0.063 inch. Trolley wheels shall have treads hardened to minimum 285 Brinell hardness number. Wheels shall concentric within 0.030 inch, and cast wheels shall be machined, if necessary, to maintain a concentricity of 0.030 inch. Where the wheel mounting arrangement is such that the wheels are not canted to the flange of "I" beam (S-section) trolley track (tapered treads), wheel treads shall be a convex shape to minimize wear. The operating, device for geared trolleys shall be a chain wheel equipped with an endless chain of a length as specified in 3.3.2.2. Unless otherwise specified (see 6.2), trolley wheel spacing shall be for use on applicable standard "I" beam flange size.

3.3.7.1.1 Wheel axles. Wheel axles shall be made of carbon or alloy steel.

3.3.7.2 Wheel bearings. The trolley wheels shall be equipped with anti-friction bearings. The wheel bearings shall be protected to exclude foreign matter.

3.3.7.3 Wheel gear and drive pinion. The trolley wheel gear and drive pinion shall be made of steel, malleable iron, or bronze in accordance with QQ-B-728.

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

3.3.7.1 Hoist track clamps. When specified (see 6.2), quick acting track clamps shall be provided for locking fully loaded trolley hoists to the track. The clamps shall be adjustable for wear and shall function equally well on curved or straight track. The 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. The operating device for trolley track clamps shall be either a chain wheel equipped with a hand chain, a lever, or a drum and lanyard. The hand pull required to set or release the trolley track clamps shall not exceed 80 pounds. The chain or lanyard drop from the beam shall end approximately 2 feet less than the specified lift of the hoist. The trolley track clamps shall show no sign of slipping or of permanent deformation (see 4.7.4).

3.3.7.6 Curved track. Unless otherwise specified (see 6.2), the trolley wheels shall be spaced to negotiate curved track at the radii shown in tables III, IV, and V.

3.3.7.7 Wheel preventer bars. Trolley wheel presenter bars shall be provided to prevent the trolley wheel flanges from riding up onto the supporting beam.

3.3.8 Chain container. When specified (see 6.2), types C, D, E, F, and G shall be equipped with a load chain container of durable construction to store the slack load chain. The load chain container shall have sufficient volume to contain the slack load chain and shall be located to prevent interference with the hoist operation.

3.3.9 Over capacity of class 3 hoists. Class 3 hoists shall pass periodic dynamic overload tests at 125 percent of rated load and periodic static overload tests at 150 percent of rated load.

3.3.10 Load limiting device. When specified (see 6.2), a load limiting device shall be provided as part of the hoist. This device shall prevent the hoist from lifting a load greater than 125 percent of rated load.

3.4 Type C, hook suspension. Type C hook suspension shall conform to the requirements of table II and as specified herein.

3.5 Types D and E, plain and geared trolley suspension. Types D and E plain and geared trolley suspension shall conform to the requirements of table III and as specified herein. The efficiency and hand chain pull requirements shall be in accordance with table II.

TABLE II. Type C, hook suspension.

Rated load	Standard lift [2]	Distance between hooks	Weight [1] (max)		Hand chain pull to lift the rated load (max)	Mechanical efficiency
		(max) [3]	Class 1 Class 3	Class 2		(min) [4]
(ton) [5]	(feet)	(inch)	(pound)	(pound)	(pound) [6]	(percentage) [7]
1/4	8	14-1/4	71	42	50	80
1/2	8	18	71	44	60	80
1	8	18	105	47	80	80
1-1/2	8	21	163	79	85	75
2	8	23	245	84	95	75
3	8	25-1/2	284	131	105	70
4	8	37	336	145	110	70
5	8	45	434	181	115	70
6	8	45	441	205	115	70
8	8	49	525	320	120	65
10	8	54	651	338	120	65
12	8	54	919	386	130 [7]	65
16	8	60	1,176	630	130 [7]	65
20	8	71	1,365	1,155	130 [7]	65

[1] Shall not be exceeded (see 6.7)
[2] See 6.2
[3] Measured between the inside of the suspension and load hooks when load chain is retracted to its shortest length.
[4] See 4.7.3.
[5] 2,000 pounds per ton.
[6] See 4.7.3.1.
[7] Up to 10 percent efficiency is acceptable when the pull load is less than specified.
[8] Indicates pull on each hand chain when operated simultaneously.

TABLE III. Types D and E, plain and geared trolley suspensions.

Rated load	Standard lift [2] (min)	"I" beam size [3]	Beam to hook distance [4] (max)	Pull to traverse hoist (max)		Track radius [5] (min)	Weight [1] (max)			
							Type D		Type E	
				Type D	Type E		Classes 1 and 3	Class 2	Classes 1 and 3	Class 2
(ton) [6]	(feet)	(inch)	(inch)	(***) [7]	(***) [8]	(inch)	(***)	(***)	(***)	(***)
1/4	8	5	11-1/2	15	-	21	124	104	-	-
1/2	8	5	14	20	5	21	124	104	-	121
1	8	6	14-3/8	40	10	21	179	105	-	132
1-1/2	8	7	18-3/4	45	13	36	273	208	294	236
2	8	8	18-3/4	60	15	36	250	210	378	236
3	8	10	20	65	21	48	452	315	504	355
4	8	10	27-1/16	70	23	66	561	320	662	357
5	8	12	27-3/4	75	28	66	767	394	840	483
6	8	12	27-3/4	100	35	66	767	431	890	483

*** = pound *** = pound

[1] Weight (less track clamp) shall not be exceeded (see 6.7).
[2] See 6.2.
[3] Standard size "I" beam (S-section).
[4] Maximum distance between hook and underside of "I" beam, measured from inside of load hook when load chain is retracted to its shortest length.
[5] Minimum curve of track.
[6] 2,000 pounds per ton.
[7] Direct pull on trolley (along direction of track when moving on straight level track).
[8] Pull on gear trolley hand chain (when moving on straight level track).

3.6 Type F, low headroom, plain trolley suspension. Type F, low headroom, plain trolley suspension shall conform to the requirements of table IV and as specified herein. The efficiency and hand chain pull requirements shall be in accordance with table II.

3.7 Type G, low headroom, geared trolley suspension. Type G shall conform to the requirements of table V and as specified herein. The efficiency and hand chain pull requirements shall be in accordance with table II.

TABLE IV. Type F, low headroom, plain trolley suspension.

Rated load	Standard lift [1] (min)	Standard size of "I" beam	Distance between load hook and underside of beam (max) [2]	Radius of track curve (min)	Pull to traverse hoist (max)	Weight less track clamp (max)
(ton) [1]	(feet)	(inch)	(inch)	(inch)	(pound) [4]	(pound) [5]
1/2	8	5	6	21	20	189
1	8	6	6	21	40	210
1-1/2	8	7	6-3/4	36	45	294
2	8	8	7	36	60	341
3	8	9	8	48	65	473

[1] 2,000 pounds per ton.
[2] See 6.2.
[3] Measured from inside of load hook when load chain is retracted to its shortest length.
[4] Direct pull on trolley (along direction of track) when moving on straight level track.
[5] Shall not exceeded (see 6.7).

TABLE V. Type G, low headroom, geared trolley suspension.

Rated load	Standard lift [1] (min)	Standard size of "I" beam	Distance between load hook and underside of beam (max) [2]	Radius of track curve (min)	Pull to traverse hoist (max)	Weight less track clamp (max)
(ton) [3]	(feet)	(inch)	(inch)	(inch)	(pound) [4]	(pound) [5]
1-1/2	8	7	6-3/4	36	13	326
2	8	8	7	36	15	373
3	8	9	8	48	21	499
4	8	10	9-1/2	66	30	735
5	8	12	10-1/2	66	38	1,008
6	8	12	10-1/2	66	45	1,019

[1] 2,000 pounds per ton.
[2] See 6.2.
[3] Measured from inside of load hook when load chain is retracted to its shortest length.
[4] Pull on geared trolley hand chain (when moving on straight level track).
[5] Shall not be exceed (see 6.7).

3.8 Type II book suspension, lever operated, fixed and convertible capacity. Type H shall be hook suspended, lever operated, and shall contain a mechanism for hoisting and lowering which is either a pawl ratchet and lever, or a spur geared arrangement (friction brake) constructed for safe operation of the hoist. The hoist shall feature a brake device that shall support the maximum loads specified. There shall be no limitation on position of the hoist when in use.

3.9.1 Fixed. Fixed rated load hoists shall conform to the requirements shown in table VI and as specified herein.

TABLE VI. Type H, hook suspension, fixed capacity, roller and link chain.

Rated load	Standard lift [2] (min)	Distance between hooks, retracted (max) [3]	Pull on lever to lift rated load [4]	Weight [1] (max)		Mechanical efficiency (min)
				Class 1 Class 3	Class 2	
(ton) [5]	(inch)	(inch)	(pound)	(pound)	(pound)	1 (percent) [6]
1/2	65	8-1/2	45	16	11	80
3/4	50	13	70	21	16	80
1	50	13	70	26	15	75
1-1/2	50	18	85	37	26	60
2	50	19	85	44	26	60
2-1/2	50	19	85	44	26	65
3	50	20-1/2	95	47	38	55
4-1/2	50	25	102	68	53	55
6	50	26	110	89	68	55
9	50	36-1/2	110	126	84	55
11	50	36-1/2	110	142	105	55
13	50	36-1/2	110	158	126	55
15	50	36-1/2	110	273	158	55

[1] Shall not be exceeded (see 6.7).
[2] See 6.2.
[3] Measured between inside of suspension and load hooks when chain is retracted to its shortest length.
[4] See 4.7.3.2.
[5] 2,000 pounds per ton.
[6] Up to 10 percent lower efficiency is acceptable when the pull is less than specified.

3.8.2 Convertible. Convertible capacity hoists shall conform to the requirements shown in table VII and as specified herein.

3.8.2.1 Increasing rated load. Means for increasing the rated load of type H convertible shall be accomplished by increasing the number of purchase parts of the load chain. The conversion shall be readily accomplished without using tools. It shall not be necessary to unreeve the load chain to convert from one rated load to another.

TABLE VII. Type H, hook suspension, convertible capacity, roller and link chain.

Rated load	Standard lift (min)	Distance between hooks, chain retracted (max)	Pull on lever to lift rated load [1]	Weight	Mechanical efficiency (min)
(ton) [2]	(inch) [3]	(inch) [4]	(pound) [5]	(pound) [5]	(percent) [6]
34 to 1-1/2	57	15	70	26	70
1-1/2 to 3	57	19	100	47	70
3 to 4-1/2	57	25	100	63	55
4-1/2 to 6	57	26	100	74	55

[1] See 4.7.3.2.
[2] 2,000 pounds per ton.
[3] See 6.2.
[4] Measured between inside of suspension and load hooks when load chain is retracted to its shortest length with hoist reeved for maximum rated load.
[5] Shall not be exceeded (see 6.7).
[6] Up to 10 percent lower efficiency is acceptable when the pull load is less than specified.

3.8.2.2 Chain stop. Type H convertible capacity may have a chain stop attached to the load chain end in lieu of securing the chain to the hoist. The chain stop shall prevent unreeving of the hoist and shall be removable.

3.93 Lever. The operating lever length for type H shall be a maximum of 34 inches measured from the center of the yoke pin to the extreme end. The hoist shall engage to lift or lower with a lever stroke of 36 degrees or less. The hoist shall permit a lever power stroke through a minimum arc of 60 degrees.

3.8.4 Control devices. When not under load, it shall be possible to extend the reach of the hoist without using the lever (freewheeling feature). Other control devices on the hoist shall be simple, reliable, and arranged for ease of operation by the hoist operator. Operating instructions shall be legible and of a permanent character.

3.9 Lubrication. Means shall be provided for lubrication of all moving parts of hoists and trolleys. Where life-lubricated bearings are used, no means of external lubrication is required. Lubricants in accordance with DOD-G-24508 and MIL-L-17331 shall be used when external lubrication is required.

3.10 Painting. When specified (see 6.2), exposed surfaces, except hooks and chains, shall be cleaned, pretreated, and finish coated in accordance with method I as specified in 3.10.1. Method II (see 3.10.2) may he used if method I is not specified.

3.10.1 Method I. 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 SP 10. Steel surfaces, except for corrosion-resisting steels, shall be coated with an inorganic zinc primer conforming to MIL-P-23236, class 3, applied at 3 to 5 mils dry film thickness (DFT). Prior to overcoating, residual deposits shall be removed by the manufacturer recommended cleaning procedure. A coat of formula 150 which has beer thinned with 1 pint of thinner per gallons 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-24441/1, 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.

3.10.2 Method II. Method II surface preparation and finish shall be contractor’s standard commercial procedures.

3.11 Identification. Identification shall be cast, stamped, or attached on an identification plate in a prominent location on each hoist. The following information shall be provided:

a. Hoist weight and shock (grade), as applicable
b. Class and type, as applicable
c. Rated load
d. Military specification (MIL-H-904)
e. National stock number (NSN)
f. Manufacturer’s model number, part number, or serial number
g. Contract or order number
h. Manufacturer’s name or trademark.

3.11.1 Class 3. For class 3 hoists, space shall be provided, either on the identification plate or in another prominent location, for a 21-word inscription (135 spaces) of 0.125 inch (minimum) size lettering.

3.11.2 Class 3 marking. Metal castings for load bearing parts of class 3 hoists shall be identified with the foundry heat number cast or stamped on a raised pad 0.125 inch above the casting surface using 0.250-inch letters. When a raised pad is not practical due to space or function, the heat number shall be applied in a legible, permanent manner. Marking stamps shall be of the low stress in accordance with MIL-STD-792.

3.12 Workmanship. The hoist shall withstand any operation specified herein without malfunction or component failure caused by faulty workmanship. All parts of the hoist, before and after painting, shall be clean and free of harmful extraneous material. Edges and surfaces exposed to operating and

maintenance personnel shall be smooth and rounded to the extent that a hazardous surface does not exist. Bolted connections shall use standard bolts and nuts; self-locking nuts are acceptable. All 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 (examinations and tests) as specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use his own or any own 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 this specification where such inspections are deemed necessary to ensure supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items shall meet all requirements of sections 3 and 5. The inspection set forth in this specification shall become a part of the contractor's overall inspection system or quality program (see 6.3). The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of ensuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling inspection, as part of the manufacturing operations, is an acceptable practice to ascertain conformance to requirement however, this does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to accept defective material.

4.2 Classification of inspections. The inspection requirements specified herein are classified as follows:

a. Qualification inspection (classes 1 and 2 only) (see 4.3)
b. First article inspection (class 3 only) (see 4.4)
c. Quality conformance inspection (see 4.5).

4.3 Qualification inspection. Qualification inspection of class 1 and class 2 hoists shall be conducted at a laboratory satisfactory to NAVSEA. Qualification inspection shall be conducted on each class and all types of hoist and shall consist of the examination specified in 4.6 and the tests specified in 4.7. For shock-resistant hoists, qualification approval of hoists to grade A shock will include approval of hoists to grade B shock, and standard hoists (non-shock-resistant), if requested by the manufacturer. Qualification approval of hoists to grade B shock will include qualification of standard hoists (non-shock-resistant), if requested by the manufacturer.

4.3.1 Rated load. The rated load of the hoists to be subjected to qualification inspection shall be designated by NAVSEA. When a particular hoist model is manufactured in several rated loads, NAVSEA will designate the number and rated loads of the hoist models to be tested.

4.3.2 Failures. Failure in any of the applicable examinations or tests shall be cause for refusal to grant qualification.

4.4 First article inspection for class 3 hoists. First article inspection shall he conducted on each type and rated load of class 3 hoist, and shall consist of the examination specified in 4.6 and the tests specified in 4.7.1 through 4.7.9 (see 6.3). For shock-resistant hoists, first article approval of grade A shock will include grade B and standard hoists (non-shock-resistant), if requested by the contractor. First article approval of grade B will include standard hoists (non-shock-resistant), if requested by the contractor.

4.4.1 Casting inspection for class 3 hoists. A minimum of two test bars per heat, heat treated in the same manner as the castings, shall be used for determination of physical characteristics of the heat (see 6.3). If after first article inspection has been completed, a change is made in the source of aluminum alloy castings or in the casting procedures, the contractor shall conduct tests and other checks to verify that the castings to be supplied meet the same procedure criteria as those used in the hoists subjected to first article inspection. Steel castings for load-bearing parts of class 3 hoists shall be radiographed to assure sound castings for the intended service, and in addition shall be subjected to magnetic particle or liquid penetrant inspection. The acceptability of castings subject to radiographic examination shall be based upon the radiographic standards for castings specified in MIL-STD-278 for criticality level 1. The acceptability of castings subject to surface inspection shall be class 2 in accordance with NAVSHIPS 0900-LP-003-8000.

4.4.2 Sample for first article inspection. Prior to beginning production, a sample of each type and capacity of class 3 hoists shall be examined and tested as specified in 4.4 (see 6.6). Hoists furnished for first article inspection shall not be included for delivery.

4.5 Quality conformance inspection. Quality conformance inspection shall be conducted on a production hoist prior to delivery and shall consist of visual examination (see 4.6.1) and test groups A (see 4.5.4.1), B (see 4.5.4.2) and C (see 4.5.43). Group C tests shall be conducted only when specified (see 6.2).

4.5.1 Class 3 hoist. There shall be no deviation of subsequent units of the same design and type of claw 3 hoist in design, construction, manufacturing process, testing, or materials from the completion of the first article inspection.

4.5.2 Lot. A lot shall consist of all hoists of the same class, type, and capacity offered for inspection at one time.

4.5.3 Sampling for visual examination. Sampling for visual examination of class 1 and 2 hoists shall be conducted in accordance with table VIII (see 6.9). Each class 3 hoist shall be examined, and no defects are permitted. Visual examination for defects shall be in accordance with 4.6.1.

TABLE VIII. Sampling for visual examination

Lot Size	Sample size
Major defects	
2 - 50	5
51 - 90	7
91 - 150	11
151 - 280	13
281 - 500	16
501 - 1200	19
1201 - over	23
Minor defects	
2 - 25	3
26 - 50	5
51 - 90	6
91 - 150	7
151 - 280	10
281 - 500	11
501 - 1200	15
1201 - over	18

4.5.4 Sampling for tests. Sampling for tests shall be in accordance with 4.5.4.1 through 4.5.4.3, except that each class 3 hoist shall undergo P static load test (see 4.7.1) and a dynamic overload test (see 4.7.2). These tests shall be performed for each class 3 hoist. Class 3 hoists which have been tested shall be refurbished to new condition to be accepted for delivery.

4.5.4.1 Group A. Sampling for group A tests shall be in accordance with table IX. Group A tests shall consist of the following:

a. Static load (see 4.7.1)
b. Dynamic overload (see 4.7.2)
c. Efficiency (see 4.7.3)
d. Track clamp (see 4.7.4).

TABLE IX. Sampling for group A tests. [1]

Lot size	Sample size
2 - 90	8
91 - 150	12
151 - 280	19
281 - 500	21
501 - 1200	27
1201 - over	35

[1] Hoists, which have been tested, shall be refurbished to new condition to be accepted for delivery.

4.5.4.2 Group B. Sampling for group B tests shall be in accordance with table X. Group B tests shall consist of the following:

a. Plain trolley (see 4.7.5).
b. Geared trolley (see 4.7.6).

TABLE X. Sampling for group B tests. [1]

Lot size	Sample size
2 - 50	5
51 - 90	7
91 - 150	11
151 - 280	13
281 - 500	16
501 - 1200	19
1201 - over	23

[1] Hoists, which have been tested, shall be refurbished to new condition to be accepted for delivery.

4.5.4.3 Group C. One sample hoist representative of each class and type shall be subjected to group C tests. Group C tests shall be performed on sample hoists of each class and selected from lots which have passed the group A and B tests. Group C tests shall consist of the following:

a. Drop test (see 4.7.7)
b. Life cycle test (see 4.7.8)
c. Shock test (see 4.7.9) (for high-impact shock qualified hoists only).

4.5.5 Sampling for inspection of packaging. Sampling for inspection of packaging of class 1 and class 2 hoists shall be in accordance with table XI (see 6.9). For class 3 hoists, one shipping container per lot shall be inspected. No defects are permitted. Examination for defects shall be in accordance with 4.8.

TABLE XI. Sampling for inspection of packaging

Lot size	Sample size
2 - 15	2
16 - 25	3
26 - 90	5
91 - 150	6
151 - 280	7
281 - over	9

4.6 Examination.

4.6.1 Visual examination. Sample hoists shall be visually examined in accordance with table XII.

TABLE XII. Classification of visual defects.

Major	Defects
100	Hoist hooks not equipped with safety latch, or safety latch not specified (see 3.3.5.1)
101	Hook throat opening not as specified (see table I)
102	Trolley wheel mounting arrangement not as specified (see 3.3.7.1)
103	Trolley wheel treads not as specified (see 3.3.7.1)
104	Trolley hoist not equipped with track clamp, when specified (see 3.3.7.5)
105	Trolley track clamps do not function as specified (see 3.3.7.5)
106	Trolley wheel preventer bars missing or do not prevent trolley wheel flange from riding up onto the supporting beam (see] 3.3.7.7)
107	Type H hoist (convertible capacity), means to convert hoist rate load, not as specified (see 3.8.2.1). Type H hoist convertible capacity chain stops not removable (see 3.8.2.2).
108	Type H hoists not equipped with freewheeling device (see 3.8.4)
109	Lubrication fittings missing (see 3.9)
110	Hoist components damaged or missing (see 3.12)
111	Load chain not securely attached to hook swivel or, for multiple sheave reeve, not securely attached to load block or hoist (see 3.3.2.1.1)
112	Hoist lift height not as specified (see tables II through VII)
113	Lubrication of moving parts inadequate (see 3.9)
Minor	
201	Gear casing does not protect against the entry of foreign matter (such as dirt, dust, and water spray) or permit ready access (see 3.3)
202	Hoists, hook suspension, hoist load hook fully retracted, distance between hooks not as specified (see tables II, VI, and VII)
203	Hoist weight not as specified (see tables II through VII)
204	Trolley hoist underside of track to inside of load hook

		distance is not as specified (see tables III, IV, and V)
205		Chain link not uniform, with a tendency to twist chain (see 3.3.2.1.1)
206		Hand chain drop not as specified (see 3.3.2.2)
207		Chain finish not as specified (see 3.3.2.3)
209		Trolley wheels, concentricity not as specified (see 3.3.7.1)
210		Trolley wheel bearing not protected to exclude foreign matter (see 3.3.7.2)

TABLE XII. Classification of visual defects - Continued.

Minor	Defects
211	Trolley wheel gear and drive pinion not as specified (see 3.3.7.3)
212	Trolley frame (side plates) not connected by an equalizing pin (see 3.3.7.4)
213	Hoist types C, D, E, F and G not equipped with chain container when specified (see 3.3.8)
214	Type H hoists not capable of operation for lever motion specified (see 3.8.3)
215	Type H hoists, lever length not as specified (see 3.8.3)
216	Type H hoists, operating controls and instruction marking not as specified (see 3.8.4)
217	Paint not as specified, paint surface broken (see 3.10)
218	Hoist identification data missing, incomplete, illegible, inadequately attached (see 3.1.1)
219	Lubrication fittings damaged (see 3.9)
220	Hoist not clean of foreign material and excess lubricant (see 3.12)

4.7 Tests (see 6.3). Testing shall be accomplished in a sequence that will allow performance of all tests with no replacement components, for example: static load test (see 4.7.1), dynamic overload test (see 4.7.2), efficiency test (see 4.73), track clamp test (see 4.7.4), trolley test 4.7.5 and 4.7.6), life cycle test (see 4.7.8), drop test (see 4.7.7), and high-impact shock test (see 4.7.9), except that the contractor has the option to submit an untested hoist for the drop test (see 4.7.7), and an untested hoist for the high-impact shock test (see 4.7.9).

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

4.7.2 Dynamic overload. The hoist, fixed capacity and convertible capacity (convertible hoists shall be for their fixed load rating) shall be loaded to 150 percent of rated load and operated by hoisting and lowering the test load through the required lift height. With the test load clear of the ground, a minimal length of 1 foot of load chain shall be overhauled in each direction. test shall be performed at a minimum hand speed of 10 feet per minute (ft/min) (hand chain or hand lever). 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 he performed 10 times

at a minimum trolley speed of 15 ft/min. Hoist and trolley shall operate satisfactorily and the brake shall exhibit no sign of slippage. Evidence of failure, permanent deformation, or excessive wear (see 4.7.8.2) of hoist parts shall be cause for rejection.

4.7.3 Efficiency test. Efficiency tests shall be performed as specified in 4.73.1 through 4.733.

4.7.3.1 Hand chain operated hoists. The hoists shall be loaded to rated capacity and operated to raise the load through any conveniently measured distance. The number of feet of hand chain passed by a reference mark in raising the load to the selected height and the tension in the hand chain, measured with an accurate spring balance for attached weights, shall be recorded. The mechanical efficiency of the hoist shall be determined, from the formula specified in 4.7.3.3. Failure of hoists to conform to specified minimum mechanical efficiency shall constitute failure of this test.

4.7.3.2 Type H hoist, lever operated. The hoist shall be load to rated capacity and operated to raise the load through any conveniently measured distance. A spring balance shall be connected not more than 2 inches from the end of the operating lever of the hoist. The mean force required to operate the lever through one operating stroke shall be determined by measuring the force at five equidistant positions over the operating stroke. Measurement shall be made with the spring balance always at a right angle to the level and for at least six successive operating strokes. The total distance through which the operating force acts and the distance through which the load is lifted shall be noted. The mechanical efficiency of the sample hoist shall be determined from the formula specified in 4.7.3.3.

4.7.33 Efficiency formula. The efficiency formula shall be as follows:

$$E = \frac{C \times L \times 100}{P \times T}$$

where:

E = Mechanical efficiency in percent of 100
C = Rated capacity of hoists in pounds
L = Distance lifted (feet)
P = Mean operating force in pounds
T = Number of feet of hand chain to raise load, or total distance through which "P" acts for lever operated hoists.

4.7.4 Track clamp. When a trolley hoist is fitted with a track clamp, the clamp shall be tested with hoist loaded to its rated load; by subjecting the trolley to a pull in either direction, parallel to the track, equal to one-third of the hoist rated load. Failure of the hoist to remain stationary during the test shall constitute failure of this test.

4.7.5 Plain trolley. The pull required to move the hoist loaded to its rated load (plain trolley suspension) along a straight portion of track shall be determined by attaching a cable or cord to the trolley, passing the cable or cord over a sheave suspended from the track at a reasonable distance from

the trolley, and measuring the required pull by means of weights or a spring balance attached to the cable or cord. Failure to meet the requirements for maximum pull to traverse the hoist shall constitute failure of this test (see tables III and IV for applicable hoist).

4.7.6 Geared trolley. 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 at attaching weights or a spring balance to the chain. Failure to conform to the requirements for maximum pull to traverse the hoist shall constitute failure of this test (see tables III and V for applicable hoist).

4.7.7 Drop. Sample hoists shall be drop-tested by dropping the hoist rated load from heights from heights progressing from 1 through 4 inches, in 1-inch increments, in such a manner that the falling load will be stopped by the hoist load brake. The test load shall be supported by the hoist hook during the drop test. Type H, convertible capacity hoists shall be reeved and loaded for maximum rated load for the drop test. The load hook shall be lowered to extend 4 feet below the body of the hoist. The test arrangement shall be such that the dynamic forces will pass through the hoist from the load hook to the suspension hook. The hoist shall be suspended from a clevis or equally rigid connection or by its own trolley from a beam of such strength that it will not permanently deform as a result of the test. The structure shall be rigid to limit the deflection of the hoist supporting beam, measured at the center of a 6-foot span to 0.020 inch when supporting 20 tons. Trolley hoists shall be secured against lateral motion. The hoist chain shall not slip downward more than one link (or 1 inch maximum) for the entire test, measured from the original position of a pre-selected chain link to the hoist body before and after the test. The hoist shall not fail, so as to drop its load, under the four successive impacts although deformation of the hoist banks and chain is permissible. Separation of component parts from the hoist shall constitute failure of the test. The hoist unit need not be operable at the conclusion of this test.

4.7.8 Life test. Hoists of all classes and types, except type H shall be tested to 5000 continuous operating cycles when single reeved. The operating cycles for testing multiple reeved hoists shall be determined by dividing 5000 by the number of hoist load lines. An operating cycle shall consist of lifting and lowering the hoist rated load through a minimum distance of 4 feet, with a 6-second maximum pause between lift and lowering. This test shall be performed at a minimum of 15 ft/min and a maximum of 70 ft/min. All hoists shall be clean and free of foreign material and lubricant. During operation of those hoists, no wear particles greater than 0.031 inch in any direction shall be generated. Operation of the hoists may be accomplished by means of power operated equipment. The use of auxiliary cooling equipment for the power operated equipment is permissible.

4.7.8.1 Type H hoist. Type H hoists shall be tested to 2000 continuous operating cycles when single reeved. The operating cycles for testing multiple reeved hoists shall be determined by dividing 2000 by the number of hoist load lines. Convertible hoists shall be reeved for their fixed rated load. An operating cycle for these hoists shall consist of lifting and lowering the hoist rated load through a distance of 6 inches. Type H, lever

operated hoists shall be operated at a minimum speed of 15 ft/min and a maximum of 70 ft/min. All hoists shall be clear and free of foreign material and excess lubricant. During operation of these hoists, no wear particles greater than 0.031 inch in any direction shall be generated.

4.7.8.2 Inspection after test. After completion of the tests specified in 4.7.8 and 4.7.8.1, gears, chain, bearings, chain sprockets, brakes, and other wearing parts shall be examined for excessive wear. Excessive wear is defined as that which impairs safe operation of the hoist. Reduction of bar diameter of link chain in excess of 10 percent load brake lining reduced in excess of 50 percent of useful life, and life-lubricated bearings requiring lubrication is evidence of excessive wear. Evidence of excessive wear shall be cause for rejection.

4.7.8.3 Additional testing. After completion of 4.7.8 and 4.7.8.1, tests specified in 4.7.1 and 4.7.2 shall be conducted to demonstrate hoist is still safe to operate.

4.7.9 High-impact shock. Hoists shall undergo the high-impact shock test in accordance with MIL-S-901 and as specified herein (see 6.2). Hoists shall undergo the grade 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 H 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 the test unit from becoming a missile hazard to test personnel Hoists shall have load hook or load block retraced for the test. The chain shall be looped in loops not to exceed 2 feet, and secured in or lashed to the load hook during the test. The test fixture for mounting the hoist shall conform, as applicable, to the deck-platform or bulkhead mounting figures shown in MIL-S-901. The test fixture, for mounting hoists differing from those specified shall require prior review by the acquisition activity. Shock tests shall conform to the requirements as specified for the lightweight or medium weight test. Separation of component parts of the hoist during the test, evidence of permanent deformation of the hoist during inspection, or failure of the hoist to conform to the requirements of 3.3.1 following completion of the shock test shall be cause for rejection. Following successful completion of high-impact shock test, the hoist shall be subjected to the following tests:

a. Static and dynamic overload tests (see 4.7.1 and 4.7.2)
b. Efficiency test (see 4.7.3)
c. Plain and geared trolley test (see 4.7.5 and 4.7.6, as applicable)
d. Track clamp test (see 4.7.4, as applicable).

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

5. PACKAGING

(The packaging requirements specified herein apply only for direct Government acquisition. For the extent of applicability of the packaging requirements of referenced documents listed in section 2, see 6.10.)

5.1 Packaging requirements. Hoist, chain, hand-operated hook, and trolley suspensions shall be preserved level A or commercial, packed level A, B, or commercial, and marked in accordance with MIL-H-3280, as specified (see 6.2), and shall include bar codes and applicable packaging acquisition options stated therein. In addition, for Navy acquisitions, the following applies:

a. Navy fire-retardant requirements:

(1) Treated lumber and plywood. Unless otherwise specified (see 6.2), all lumber and plywood (including laminated veneer material used in shipping containers and pallet construction, members, blocking, bracing, and reinforcing shall be fire-retardant treated material conforming to MIL-L-19140 as follows:

Levels A and B	Type II - weather resistant Category 1 - general use
Level c	Type I - non-weather resistant Category 1 - general use.

(2) Fiberboard. Unless otherwise specified (see 6.2), fiberboard used in the construction of class-domestic, non-weather resistant fiberboard, cleated fiberboard boxes (including interior packaging forms) shall meet the flame spread index and the specific optic density requirements specified in PPP-F-320.

6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. Class 1 and class 2 hoists covered by this specification are intended for general material handling. Class 3 hoists are intended for special purpose service (such as reactor component handling).

6.2 Acquisition requirements. Acquisition documents must specify the following:

a. Title, number and date of this specification

b. Class, type, and capacity of hoist required (see 1.2). When class 3 is specified, special service should be defined.

c. For type H hoists, specify of load chain and hoist capacity (fixed or convertible capacity) (see 1.2.1)

d. Issue of DODISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.1.1 and 2.2)

e. When first article inspection is required (see 3.1)

f. Hoist shock resistance (grade A or B) (see 3.3.1)

g. If hooks do not require swivel capability or safety device (see 3.3.5.1)

h. Special size or range of "I" beam flange sizes required of trolley wheels (see 3.3.7.1), if other than shown for standard "I" beams in tables III, IV, and V

i. Specify track clamps, if required (see 3.3.7.5). Trolley hoists for U.S. Navy ships should have track clamps.

j. Radius of curved track, if other than specified (see 3.3.7.6)

k. If chain container is required (see 3.3.8)

l. If a load limiting device is to be provided as a part of the hoist (see 3.3.10). (The periodic 150 percent of rated load dynamic load test cannot be accomplished with these devices installed. This device should not be specified for hoists to be used on board U.S. Navy ships.)

m. If required lift height is other than standard (see tables II through VII)

n. Painting method required (see 3.10)

o. When group C tests are required (see 4.5)

p. Level of preservation, packing, and marking required (see 5.1)

q. When fire-retardant material is not required (see 5.1.a).

6.3 Consideration of data requirements. The following data requirements should be considered when specification is applied on a contract. The applicable Data Item Descriptions (DID's) should be reviewed in conjunction with the specific acquisition to ensure that only essential data are requested/provided and that the DID's are tailored to reflect the

requirements of the specific acquisition. To ensure correct contractual application of the data requirements, a Contract Data Requirements List (DD Form 1423) must be prepared to obtain the data, except where DOD FAR Supplement 27.475-1 exempts the requirement for a DD Form 1423.

Reference paragraph	DID number	DID title	Suggested tailoring
3.3	DI-MISC-80296	Design Data and Calculations	-
3.3	DI-DRPR-81000	Product Drawings, Associated Lists	
4.1.1	UDI-E-24007A	Certificate of Compliance	-
4.4	DI-MISC-80678	Certification/Data Report	10.3.1 does not apply
4.4.1 and 4.7	DI-T-2072	Tests, Reports	-
4.7.9	DI-ENVR-80708	Shock Test Report	

The above DID's were cleared as of the date of this specification. The current issue of DOD 5010.12-L, Acquisition Management Systems and Data Requirements Control List (AMSDL), must be researched to ensure that only current, cleared DID's are cited on the DD Form 1423.

6.4 Technical manuals. The requirement for technical manuals should be considered when this specification is applied on a contract if technical manuals are required, military specifications and standards that have been cleared and listed in DOD 5010.12-L, Acquisition Management Systems and Data Requirements Control List (AMSDL) must be listed on a separate Contract Data Requirements List (DD Form 1423), which is included as an exhibit to the contract. The technical manuals must be acquired under separate contract line item in the contract.

6.5 Qualification. With respect to products requiring qualification, awards will be made only for products which are, at the time of award of contract, qualified for inclusion in Qualified Products List No. 904 whether or not such products have actually been so listed by that date. The attention of the contractors is called to these requirements, and manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government tested for qualification in order that they may be eligible to be awarded contracts or purchase orders for the products covered by this specification. The activity responsible for the Qualified

Products List is the Naval Sea Systems Command, SEA 51222, Departments of the Navy, Washington, DC 20362-5101 and information pertaining to qualification of products may be obtained from that activity. Application for qualification tests shall be made in accordance with "Provisions Governing Qualification SD-6" (see 6.5.1).

6.5.1 Copies of Provisions Governing Qualification SD-6" may be obtain upon application to Commanding Officer, Naval Publications and Forms Center, Standardization Document Order Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.

6.6 First article. When first article inspection is required, the contracting officer should provide specific guidance to offerors whether the item(s) should be a preproduction sample, a first article sample, a first production item, a sample selected from the first production items, a standard production item from the contractor's current inventory (see 3.1.2), and the number of items to be tested as specified in 4.4. The contracting officer should also include specific instructions in acquisition document regarding arrangements for examinations, approval of first article test results, and disposition of first articles. Invitations for bids should provide that the Government reserves the right to waive the requirement for samples for first article inspection to those bidders offering a product which has been previously acquired or tested by the Government and that bidders offering such products, who wish to rely on such production or test, must furnish evidence with the bid that prior Government approval is presently appropriate for the pending contract. Bidders should not submit alternate bids unless specifically requested to do so in the solicitation.

6.7 Weight limit increase. In the acquisition of hoists where the lift required exceeds the standard lifts as listed in this specification, the specification weight limits should be increased proportionately.

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

6.8.1 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 manufacturer of the equipment. Packaging for such parts should also be specified.

6.9 Acceptance and rejection criteria. Lot acceptance and rejection criteria for quality conformance inspection shall be as specified in tables XIII through XVI.

6.10 Sub-contracted material and parts. The packaging 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.

TABLE XIII. Visual examination.[1], [2], [3]

Lot size	Sample size	Accept	Reject
	Major defects		
2 - 50	5	0	1
51 - 90	7	0	1
91 - 150	11	0	1
151 - 280	13	0	1
281 - 500	16	0	1
501 - 1200	19	0	1
1201 - over	23	0	1
	Minor defects		
2 - 25	3	0	1
26 - 50	5	0	1
51 - 90	6	0	1
91 - 150	7	0	1
151 - 280	10	0	1
281 - 500	11	0	1
501 - 1200	15	0	1
1201 - over	18	0	1

[1] All defective items must be replace with acceptable items prior to lot acceptance.
[2] Inspect sample size until reject criteria is reached.
[3] Rejected lots may be screened and resubmitted for inspection and retest.

TABLE XIV. Group A test.[1], [2], [3]

Lot size	Sample size	Accept	Reject
2 - 90	8	0	1
91 - 150	12	0	1
151 - 280	19	0	1
281 - 500	21	0	1
501 - 1200	27	0	1
1201 - over	35	0	1

[1] All defective items must be replace with acceptable items prior to lot acceptance.
[2] Inspect sample size until reject criteria is reached.
[3] Rejected lots may be screened and resubmitted for inspection and retest.

TABLE XV. Group B tests.[1], [2], [3]

Lot size	Sample size	Accept	Reject
2 - 50	5	0	1
51 - 90	7	0	1
91 - 150	11	0	1
151 - 280	13	0	1
281 - 500	16	0	1
501 - 1200	19	0	1
1201 - over	23	0	1

[1] All defective items must be replace with acceptable items prior to lot acceptance.
[2] Inspect sample size until reject criteria is reached.
[3] Rejected lots may be screened and resubmitted for inspection and retest.

TABLE XIV. Inspection of packaging.[1], [2], [3]

Lot size	Sample size	Accept	Reject
2 - 15	2	0	1
16 - 25	3	0	1
26 - 90	5	0	1
91 - 150	6	0	1
151 - 280	7	0	1
281 - over	9	0	1

[1] All defective items must be replace with acceptable items prior to lot acceptance.
[2] Inspect sample size until reject criteria is reached.
[3] Rejected lots may be screened and resubmitted for inspection and retest.

6.11 Deletions. Types A, B, H and K hoists forms A and B, and grade designations for hand and load chains have been deleted from this specification for the following reasons:

a. Hoist types A and B: Their function can be accomplished by the type C hoist which is more efficient and has a greater range of hoist capacities. There is little demand by the miliary activities for these items.

b. Type H wire rope hoist: Survey of military activities showed little demand for wire rope ratchet hoist; the type H chain hoists duplicate the function, and provide for greater range of hoist capacities.

c. Form A and B and grade designations for hand and load chain resulted in conflicting requirements for hoist design. Specifying requirements for non-sparking, non-corrosive chain and hooks cannot be justified for manual hoist operation. Steel and corrosion-resisting coatings have been specified for load and hand chain and for hooks.

6.12 Subject term (key word) listing.

Brake
Drive pinion
Track
Wheel bearings
Wheel gear

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

Custodians:
Army - ME
Navy - SH
Air Force - 84

Preparing activity:
Navy - SH
(Project 3950-0273)

Review activities:
DLA - CS

User activities:
Navy - CG, MC, YD