ASME HST-2–2018
(Revision of ASME HST-2–2014)

Performance Standard for Hand Chain Manually Operated Chain Hoists

AN AMERICAN NATIONAL STANDARD

The American Society of Mechanical Engineers

ASME HST-2–2018
(Revision of ASME HST-2–2014)

Performance Standard for Hand Chain Manually Operated Chain Hoists

AN AMERICAN NATIONAL STANDARD

The American Society of Mechanical Engineers
Two Park Avenue • New York, NY • 10016 USA

Date of Issuance: June 28, 2019

The next edition of this Standard is scheduled for publication in 2024.

ASME issues written replies to inquiries concerning interpretations of technical aspects of this Standard. Interpretations are published on the Committee web page and under http://go.asme.org/InterpsDatabase. Periodically certain actions of the ASME HST Committee may be published as Cases. Cases are published on the ASME website under the HST Committee Page at http://go.asme.org/HSTcommittee as they are issued.

Errata to codes and standards may be posted on the ASME website under the Committee Pages to provide corrections to incorrectly published items, or to correct typographical or grammatical errors in codes and standards. Such errata shall be used on the date posted.

The HST Committee Page can be found at http://go.asme.org/HSTcommittee. There is an option available to automatically receive an e-mail notification when errata are posted to a particular code or standard. This option can be found on the appropriate Committee Page after selecting "Errata" in the "Publication Information" section.

The American Society of Mechanical Engineers
Two Park Avenue, New York, NY 10016-5990

CONTENTS

Form

FOREWORD

This Standard is one in a series that provides performance requirements for hoists and was originally issued in 1983. It was developed by the ASME HST Standards Committee, Hoists — Overhead. It is intended to serve as a guide to manufacturers of the equipment and to the purchasers and users of the equipment.

Standards in this series are as follows:

Designator	Title
HST-1	Performance Standard for Electric Chain Hoists
HST-2	Performance Standard for Hand Chain Manually Operated Chain Hoists
HST-3	Performance Standard for Lever Hoists
HST-4	Performance Standard for Overhead Electric Wire Rope Hoists
HST-5	Performance Standard for Air Chain Hoists
HST-6	Performance Standard for Air Wire Rope Hoists

This Standard is available for public review on a continuing basis. This provides an opportunity for additional public review input from industry, academia, regulatory agencies, and the public-at-large.

This Standard was approved as an American National Standard on October 30, 2018.

ASME HST COMMITTEE
Hoists — Overhead

(The following is the roster of the Committee at the time of approval of this Standard.)

STANDARDS COMMITTEE OFFICERS

J. R. Burkey, *Chair*
W. E. Osborn, *Vice Chair*
E. Dominguez, *Secretary*

STANDARDS COMMITTEE PERSONNEL

J. R. Burkey, Columbus McKinnon Corp.
B. M. Casey, Electric Boat
E. Dominguez, The American Society of Mechanical Engineers
J. E. Eaglin, John Group International
F. G. Heath, Heath & Associates
E. K. Marburg, Columbus McKinnon Corp.
M. A. Martinez Correa, Chevron Upstream and Gas
W. E. Osborn, Ingersoll Rand
N. L. Pagano, Harrington Hoist, Inc.
J. Davis, *Contributing Member,* John W. Davis
R. B. Wehrmeister, *Contributing Member,* Advanced Overhead Crane

CORRESPONDENCE WITH THE HST COMMITTEE

General. ASME Standards are developed and maintained with the intent to represent the consensus of concerned interests. As such, users of this Standard may interact with the Committee by requesting interpretations, proposing revisions or a case, and attending Committee meetings. Correspondence should be addressed to:

Secretary, HST Standards Committee
The American Society of Mechanical Engineers
Two Park Avenue
New York, NY 10016-5990
http://go.asme.org/Inquiry

Proposing Revisions. Revisions are made periodically to the Standard to incorporate changes that appear necessary or desirable, as demonstrated by the experience gained from the application of the Standard. Approved revisions will be published periodically.

The Committee welcomes proposals for revisions to this Standard. Such proposals should be as specific as possible, citing the paragraph number(s), the proposed wording, and a detailed description of the reasons for the proposal, including any pertinent documentation.

Proposing a Case. Cases may be issued to provide alternative rules when justified, to permit early implementation of an approved revision when the need is urgent, or to provide rules not covered by existing provisions. Cases are effective immediately upon ASME approval and shall be posted on the ASME Committee web page.

Requests for Cases shall provide a Statement of Need and Background Information. The request should identify the Standard and the paragraph, figure, or table number(s), and be written as a Question and Reply in the same format as existing Cases. Requests for Cases should also indicate the applicable edition(s) of the Standard to which the proposed Case applies.

Interpretations. Upon request, the HST Standards Committee will render an interpretation of any requirement of the Standard. Interpretations can only be rendered in response to a written request sent to the Secretary of the HST Standards Committee.

Requests for interpretation should preferably be submitted through the online Interpretation Submittal Form. The form is accessible at http://go.asme.org/InterpretationRequest. Upon submittal of the form, the Inquirer will receive an automatic e-mail confirming receipt.

If the Inquirer is unable to use the online form, he/she may mail the request to the Secretary of the HST Standards Committee at the above address. The request for an interpretation should be clear and unambiguous. It is further recommended that the Inquirer submit his/her request in the following format:

Subject:	Cite the applicable paragraph number(s) and the topic of the inquiry in one or two words.
Edition:	Cite the applicable edition of the Standard for which the interpretation is being requested.
Question:	Phrase the question as a request for an interpretation of a specific requirement suitable for general understanding and use, not as a request for an approval of a proprietary design or situation. Please provide a condensed and precise question, composed in such a way that a "yes" or "no" reply is acceptable.
Proposed Reply(ies):	Provide a proposed reply(ies) in the form of "Yes" or "No," with explanation as needed. If entering replies to more than one question, please number the questions and replies.
Background Information:	Provide the Committee with any background information that will assist the Committee in understanding the inquiry. The Inquirer may also include any plans or drawings that are necessary to explain the question; however, they should not contain proprietary names or information.

Requests that are not in the format described above may be rewritten in the appropriate format by the Committee prior to being answered, which may inadvertently change the intent of the original request.

Moreover, ASME does not act as a consultant for specific engineering problems or for the general application or understanding of the Standard requirements. If, based on the inquiry information submitted, it is the opinion of the Committee that the Inquirer should seek assistance, the inquiry will be returned with the recommendation that such assistance be obtained.

ASME procedures provide for reconsideration of any interpretation when or if additional information that might affect an interpretation is available. Further, persons aggrieved by an interpretation may appeal to the cognizant ASME Committee or Subcommittee. ASME does not "approve," "certify," "rate," or "endorse" any item, construction, proprietary device, or activity.

Attending Committee Meetings. The HST Standards Committee regularly holds meetings and/or telephone conferences that are open to the public. Persons wishing to attend any meeting and/or telephone conference should contact the Secretary of the HST Standards Committee. Future Committee meeting dates and locations can be found on the Committee Page at http://go.asme.org/HSTcommittee.

Chapter 2-0
Scope, Definitions, References, and Appendix

SECTION 2-0.1: SCOPE

(a) This Standard establishes performance requirements for hand chain manually operated chain hoists for vertical lifting service involving material handling of freely suspended (unguided) loads, using welded link type load chain as a lifting medium, with one of the following types of suspension:

(1) hook or clevis

(2) trolley

(b) This Standard is applicable to hoists manufactured after the date on which this Standard is issued. Differential pulley and self-locking worm drive type hoists are not covered in this Standard.

(c) This Standard is not applicable to

(1) damaged or malfunctioning hoists

(2) hoists that have been misused or abused

(3) hoists that have been altered without authorization of the manufacturer or a qualified person

(4) hoists used for lifting or supporting people

(5) hoists used for the purpose of drawing both the load and the hoist up or down the hoist's own load chain

(6) hoists used in applications where the load on the hand chain hoist is not freely suspended from the hand chain hoist

The requirements of this Standard shall be applied together with the requirements of ASME B30.16. Please also refer to ASME B30.16 for requirements pertaining to marking, construction, installation, inspection, testing, maintenance, and operation.

SECTION 2-0.2: DEFINITIONS

ambient temperature: the temperature of the atmosphere surrounding the hoist.

beam: an overhead standard structural shape or specially fabricated shape on which a trolley operates.

chain, hand: the chain provided to control movement of a hand-chain-operated hoist or trolley (see Figure 2-0.2-1).

NOTE: Hand chain and load chain properties do not conform to those shown in ASME B30.9.

chain, load: the load-bearing chain in the hoist.

NOTE: Hand chain and load chain properties do not conform to those shown in ASME B30.9.

conditions, abnormal operating: environmental conditions that are unfavorable, harmful, or detrimental to or for the operation of a hoist, such as excessively high or low ambient temperatures, exposure to weather, corrosive fumes, dust-laden or moisture-laden atmospheres, and hazardous locations.

conditions, normal operating: conditions during which a hoist is performing functions within the scope of the original design.

hand chain drop: the distance to the lowest point of the hand chain measured from the saddle of the load hook at its upper limit of travel (see Figure 2-0.2-1).

hand chain overhaul: the number of feet (meters) the hand chain must travel to raise the load hook 1 ft (1 m).

hand chain pull: the average force measured in pounds (kilonewtons) exerted by the operator on the hoist hand chain to lift the rated load.

hand chain wheel: a wheel with formed pockets on its periphery to allow torque to be transmitted when a force is applied to the hand chain.

hazardous (classified) locations: locations where fire or explosion hazards may exist. Locations are classified depending on the properties of the flammable vapors, liquids, or gases, or combustible dust or fibers that may be present, and the likelihood that a flammable or combustible concentration or quantity is present. Refer to NFPA 70.

headroom: headroom is measured with the load hook at its upper limit of travel, and is the distance from the saddle of the load hook to the following (see Figure 2-0.2-1):

(a) saddle of the top hook on hook-suspended hoists
(b) saddle of clevis on clevis-suspended hoists
(c) wheel treadline on trolley-suspended hoists

hoist, hand-chain-operated: a suspended machinery unit that, by use of manual operation, is used for lifting or lowering a freely suspended (unguided) load.

(a) hoist, clevis-suspended: a hoist suspended by means of a clevis or eye at the top of the hoist (see Figure 2-0.2-1).

(b) hoist, hook-suspended: suspension of a hoist from a trolley or rigid structure by means of a hook at the top of the hoist (see Figure 2-0.2-1).

(c) hoist, trolley-suspended: a hoist suspended from a trolley. A hoist can be connected to a trolley by hook or clevis, or the hoist can be integral with the trolley (see Figure 2-0.2-1).

hook latch: a mechanical device to close (bridge) the throat opening of a hook; a rigging aid not intended to support the load.

lift: the maximum vertical distance through which the load hook can travel, and is the total allowable hook movement between its upper limit of travel and its lower limit of travel (see Figure 2-0.2-1).

lifting devices, below-the-hook: devices that are not normally reeved onto the hoist chains, such as hook-on buckets, magnets, grabs, and other supplemental devices used for hanging or attaching to the load. The weight of these devices is to be considered part of the load to be lifted.

load: the total superimposed weight on the load block or load hook, including lifting devices.

load block: the assembly of hook or shackle, swivel, bearing, pins, sprocket, and frame suspended by the load chain. This shall include all appurtenances reeved into the load chain.

load hook: the hook used to connect the load to the hoist.

load sprocket: a hoist component that transmits motion to the load chain. This component is sometimes called load wheel, load sheave, pocket wheel, chain wheel, or lift wheel.

load suspension parts: the means of suspension (trolley, hook, or clevis), the chain, the sprocket(s), the structure or housing that supports the sprocket(s), and the load block.

minimum radius: the smallest radius of the beam, measured to the centerline of the web of the beam, on which the trolley will operate.

overload: any load greater than the rated load.

parts (lines): number of lines of chain supporting the load block or hook.

qualified person: a person who, by possession of a recognized degree in an applicable field or a certificate of professional standing, or by extensive knowledge, training, and experience, has successfully demonstrated the ability to solve or resolve problems relating to the subject matter and work.

rated load: the maximum load for which a hoist or trolley is designated by the manufacturer or qualified person.

reach: the distance from the saddle of load hook at its lower limit of travel to the upper point of the headroom measurement. Reach is equal to lift plus headroom (see Figure 2-0.2-1).

reeving: a system in which a chain travels around sprockets.

shall: a word indicating a requirement.

should: a word indicating a recommendation.

trolley: a wheeled mechanism from which a hoist is suspended to provide horizontal motion of the hoist along a beam.

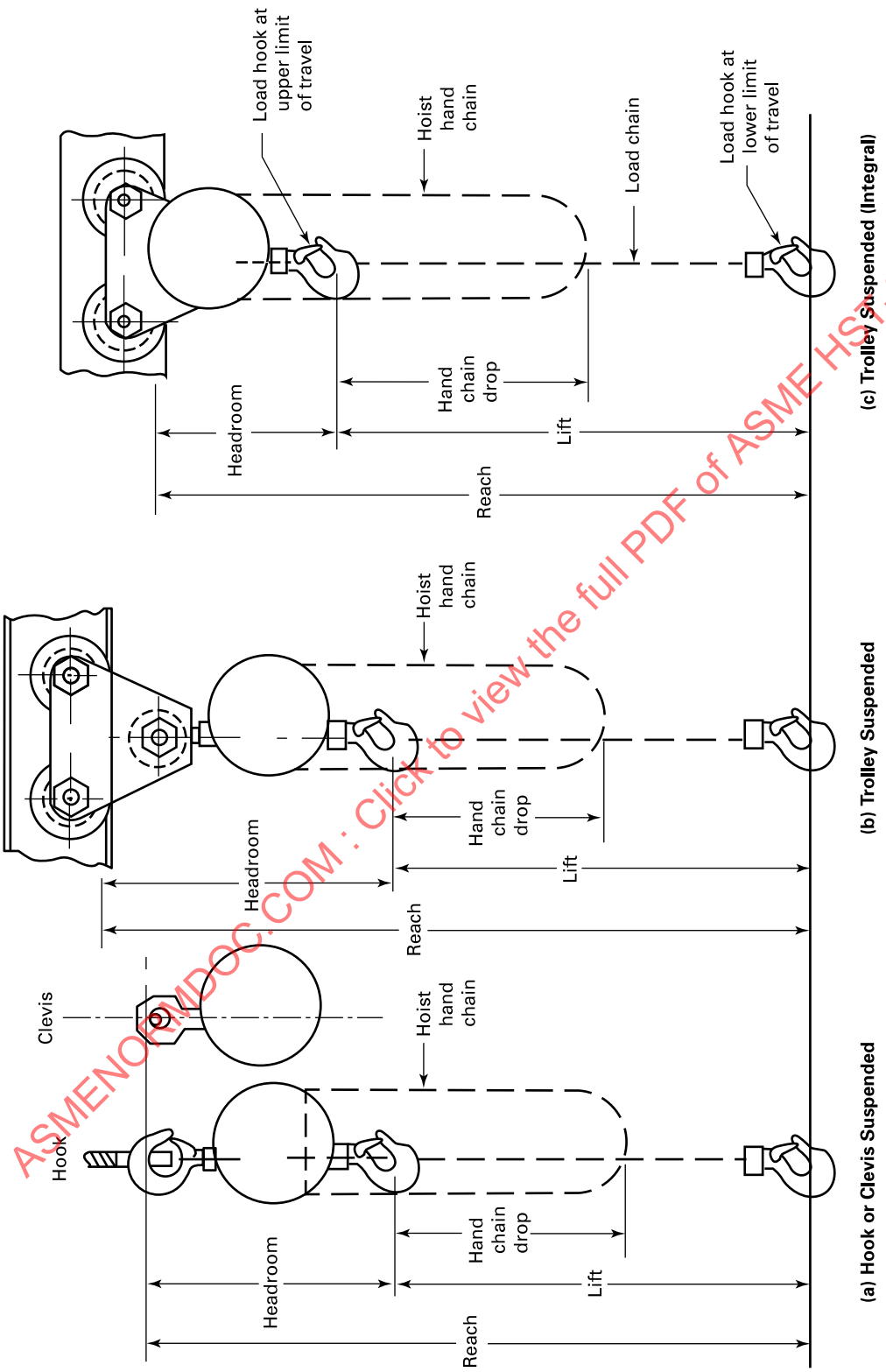

Figure 2-0.2-1 Headroom, Lift, and Reach

SECTION 2-0.3: REFERENCES

The following is a list of publications referenced in this Standard. The latest issue shall apply.

ASME B30.9, Slings
ASME B30.10, Hooks
ASME B30.16, Overhead Hoists (Underhung)
Publisher: The American Society of Mechanical Engineers (ASME), Two Park Avenue, New York, NY 10016-5990 (www.asme.org)

NFPA 70, National Electrical Code
Publisher: National Fire Protection Association (NFPA), 1 Batterymarch Park, Quincy, MA 02169-7471 (www.nfpa.org)

SECTION 2-0.4: APPENDIX

Nonmandatory Appendix A applies to the performance requirements for hoists used in marine and other applications. The requirements stated in Nonmandatory Appendix A are in addition to the requirements of ASME HST-2–2018 and shall be specifically invoked.

Chapter 2-1
Performance

SECTION 2-1.1: GENERAL

All equipment selected in accordance with this Standard is designed to perform satisfactorily when installed, inspected, tested, operated, and maintained in accordance with Chapters 16-1 through 16-4 of ASME B30.16.

All equipment shall provide hand chain pull, hand chain overhaul, lift, and headroom in accordance with manufacturer's specifications or to specifications agreed upon by the manufacturer and user.

SECTION 2-1.2: CHARACTERISTICS

Table 2-1.2-1 denotes the typical hoist characteristics for hook-suspended or clevis-suspended hoists.

Table 2-1.2-2 denotes the typical hoist characteristics for trolley-suspended hoists where the trolley is separate from the hoist.

Table 2-1.2-3 denotes the typical trolley hoist characteristics where the trolley is integral with the hoist.

Characteristics not shown, such as minimum radius of beam, size of beam, number of parts (lines), and reach, should be obtained from the hoist and trolley manufacturer.

SECTION 2-1.3: APPLICATION ANALYSIS

Manually operated hand chain hoists shall be capable of vertical lifting or lowering a freely suspended (unguided) rated load. The supporting structure, including trolley(s), monorail, or crane, if any, shall be designed to withstand the loads and forces imposed by the hoist.

NOTE: Manual chain hoists shall be used only for vertical lifting of freely suspended loads unless otherwise approved by the manufacturer.

SECTION 2-1.4: SPECIFICATIONS OF LIFT, HEADROOM, AND REACH

2-1.4.1 Lift

Most hoists are manufactured with standard lifts. One of these standard lifts will normally be adequate for the particular requirement. It is recommended that the purchaser specify the required lift on the inquiry or bid request.

2-1.4.2 Headroom

Headroom should be specified if important to the application.

2-1.4.3 Reach

Reach should be specified if important to the application.

SECTION 2-1.5: TROLLEYS

2-1.5.1 Plain Type

The plain type is recommended where trolley motion is infrequent or relatively short. Due to the required force to manually operate this type of trolley, it is also recommended that plain trolleys be limited to a maximum of 3 tons (3 000 kg) capacity with the elevation of the beam not more than 20 ft (6 m) above the operator's floor level.

Table 2-1.2-1 Typical Hoist Characteristics — Hook Suspended or Clevis Suspended

Rated Load, ton (kg) [Note (1)]	Hoist Weight, lb (kg) [Note (2)]	Headroom, in. (mm)	Hand Chain Pull, lbf (kN) [Note (3)]	Hand Chain Overhaul to Lift Load, ft [Note (3)]
¼ (227)	15–60 (7–27)	10–13 (255–330)	15–50 (0.07–0.22)	10–50
½ (454)	15–60 (7–27)	10–15 (255–380)	26–65 (0.12–0.29)	15–50
1 (908)	20–90 (9–41)	12–16 (300–405)	50–80 (0.22–0.36)	25–50
1½ (1 361)	40–130 (18–60)	13–21 (330–530)	50–105 (0.22–0.47)	35–80
2 (1 815)	45–190 (20–85)	15–21 (380–530)	70–115 (0.31–0.51)	40–80
3 (2 722)	65–240 (30–110)	19–32 (480–810)	54–110 (0.24–0.49)	70–160
4 (3 629)	90–280 (41–125)	21–38 (530–965)	70–120 (0.31–0.53)	80–130
5 (4 536)	70–345 (32–155)	24–44 (610–1 120)	65–105 (0.29–0.47)	125–240
6 (5 443)	125–345 (55–155)	24–44 (610–1 120)	80–125 (0.36–0.56)	125–175
8 (7 258)	140–430 (65–195)	26–48 (660–1 220)	50–130 (0.22–0.58)	165–390
10 (9 072)	135–560 (60–255)	27–52 (685–1 320)	70–135 (0.31–0.60)	210–395
12 (10 887)	210–830 (95–375)	32–52 (810–1 320)	85–125 (0.38–0.56)	170–390
16 (14 516)	550–1,010 (250–460)	34–60 (860–1 525)	80–130 (0.36–0.58)	235–540
20 (18 144)	990–1,180 (450–535)	57–66 (1 450–1 680)	70–135 (0.31–0.60)	290–420
25 (22 680)	1,000–1,250 (455–565)	57–66 (1 450–1 680)	90–165 (0.40–0.73)	345–420
30 (27 216)	1,400–2,600 (635–1 180)	63–70 (1 600–1 780)	90–120 (0.40–0.53)	380–510
40 (36 288)	2,000–3,200 (910–1 450)	77–80 (1 955–2 030)	85–135 (0.38–0.60)	460–770
50 (45 360)	2,000–3,200 (910–1 450)	77–80 (1 955–2 030)	110–135 (0.49–0.60)	460–770

GENERAL NOTE: This Table indicates the characteristics of hoists generally available. Those values including dash (e.g., 11–44) denote typical ranges. Consult manufacturer for specifics.

NOTES:
(1) 1 ton = 2,000 lb
(2) Standard lifts are 8 ft, 0 in. (2.4 m). Weights are predicated on standard lifts. Corresponding hand chain drop is normally 2 ft, 0 in. (0.6 m) less than the reach. Other lifts are available.
(3) Values refer to each hand chain where two hand chains are required.

2-1.5.2 Hand Chain Pull (Geared Trolley)

The hand-chain-operated type is recommended where trolley motion is relatively infrequent or short, and for those loads and beam heights where a plain-type trolley would be impractical. The hand-chain-operated trolley provides good load spotting ability.

The trolley hand chain shall be guarded to prevent hand chain disengagement from the hand chain wheel. The trolley hand chain shall withstand, without permanent distortion, a pull of 3 times the pull required to traverse the trolley with rated load.

The trolley motion is obtained by pulling on the hand chain, which rotates a hand chain wheel, which in turn is directly connected to the trolley wheels through gears or sprockets. Hand-chain-operated trolleys are recommended for

(a) capacities over 3 tons (3 000 kg)
(b) beam elevations greater than 20 ft (6 m) above operator's floor level
(c) accurate load spotting ability

SECTION 2-1.6: OVERLOAD LIMITING DEVICE

An overload limiting device, when furnished, shall be designed to permit operation of the hoist within its rated load and to limit the amount of overload that can be lifted by a properly maintained hoist under normal operating conditions.

The overload limiting device may allow the lifting of an overload, but shall be designed to prevent the lifting of an overload that could cause damage to the hoist. This does not imply that any overload is to be intentionally applied to the hoist.

The overload limiting device is an emergency device and shall not be used to measure the maximum load to be lifted, and shall not be used to sense the overload imposed by a constrained load.

Table 2-1.2-2 Typical Trolley-Suspended Hoist Characteristics (Hoist Suspended From a Separate Trolley)

Rated Load, ton (kg) [Note (1)]	Hoist Weight, lb (kg) [Note (2)]	Headroom, in. (mm)	Hand Chain Pull, lbf (kN) [Note (3)]	Hand Chain Overhaul to Lift Load, ft [Note (3)]
¼ (227)	40–260 (18–120)	10–19 (255–485)	15–50 (0.07–0.22)	10–50
½ (454)	40–260 (18–120)	14–19 (355–485)	20–60 (0.09–0.27)	15–60
1 (908)	55–260 (25–120)	14–19 (355–485)	45–80 (0.20–0.36)	25–60
1½ (1 361)	60–310 (27–140)	18–25 (460–635)	40–105 (0.18–0.47)	35–90
2 (1 815)	85–325 (39–145)	18–25 (460–635)	55–115 (0.24–0.51)	40–90
3 (2 722)	155–565 (70–255)	23–31 (585–790)	40–110 (0.18–0.49)	65–180
4 (3 629)	179–575 (81–260)	24–35 (610–890)	55–140 (0.24–0.62)	70–180
5 (4 536)	250–950 (115–430)	27–37 (685–940)	45–105 (0.20–0.47)	125–260
6 (5 443)	264–1,350 (119–610)	28–36 (710–915)	55–140 (0.24–0.62)	155–260
8 (7 258)	410–1,460 (185–660)	36–44 (915–1 120)	45–165 (0.20–0.73)	130–500
10 (9 072)	483–1,460 (219–660)	36–44 (915–1 120)	55–115 (0.24–0.51)	230–500
12 (10 887)	490–2,410 (220–1 095)	36–63 (915–1 600)	60–176 (0.27–0.78)	105–500
16 (14 516)	1,051–2,700 (476–1 225)	39–71 (990–1 800)	70–182 (0.31–0.81)	232–710
20 (18 144)	1,400–2,700 (635–1 225)	70–78 (1 780–1 980)	73–190 (0.32–0.84)	290–770
24 (21 816)	1,400–2,700 (635–1 225)	70–78 (1 780–1 980)	100–206 (0.44–0.92)	348–770

GENERAL NOTE: This Table indicates the characteristics of hoists generally available. Those values including dash (e.g., 11–44) denote typical ranges. Consult manufacturer for specifics.

NOTES:
(1) 1 ton = 2,000 lb
(2) Standard lifts are 8 ft, 0 in. (2.4 m). Weights are predicated on standard lifts and include typical trolley weight. Corresponding hand chain drop is normally 2 ft, 0 in. (0.6 m) less than the reach. Other lifts are available.
(3) Values refer to each hand chain where two hand chains are required.

SECTION 2-1.7: LOAD SPROCKETS (POCKET WHEELS)

(a) Load sprockets shall have pockets formed to allow proper engagement of the load chain.
(b) Load sprockets shall be guarded to minimize entrance of foreign objects.
(c) Provision shall be made to guard against jamming of the load chain with the hoist mechanism under normal operating conditions.

SECTION 2-1.8: LOAD CHAIN

The hoist shall lift or lower the rated load in a controlled manner when a manual force is applied to the hand chain. When equipped with more than one hand chain, the hand chain pull indicates the required pull for each hand chain.
(a) Load chain shall be suitable for hoist service. Chain shall be accurately pitched to pass over sprockets without binding.
(b) Load chains shall be proof tested by the chain manufacturer or hoist manufacturer with a load at least equivalent to 1½ times the hoist rated load divided by the number of chain parts (lines) supporting the load.
(c) If a load is supported by more than one part (line) of load chain, the tension on the parts (lines) shall be equalized.

SECTION 2-1.9: HOOKS

Hooks shall follow the guidance of ASME B30.10.
(a) If the hooks are of the swiveling type, they should be free to rotate. Load hooks should be capable of rotating through 360 deg when supporting the rated load.
(b) Hooks shall incorporate latches unless the application makes the use of the latch impractical. When required, a latch shall be provided to bridge the opening of the hook for the purpose of retaining slings, chains, etc., under slack conditions.

Table 2-1.2-3 Typical Trolley-Suspended Hoist Characteristics (Integral)

Rated Load, ton (kg) [Note (1)]	Hoist Weight, lb (kg) [Note (2)]	Headroom, in. (mm)	Hand Chain Pull, lbf (kN) [Note (3)]	Hand Chain Overhaul to Lift Load, ft [Note (3)]
1/4 (227)	27–258 (12–117)	6–13 (152–330)	17–24 (0.08–0.11)	25–33
1/2 (454)	27–258 (12–117)	6–14 (152–356)	23–46 (0.10–0.20)	22 1/2–57
1 (908)	36–258 (16–117)	6–14 1/2 (152–368)	46–70 (0.20–0.32)	30–57
1 1/2 (1361)	55–267 (25–121)	6–19 (152–483)	41–80 (0.18–0.36)	40 1/2–87
2 (1815)	55–270 (25–122)	6–19 (152–483)	54–95 (0.24–0.42)	52–87
3 (2722)	179–469 (81–213)	7–21 (178–535)	42–85 (0.19–0.38)	60–176
4 (3629)	236–469 (107–213)	8–27 1/8 (203–689)	56–94 (0.25–0.42)	100–176
5 (4536)	314–683 (142–310)	8–28 (203–711)	50–81 (0.22–0.36)	156–250
6 (5443)	325–683 (147–310)	8–28 (203–711)	60–97 (0.27–0.43)	156–250
8 (7258)	491–1,020 (223–463)	11–27 (279–685)	45–91 (0.20–0.40)	220–500
10 (9072)	491–1,105 (223–501)	11–27 (279–685)	55–98 (0.24–0.44)	254–500
12 (10887)	1,022–1,376 (510–624)	11–13 (279–330)	65–104 (0.29–0.46)	174–500
16 (14516)	1,314–1,681 (596–763)	13–14 (330–356)	64–95 (0.28–0.42)	232–710
20 (18144)	1,431–2,110 (649–957)	17–18 (432–457)	80–87 (0.36–0.39)	290–762
24 (21816)	1,431–2,110 (649–957)	17–18 (432–457)	100–108 (0.44–0.48)	348–762

GENERAL NOTE: This Table indicates the characteristics of hoists generally available. Those values including dash (e.g., 11–44) denote typical ranges. Consult manufacturer for specifics.

NOTES:
(1) 1 ton = 2,000 lb
(2) Standard lifts are 8 ft, 0 in. (2.4 m). Weights are predicated on standard lifts and include typical trolley weight. Corresponding hand chain drop is normally 2 ft, 0 in. (0.6 m) less than the reach. Other lifts are available.
(3) Values refer to each hand chain where two hand chains are required.

SECTION 2-1.10: LOAD BLOCKS

Load blocks shall be guarded against load chain jamming under normal operating conditions.

SECTION 2-1.11: BRAKES

The hoist shall be equipped with a brake that shall sustain and control the rated load when the hoist is being operated in either direction.

The hoist shall be equipped with a mechanical load brake that shall perform the following functions under normal operating conditions with rated loads and under test conditions with test loads up to 125% of rated load:

(a) stop and hold the load when hand chain(s) is released
(b) permit smooth controlled lowering of a load when manual power is applied to the hand chain(s)
(c) have provision for adjustment where necessary to compensate for wear
(d) have heat dissipation capability for the specified frequency of operation

SECTION 2-1.12: OVERTRAVEL RESTRAINT

Before the load chain can be completely run out of the hoist, it shall be restrained in its fully extended position. The restraint shall be such that the unloaded hoist can withstand a lowering hand chain force equal to twice the pull required to lift the rated load, or the hoist with rated load can withstand a lowering hand chain force equivalent to the pull required to lift the rated load.

SECTION 2-1.13: TYPICAL HOIST INQUIRY DATA FORM

See Form 2-1.13-1.

Form 2-1.13-1 Typical Hoist Inquiry Data Form

Hoist

Quantity of hoists required_____

Rated capacity_____ tons (_____kg)

Lift [Note (1)] _____ ft (_____m)

Reach_____ft (_____m)

Hand chain drop _____ft (_____ m)

Headroom_____in. (_____ mm)

Type of suspension:

☐Hook ☐Clevis ☐Trolley

Trolley (Separate)

Quantity of trolleys required_____

Rated capacity_____tons (_____ kg)

Type: ☐Plain ☐Hand chain operated

Hand chain drop_____ft (_____m)

Trolley (Integral)

Type: ☐Plain ☐Hand chain operated

Headroom (including hoist)_____in. (_____mm)

Hand chain drop_____ ft (_____m)

Beam Data (Trolley-suspended hoists only)

Type and size of beam_____

Width of running flange_____ in. (_____mm)

Minimum radius of beam curves

_____ ft _____ in. (_____ m)

Clearance dimensions of interlocks, switches, or beam splices (if used)_____

_____

_____

_____

Environmental conditions: Furnish complete information regarding any abnormal operating conditions such as ambient temperatures below 0°F (−18°C) or above 130°F (54°C), long exposure to weather, corrosive fumes, dust-laden or moisture-laden atmospheres, and hazardous locations.

_____

_____

_____

_____

NOTE: (1) Refer to manufacturer's catalog for standard lift that will meet the application requirement.

NONMANDATORY APPENDIX A
PERFORMANCE REQUIREMENTS FOR HAND CHAIN MANUALLY OPERATED CHAIN HOISTS USED IN MARINE AND OTHER APPLICATIONS AS REQUIRED BY THE U.S. DEPARTMENT OF DEFENSE (DoD)

A-1 GENERAL

A-1.1 Scope

This Appendix provides performance requirements beyond those cited in ASME HST-2–2018 for hand operated chain hoists for use in marine and other applications as required by the Department of Defense (DoD).

This Appendix, in conjunction with ASME HST-2–2018, is replacing the requirements of MIL-H-904 for hand operated chain hoists.

A-1.2 Classification

Hand chain manually operated chain hoists shall be of the following classes and types [see para. A-5.1(b)].

A-1.2.1 Classes

Class 1 Conventional weight, for general material handling

Class 2 Light weight, for general material handling

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

A-1.2.2 Types

Type A Hand-chain-operated hoist, link chain, hook suspension

Type B Hand-chain-operated hoist, link chain, plain trolley suspension

Type C Hand-chain-operated hoist, link chain, geared trolley suspension

Type D Hand-chain-operated hoist, link chain, low headroom, plain trolley suspension

Type E Hand-chain-operated hoist, link chain, low headroom, geared trolley suspension

A-1.3 Definitions

brittle material: material showing less than 10% elongation in gage length for the tensile test specimen.

operating cycle: the lifting and lowering of the hoist rated load through a minimum distance of 4 ft, with a 6-sec maximum pause between lift and lowering.

recovered materials: materials that have been collected or recovered from solid waste and reprocessed to become a source of raw materials, as opposed to virgin raw materials.

A-1.4 References to Other Codes and Standards

Refer to the following publications, copies of which may be obtained from the publisher as indicated. The edition bearing the latest date of issuance shall be used.

ASTM A48, Standard Specification for Gray Iron Castings (DoD adopted)

Table A-2.3.3-1 Type D, Hand-Chain-Operated Hoist, Link Chain, Low Headroom, Plain Trolley Suspension

Rated Load, ton [Note (1)]	Minimum Standard Lift, ft [Note (2)]	Standard Size of "I" Beam, in.	Maximum Headroom, in.	Maximum Pull to Traverse Hoist, lbf [Note (3)]	Maximum Weight Less Track Clamp (Class 1), lb
½	8	5	6	20	189
1	8	6	6	40	210
1½	8	7	6¾	45	294
2	8	8	7	60	341
3	8	9	8	65	473

GENERAL NOTE: This Table indicates the characteristics of hoists generally available. Consult manufacturer for specifics.

NOTES:
(1) 1 ton = 2,000 lb
(2) Standard lifts are 8 ft, 0 in. Weights are predicated on standard lifts and include typical trolley weight. Other lifts are available.
(3) Direct pull on trolley (along direction of track) when moving on straight level track.

ASTM A143, Standard Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement (DoD adopted)
ASTM B26, Standard Specification for Aluminum-Alloy Sand Castings (DoD adopted)
ASTM B108, Standard Specification for Aluminum-Alloy Permanent Mold Castings (DoD adopted)
ASTM B633, Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel (DoD adopted)
Publisher: American Society for Testing and Materials (ASTM International), 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959 (www.astm.org)

MIL-DTL-917, Detail Specification: Electric Power Equipment, Basic Requirements for
MIL-S-901, Shock Tests, H.I. (High-Impact) Shipboard Machinery, Equipment, and Systems, Requirements for
MIL-STD-889, Detail Specification: Dissimilar Metals
Publisher: Department of Defense, Defense Logistics Agency (DLA), DLA Document Services, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094 (http://quicksearch.dla.mil)

A-2 PERFORMANCE REQUIREMENTS

A-2.1 General

Performance requirements shall be in accordance with ASME HST-2–2018, and as specified in this Appendix.

A-2.2 Application

Metals susceptible to corrosion attack in a seawater environment shall be treated, plated, or painted to provide corrosion resistance. Assemblies containing dissimilar metals shall be protected against galvanic corrosion in accordance with MIL-DTL-917 and MIL-STD-889. If a metal is coated or plated, the coating or plating metal rather than the base metal, shall be considered in metal-to-metal contact between parts that depend upon coating or plating for corrosion resistance.

When specified [see para. A-5.1(c)], hooks shall be zinc plated in accordance with ASTM B633, Type 11, Class Fe/Zn 12. The hook throat safety device shall be constructed of noncorrosive material or treated for corrosion resistance.

When specified [see para. A-5.1(d)], the link load chain and link hand chain shall be zinc plated in accordance with ASTM B633, Type 11, Class Fe/Zn 12. The safeguarding against and procedure for detecting embrittlement of zinc coating shall be in accordance with ASTM A143.

A-2.3 Characteristics

A-2.3.1 Type A, Hand-Chain-Operated Hoist, Link Chain, Hook Suspension. Type A hook suspension shall be in accordance with Table 2-1.2-1 of ASME HST-2–2018 and as specified herein.

A-2.3.2 Types B and C, Hand-Chain-Operated Hoist, Link Chain, Plain and Geared Trolley Suspension. Types B and C plain and geared trolley suspension shall be in accordance with Tables 2-1.2-2 and 2-1.2-3 of ASME HST-2–2018 and as specified herein.

Table A-2.3.4-1 Type E, Hand-Chain-Operated Hoist, Link Chain, Low Headroom, Geared Trolley Suspension

Rated Load, ton [Note (1)]	Standard Lift, ft [Note (2)]	Standard Size of "I" Beam, in.	Maximum Headroom, in.	Maximum Pull to Traverse Hoist, lbf [Note (3)]	Maximum Weight Less Track Clamp (Class 1), lb
1½	8	7	6¾	13	326
2	8	8	7	15	373
3	8	9	8	21	499
4	8	10	9½	30	735
5	8	12	10½	38	1,008
6	8	12	10½	45	1,019

GENERAL NOTE: This Table indicates the characteristics of hoists generally available. Consult manufacturer for specifics.

NOTES:
(1) 1 ton = 2,000 lb
(2) Standard lifts are 8 ft, 0 in. Weights are predicated on standard lifts and include typical weight. Other lifts are available.
(3) Direct pull on trolley (along direction of track) when moving on straight level track.

A-2.3.3 Type D, Hand-Chain-Operated Hoist, Link Chain, Low Headroom, Plain Trolley Suspension. Type D, low headroom, plain trolley suspension shall be in accordance with the requirements of Table A-2.3.3-1 and as specified herein.

A-2.3.4 Type E, Hand-Chain-Operated Hoist, Link Chain, Low Headroom, Geared Trolley Suspension. Type E shall be in accordance with the requirements of Table A-2.3.4-1 and as specified herein.

A-2.4 Lubrication

Lubricants used shall be readily available and be free of ozone-depleting chemicals (ODC).

A-2.5 Painting

Paints and coatings shall be lead free and chromate free.

A-2.6 Workmanship

The hoist shall perform any operation specified herein without malfunction or component failure caused by faulty workmanship. Edges and surfaces exposed to operating and maintenance personnel shall be smooth and rounded so that a hazardous surface does not exist.

A-2.7 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. Component parts for the same type of hoists from the same manufacturer shall be interchangeable to the greatest extent possible.

A-3 MECHANICAL REQUIREMENTS

A-3.1 Design Stress

The maximum combined stress in component parts shall not exceed 35% of the tensile yield strength of the material for hoist operation at rated load. The maximum combined stress in component parts shall not exceed 70% of the tensile yield strength of the material. For all classes of hoists at rated load, the safety factor for load-bearing parts shall be not less than three, based on the yield strength of the materials used, or a minimum safety factor of five, 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 hoist shall be interchangeable.