

**ASME B30.7-2021**  
(Revision of ASME B30.7-2016)

# Winches

**Safety Standard for Cableways,  
Cranes, Derricks, Hoists, Hooks, Jacks,  
and Slings**

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**AN AMERICAN NATIONAL STANDARD**



**The American Society of  
Mechanical Engineers**

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**AN AMERICAN NATIONAL STANDARD**



**The American Society of  
Mechanical Engineers**

Two Park Avenue • New York, NY • 10016 USA

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The next edition of this Standard is scheduled for publication in 2026. This Standard will become effective 1 year after the Date of Issuance.

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# FOREWORD

This American National Standard, Safety Standard for Cableways, Cranes, Derricks, Hoists, Hooks, Jacks, and Slings, has been developed under the procedures accredited by the American National Standards Institute (ANSI). This Standard had its beginning in December 1916, when an eight-page “Code of Safety Standards for Cranes,” prepared by the American Society of Mechanical Engineers (ASME) Committee on the Protection of Industrial Workers, was presented at the annual meeting of the ASME.

Meetings and discussions regarding safety on cranes, derricks, and hoists were held from 1920 to 1925 involving the ASME Safety Code Correlating Committee, the Association of Iron and Steel Electrical Engineers, the American Museum of Safety, the American Engineering Standards Committee (AESC) [later changed to American Standards Association (ASA), then to the United States of America Standards Institute (USASI), and finally to ANSI], Department of Labor — State of New Jersey, Department of Labor and Industry — State of Pennsylvania, and the Locomotive Crane Manufacturers Association. On June 11, 1925, the AESC approved the ASME Safety Code Correlating Committee’s recommendation and authorized the project with the U.S. Department of the Navy, Bureau of Yards and Docks, and ASME as sponsors.

In March 1926, invitations were issued to 50 organizations to appoint representatives to a Sectional Committee. The call for organization of this Sectional Committee was sent out October 2, 1926, and the Committee was organized on November 4, 1926, with 57 members representing 29 national organizations.

Commencing June 1, 1927, and using the eight-page Code published by ASME in 1916 as a basis, the Sectional Committee developed the “Safety Code for Cranes, Derricks, and Hoists.” The early drafts of this safety code included requirements for jacks, but due to inputs and comments on those drafts, the Sectional Committee decided in 1938 to make the requirements for jacks a separate code. In January 1943, ASA B30.2-1943 was published addressing a multitude of equipment types, and in August 1943, ASA B30.1-1943 was published addressing only jacks. Both documents were reaffirmed in 1952 and widely accepted as safety standards.

Due to changes in design, advancement in techniques, and general interest of labor and industry in safety, the Sectional Committee, under the joint sponsorship of ASME and the Bureau of Yards and Docks (now the Naval Facilities Engineering Command), was reorganized on January 31, 1962, with 39 members representing 27 national organizations. The new Committee changed the format of ASA B30.2-1943 so that the multitude of equipment types it addressed could be published in separate volumes that could completely cover the construction, installation, inspection, testing, maintenance, and operation of each type of equipment that was included in the scope of ASA B30.2. This format change resulted in B30.3, B30.5, B30.6, B30.11, and B30.16 being initially published as “Revisions” of B30.2, with the remainder of the B30 volumes being published as totally new volumes. ASA changed its name to USASI in 1966 and to ANSI in 1969, which resulted in B30 volumes from 1943 to 1968 being designated as ASA B30, USAS B30, or ANSI B30, depending on their date of publication. In 1982, the Committee was reorganized as an Accredited Organization Committee operating under procedures developed by ASME and accredited by ANSI.

This Standard presents a coordinated set of rules that may serve as a guide to government and other regulatory bodies and municipal authorities responsible for the guarding and inspection of the equipment falling within its scope. The suggestions leading to accident prevention are given both as mandatory and advisory provisions; compliance with both types may be required by employers of their employees. In case of practical difficulties, new developments, or unnecessary hardship, the administrative or regulatory authority may grant variances from the literal requirements or permit the use of other devices or methods, but only when it is clearly evident that an equivalent degree of protection is thereby secured. To secure uniform application and interpretation of this Standard, administrative or regulatory authorities are urged to consult the B30 Committee, in accordance with the format described in [Section IX](#) of the B30 Standard Introduction, before rendering decisions on disputed points.

Safety codes and standards are intended to enhance public safety. Revisions result from committee consideration of factors such as technological advances, new data, and changing environmental and industry needs. Revisions do not imply that previous editions were inadequate.

The first edition of B30.7, entitled Base-Mounted Drum Hoists, was published in 1971. New editions were published in 1977, 1984, 1989, 1994, 2001, and 2006. In 2011, the Volume was completely rewritten, and the title was changed to Winches. The 2016 edition included changes to clarify that capstans are not part of the B30.7 scope, to make the Volume more consistent with other B30 volumes, and to add personnel competence requirements and responsibilities. This 2021 edition revises the definitions and incorporates references to ASME B30.30, among other updates.

This Volume of the Standard, which was approved by the B30 Committee and by ASME, was approved by ANSI and designated an American National Standard on September 23, 2021.

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## Safety Standard for Cableways, Cranes, Derricks, Hoists, Hooks, Jacks, and Slings

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# B30 STANDARD INTRODUCTION

## SECTION I: SCOPE

The ASME B30 Standard contains provisions that apply to the construction, installation, operation, inspection, testing, maintenance, and use of cranes and other lifting and material-movement-related equipment. For the convenience of the reader, the Standard has been divided into separate volumes. Each volume has been written under the direction of the ASME B30 Standards Committee and has successfully completed a consensus approval process under the general auspices of the American National Standards Institute (ANSI).

As of the date of issuance of this Volume, the B30 Standard comprises the following volumes:

- B30.1 Jacks, Industrial Rollers, Air Casters, and Hydraulic Gantries
- B30.2 Overhead and Gantry Cranes (Top Running Bridge, Single or Multiple Girder, Top Running Trolley Hoist)
- B30.3 Tower Cranes
- B30.4 Portal and Pedestal Cranes
- B30.5 Mobile and Locomotive Cranes
- B30.6 Derricks
- B30.7 Winches
- B30.8 Floating Cranes and Floating Derricks
- B30.9 Slings
- B30.10 Hooks
- B30.11 Monorails and Underhung Cranes (withdrawn 2018 — requirements found in latest revision of B30.17)
- B30.12 Handling Loads Suspended From Rotorcraft
- B30.13 Storage/Retrieval (S/R) Machines and Associated Equipment
- B30.14 Side Boom Tractors
- B30.15 Mobile Hydraulic Cranes (withdrawn 1982 — requirements found in latest revision of B30.5)
- B30.16 Overhead Underhung and Stationary Hoists
- B30.17 Cranes and Monorails (With Underhung Trolley or Bridge)
- B30.18 Stacker Cranes (Top or Under Running Bridge, Multiple Girder With Top or Under Running Trolley Hoist)
- B30.19 Cableways
- B30.20 Below-the-Hook Lifting Devices

- B30.21 Lever Hoists
- B30.22 Articulating Boom Cranes
- B30.23 Personnel Lifting Systems
- B30.24 Container Cranes
- B30.25 Scrap and Material Handlers
- B30.26 Rigging Hardware
- B30.27 Material Placement Systems
- B30.28 Balance Lifting Units
- B30.29 Self-Erecting Tower Cranes
- B30.30 Ropes
- B30.31 Self-Propelled, Towed, or Remote-Controlled Hydraulic Platform Transporters<sup>1</sup>
- B30.32 Unmanned Aircraft Systems (UAS) Used in Inspection, Testing, Maintenance, and Lifting Operations<sup>1</sup>

## SECTION II: SCOPE EXCLUSIONS

Any exclusion of, or limitations applicable to, the equipment, requirements, recommendations, or operations contained in this Standard are established in the affected volume's scope.

## SECTION III: PURPOSE

The B30 Standard is intended to

- (a) prevent or minimize injury to workers, and otherwise provide for the protection of life, limb, and property by prescribing safety requirements
- (b) provide direction to manufacturers, owners, employers, users, and others concerned with, or responsible for, its application
- (c) guide governments and other regulatory bodies in the development, promulgation, and enforcement of appropriate safety directives

## SECTION IV: USE BY REGULATORY AGENCIES

These volumes may be adopted in whole or in part for governmental or regulatory use. If adopted for governmental use, the references to other national codes and standards in the specific volumes may be changed to refer to the corresponding regulations of the governmental authorities.

<sup>1</sup> This volume is currently in the development process.

## SECTION V: EFFECTIVE DATE

(a) *Effective Date.* The effective date of this Volume of the B30 Standard shall be 1 yr after its date of issuance. Construction, installation, inspection, testing, maintenance, and operation of equipment manufactured and facilities constructed after the effective date of this Volume shall conform to the mandatory requirements of this Volume.

(b) *Existing Installations.* Equipment manufactured and facilities constructed prior to the effective date of this Volume of the B30 Standard shall be subject to the inspection, testing, maintenance, and operation requirements of this Standard after the effective date.

It is not the intent of this Volume of the B30 Standard to require retrofitting of existing equipment. However, when an item is being modified, its performance requirements shall be reviewed relative to the requirements within the current volume. The need to meet the current requirements shall be evaluated by a qualified person selected by the owner (user). Recommended changes shall be made by the owner (user) within 1 yr.

## SECTION VI: REQUIREMENTS AND RECOMMENDATIONS

Requirements of this Standard are characterized by use of the word *shall*. Recommendations of this Standard are characterized by the word *should*.

## SECTION VII: USE OF MEASUREMENT UNITS

This Standard contains SI (metric) units as well as U.S. Customary units. The values stated in U.S. Customary units are to be regarded as the standard. The SI units are a direct (soft) conversion from the U.S. Customary units.

## SECTION VIII: REQUESTS FOR REVISION

The B30 Standards Committee will consider requests for revision of any of the volumes within the B30 Standard. Such requests should be directed to

Secretary, B30 Standards Committee  
ASME Standards and Certification  
Two Park Avenue  
New York, NY 10016-5990

Requests should be in the following format:

Volume: Cite the designation and title of the volume.  
Edition: Cite the applicable edition of the volume.  
Subject: Cite the applicable paragraph number(s) and the relevant heading(s).  
Request: Indicate the suggested revision.  
Rationale: State the rationale for the suggested revision.

Upon receipt by the Secretary, the request will be forwarded to the relevant B30 Subcommittee for consideration and action. Correspondence will be provided to the requester defining the actions undertaken by the B30 Standards Committee.

## SECTION IX: REQUESTS FOR INTERPRETATION

The B30 Standards Committee will render an interpretation of the provisions of the B30 Standard. An Interpretation Submittal Form is available on ASME's website at <http://cstools.asme.org/Interpretation/Interpretation-Form.cfm>.

Phrase the question as a request for an interpretation of a specific provision suitable for general understanding and use, not as a request for approval of a proprietary design or situation. Plans or drawings that explain the question may be submitted to clarify the question. However, they should not contain any proprietary names or information. Read carefully the note addressing the types of requests that the B30 Standards Committee can and cannot consider.

Upon submittal, the request will be forwarded to the relevant B30 Subcommittee for a draft response, which will then be subject to approval by the B30 Standards Committee prior to its formal issuance. The B30 Standards Committee may rewrite the question for the sake of clarity.

Interpretations to the B30 Standard will be available online at <https://cstools.asme.org/Interpretation/SearchInterpretation.cfm>.

## SECTION X: ADDITIONAL GUIDANCE

The equipment covered by the B30 Standard is subject to hazards that cannot be abated by mechanical means, but only by the exercise of intelligence, care, and common sense. It is therefore essential to have personnel involved in the use and operation of equipment who are competent, careful, physically and mentally qualified, and trained in the proper operation of the equipment and the handling of loads. Serious hazards include, but are not limited to, improper or inadequate maintenance, overloading, dropping or slipping of the load, obstructing the free passage of the load, and using equipment for a purpose for which it was not intended or designed.

The B30 Standards Committee fully realizes the importance of proper design factors, minimum or maximum dimensions, and other limiting criteria of wire rope or chain and their fastenings, sheaves, sprockets, drums, and similar equipment covered by the Standard, all of which are closely connected with safety. Sizes, strengths, and similar criteria are dependent on many different factors, often varying with the installation and uses. These factors depend on

- (a) the condition of the equipment or material
- (b) the loads

(c) the acceleration or speed of the ropes, chains, sheaves, sprockets, or drums

(d) the type of attachments

(e) the number, size, and arrangement of sheaves or other parts

(f) environmental conditions causing corrosion or wear

(g) many variables that must be considered in each individual case

The requirements and recommendations provided in the volumes must be interpreted accordingly, and judgment used in determining their application.

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# ASME B30.7-2021

## SUMMARY OF CHANGES

Following approval by the ASME B30 Committee and ASME, and after public review, ASME B30.7-2021 was approved by the American National Standards Institute on September 23, 2021.

ASME B30.7-2021 includes the following changes identified by a margin note, **(21)**.

<i>Page</i>	<i>Location</i>	<i>Change</i>
viii	B30 Standard Introduction	Updated
1	Section 7-0.2	(1) Definitions of <i>abnormal operating conditions</i> , <i>heavy service</i> , and <i>original language(s)</i> added (2) Definitions of <i>administrative or regulatory authority</i> , <i>exposed lifting/lowering</i> , and <i>rotation-resistant rope</i> deleted (3) Definitions of <i>brake</i> , <i>drum</i> , <i>limit device</i> , <i>minimum breaking force</i> , <i>normal operating conditions</i> , <i>normal service</i> , <i>pawl (dog)</i> , <i>rope</i> , <i>severe service</i> , <i>swinger drum</i> , and <i>switch (valve)</i> revised
2	Section 7-0.3	Added and subsequent sections redesignated
2	Section 7-0.5	Updated
5	7-1.1.3	Revised in its entirety
5	7-1.2.2	(1) Subparagraph (c) revised (2) Former subpara. (d) deleted and subsequent subparagraph redesignated
6	7-1.2.5	Revised in its entirety
7	7-2.1.3	Subparagraph (a)(4) revised
7	7-2.1.4	(1) Subparagraph (c)(9) revised (2) Subparagraph (c)(10) deleted and subsequent subparagraphs redesignated
9	Section 7-2.4	Revised in its entirety
10	7-3.1.2	(1) Subparagraph (b) revised (2) Subparagraphs (c), (d), and (e) deleted
10	7-3.1.3	Subparagraph (f) revised
11	7-3.1.3.1.1	Subparagraph (h) added
13	7-3.1.3.4	Subparagraph (b) revised
13	7-3.1.3.5	Added
14	7-3.2.2	Subparagraphs (c) and (d) deleted
14	7-3.2.3	Subparagraphs (a)(5) and (d) revised

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## Chapter 7-0

### Scope, Definitions, Personnel Competence, and References

#### SECTION 7-0.1: SCOPE OF B30.7

The B30.7 Volume includes provisions that apply to the construction, installation, operation, inspection, testing, and maintenance of winches arranged for mounting on a foundation or other supporting structure for moving loads. Winches addressed in this Volume are those typically used in industrial, construction, and maritime applications. The requirements included in this Volume apply to winches that are powered by internal combustion engines, electric motors, compressed air, or hydraulics, and that utilize drums and rope.

This Volume does not apply to overhead hoists, mine hoists, capstans, or winches installed as an integral part of the lifting system of other B30 equipment. Also excluded are winches used with

- (a) all-terrain-type recreational vehicles
- (b) drill rig relocation trucks
- (c) tow trucks
- (d) vehicle recovery units
- (e) boat trailers
- (f) amusement park rides
- (g) excavating equipment
- (h) equipment covered by ANSI A10, ANSI A17, ANSI

A90, ANSI A92, ANSI A120, ANSI B20, ANSI B56, and ANSI B77 standards

- (i) free-fall applications such as pile driving

Provisions of this Volume do not apply to the movement of personnel.

#### (21) SECTION 7-0.2: DEFINITIONS

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

**brake:** a device, other than a motor, used for retarding or stopping motion by means of friction or power.

**capstan (winch head):** a rotatable cylindrical drum with curved end flanges used for load handling by means of fiber rope or wire rope with hand tension applied to the free end of the fiber or the wire rope. A capstan may be a stand-alone machine or may be installed as an auxiliary device on a winch (see [Figure 7-0.2-1](#)).

**clutch:** a means for engagement or disengagement of power.

**critical lift:** a load handling operation that has been determined to present an increased risk beyond normal load handling activities. For example, increased risk may relate to personnel injury, damage to property, interruption of plant production, delays in schedule, release of hazards to the environment, or other jobsite factors.

**drum:** a cylindrical member around which the rope is wound for moving the load.

**final stage manufacturer:** an entity that assembles, installs, or permanently affixes a winch to complete a load movement system.

**heavy service:** service that involves operation within the rated load limit that exceeds normal service.

**jaw clutch:** a clutch composed of two hubs with jaws that engage each other. This type of clutch is either engaged or disengaged and cannot slip.

**limit device:** a device that limits motion or takes control of particular functions without action of the operator when a limiting condition is reached.

**minimum breaking force:** the minimum load at which a new and unused rope will break when loaded to destruction in direct tension.

**normal operating conditions:** conditions during which equipment is performing functions within the scope of its original design.

**normal service:** service that involves operation with randomly distributed loads within the rated load limit, or uniform loads less than 65% of rated load for not more than 25% of the time.

**original language(s):** language(s) used by the manufacturer to develop product instructions and manual(s).

**pawl (dog):** a device that engages a ratchet to prevent rotation.

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

*ratchet*: a toothed component for engagement with the pawl.

*rated line pull*: the manufacturer's recommended load in pounds (kilograms) applied to the rope attachment on the winch drum.

*rated load*: winch rating in pounds (kilograms) established by the manufacturer in accordance with [Section 7-1.1](#).

*rope*: refers to rope addressed by ASME B30.30.

*severe service*: service that involves normal or heavy service with abnormal operating conditions.

*shall*: a word indicating a requirement.

*should*: a word indicating a recommendation.

*spooling*: winding of rope on a cylindrical drum in evenly spaced wraps and uniform layers.

*standby winch*: a winch not in regular service but used occasionally or intermittently as required.

*swinger drum*: a drum, or configuration of drums, that has a rope connection point at each flange to allow a simultaneous overwind and underwind operation. When the rope is wrapped around a derrick bull wheel, it is used to slew or swing the derrick.

*switch (valve)*: a device for making, breaking, or changing the connections in an electric, hydraulic, or pneumatic circuit.

*winch*: a power-driven drum(s) that when attached to a load is capable of moving the load (see [Figures 7-0.2-1 through 7-0.2-4](#)).

(4) translating the terminology accurately

(5) reflecting the level of sophistication of the original document

(d) The finished translation shall be verified for compliance with (c)(1) through (c)(5) by a qualified person having an understanding of the technical content of the subject matter.

## SECTION 7-0.4: PERSONNEL COMPETENCE

Persons performing the functions identified in this Volume shall meet the applicable qualifying criteria stated in this Volume and shall, through education, training, experience, skill, and physical fitness, as necessary, be competent and capable of performing the functions as determined by the employer or employer's representative.

## SECTION 7-0.5: REFERENCES TO OTHER CODES AND STANDARDS (21)

The following is a list of publications referenced in this Standard:

ANSI/ASSE Z244.1-2003 (R2008), Control of Hazardous Energy — Lockout/Tagout and Alternative Methods<sup>1</sup>  
 Publisher: The American Society of Safety Professionals (ASSP), 520 N. Northwest Highway, Park Ridge, IL 60068 ([www.assp.org](http://www.assp.org))

ANSI/AWS D14.3/D14.3M-2010, Specification for Welding Earthmoving and Construction Equipment<sup>1</sup>  
 Publisher: American Welding Society (AWS), 8669 NW 36 Street, No. 130, Miami, FL 33166 ([www.aws.org](http://www.aws.org))

ASME B30.10-2014, Hooks

ASME B30.20-2013, Below-the-Hook Lifting Devices

ASME B30.26-2014, Rigging Hardware

ASME B30.30-2019, Ropes

ASME P30.1-2014, Planning for Load Handling Activities

Publisher: The American Society of Mechanical Engineers (ASME), Two Park Avenue, New York, NY 10016-5990 ([www.asme.org](http://www.asme.org))

ISO 7000:2014, Graphical symbols for use on equipment — Registered Symbols

ISO 7296-1:1991, Cranes — Graphical symbols — Part 1: General

Publisher: International Organization for Standardization (ISO), Central Secretariat, Chemin de Blandonnet 8, Case Postale 401, 1214 Vernier, Geneva, Switzerland ([www.iso.org](http://www.iso.org))

## (21) SECTION 7-0.3: TECHNICAL AND SAFETY-RELATED INFORMATION

The manufacturer shall provide instructions [manual(s)] for the operation, inspection, testing, maintenance, assembly, and disassembly of the equipment.

(a) The instructions shall be provided in a language specified by the purchaser at the time of the initial sale by the manufacturer.

(b) Pictograms used to identify controls shall be described in the instructions. The pictograms should comply with ISO 7000, ISO 7926-1, or other recognized source, if previously defined.

(c) Translations of the original language instructions shall meet professional translation industry standards, which include, but are not limited to, the following:

(1) translating the complete paragraph message, instead of word by word

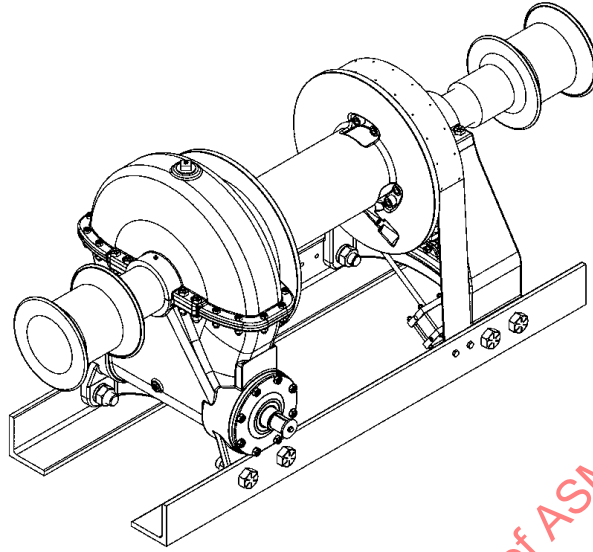
(2) ensuring grammatical accuracy

(3) preserving the source document content without omitting or expanding the text

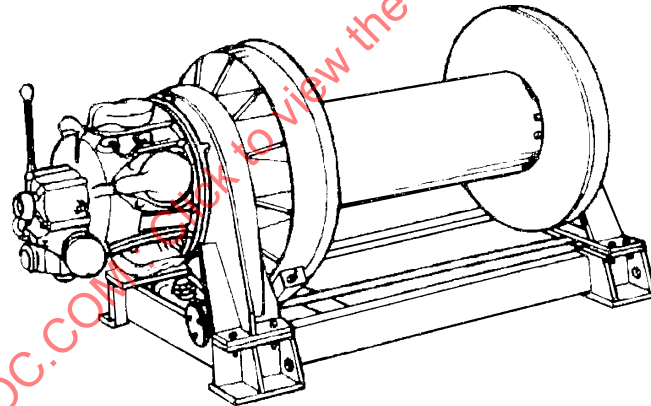
<sup>1</sup> May also be obtained from American National Standards Institute (ANSI), 25 West 43rd Street, New York, NY 10036 ([www.ansi.org](http://www.ansi.org)).



**Figure 7-0.2-1 Winch With Capstan**

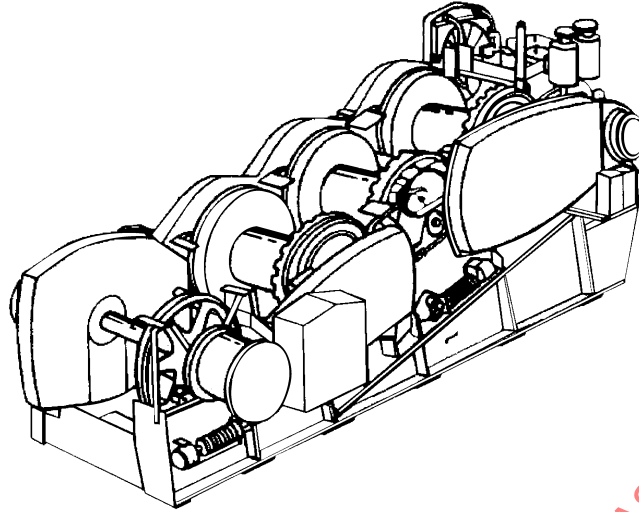


**Figure 7-0.2-2 Single-Drum Winch**

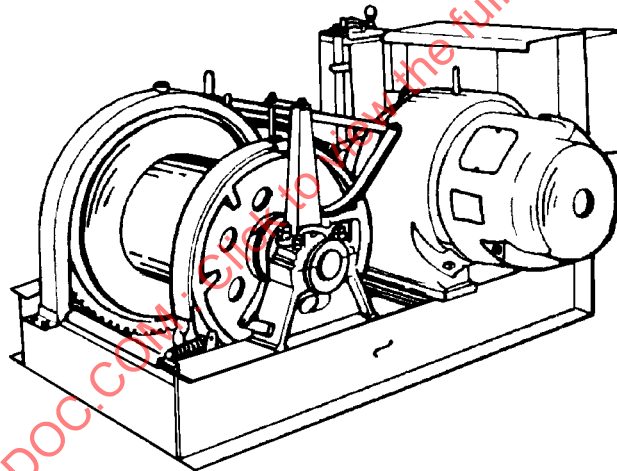




**Figure 7-0.2-3 Three-Drum Winch With Attached Swinger**



**Figure 7-0.2-4 Independent Direct Geared Swinger or Single-Drum Winch**



# Chapter 7-1

## Construction and Installation

### SECTION 7-1.1: RATINGS AND MARKINGS

#### 7-1.1.1 Basis

Winch ratings are dependent upon such factors as applied power, layers of rope wound on the drum, rope diameter and minimum breaking force, drum size, and structural competence of the various winch components and mounting methods.

#### 7-1.1.2 Winch Ratings

Winch ratings shall be the manufacturer's recommended total line pull in pounds (kilograms) at a specified rate of speed on a given size drum and prescribed number of layers of rope.

#### (21) 7-1.1.3 Markings

(a) Winches shall be marked with the following identification:

- (1) name or trademark of winch manufacturer
- (2) winch manufacturer model number
- (3) winch manufacturer unique identification number (e.g., serial number)

(b) And each drum shall be identified with the following:

- (1) rated line pull
- (2) drum size consisting of barrel diameter, barrel length, and flange diameter
- (3) rope diameter(s)
- (4) rope speed in feet per minute (meters per second) at rated load on specified layer
- (5) power requirement

#### 7-1.1.4 Rope Layer Ratings

The manufacturer shall provide line pull ratings for each rope layer and a specified rope diameter.

### SECTION 7-1.2: CONSTRUCTION

#### 7-1.2.1 General

Winches shall be designed and constructed to meet the stresses imposed on their frames and components under all anticipated operating conditions when properly installed and when handling loads not exceeding the

manufacturer's ratings. Welding shall conform to recommended practices of ANSI/AWS D14.3.

#### 7-1.2.2 Winch Mechanisms

(21)

(a) Winches shall be provided with the power, cooling, and operational characteristics to perform all winch functions.

(b) The rope shall be anchored to the drum in a manner approved by the winch manufacturer. The anchorage shall hold the rated line pull with no less than two full wraps on the drum.

(c) Winch rope drums shall be in accordance with ASME B30.30.

(d) Winches that hold loads while the winch is unattended shall be equipped with a mechanical holding device, other than a brake, such as a pawl, capable of holding the rated load.

#### 7-1.2.3 Brakes

(a) Each winch shall be equipped with at least one brake capable of holding not less than 125% of the rated load at the point where the brake is applied.

(b) Remote-operated winches shall be equipped with a self-setting brake.

(c) Foot-operated brakes, if provided, should be constructed so that the operator's foot, when in position, will not slip off the pedal.

(d) Winches designed to allow simultaneous underwind and overwind shall have a brake capable of holding 125% of the rated load in those directions.

(e) A means shall be provided for controlling the drum speed when moving the load.

(f) Braking systems shall have provision for adjustments where necessary to compensate for wear.

#### 7-1.2.4 Guards

(a) Exposed moving parts, such as gears, projecting set screws, projecting keys, chains, chain sprockets, and reciprocating or rotating parts, that might constitute a hazard under normal operating conditions shall be guarded.

(b) Guards shall be capable of supporting, without permanent distortion, the weight of a 200-lb (90-kg) person unless the guard is located where it is unlikely that a person will step on it.

**(21) 7-1.2.5 Ropes**

Ropes shall be in accordance with ASME B30.30 and shall be of a length to allow for the entire range of movement required for the application.

**7-1.2.6 Winch Controls**

(a) All controls shall be marked for identification of function and direction of the drum rotation.

(b) All winch controls used during the normal operating conditions shall be located within reach of the operator while at the operator's station.

(c) Electric motor-driven winches shall be provided with a device that will disconnect all motors from the power source in the event of a power failure and will not permit any motor to be restarted until the controller handle is brought to the off position or a reset switch or button is operated.

(d) Remote-operated winches shall function so that if the control signal for any winch motion becomes ineffective, that winch motion shall stop.

(e) All prime mover controls shall return to neutral when released.

**7-1.2.7 Control Forces and Movements**

When a winch is operated within the manufacturer's ratings, the following shall apply under normal operation:

(a) forces not greater than 35 lb (156 N) on hand levers and forces not greater than 50 lb (222 N) or less than 8 lb (36 N) on foot pedals

(b) travel distance on hand levers not greater than 14 in. (356 mm) from neutral position on two-way levers, and not greater than 24 in. (610 mm) on one-way levers; travel distance on foot pedals not greater than 10 in. (254 mm)

**7-1.2.8 Engine Clutch**

Engine-driven winches shall be provided with a clutch for disengaging power to the winch. The clutch control shall be within reach from the operator's station.

**7-1.2.9 Jaw Clutch**

If a jaw clutch is installed, it shall not be possible to disengage the clutch while the winch is under load.

**7-1.2.10 Electric Resistors**

(a) Resistor units, if used, shall be supported to minimize vibration effect.

(b) Provision shall be made to prevent broken parts or molten metal from falling from the winch.

(c) If resistor enclosures are provided, the enclosures shall be installed to prevent the accumulation of combustible matter.

**7-1.2.11 Switches**

On electric-powered winches, a circuit switch or circuit breaker of the enclosed type with provisions for locking in the open position shall be provided in the main power supply for the motor. These enclosures shall be suitable for the environment where they are installed.

**7-1.2.12 Lubrication**

Lubricating points should be accessible without the necessity of removing guards or other parts.

**SECTION 7-1.3: INSTALLATION****7-1.3.1 Attachments and Anchorages**

Winch attachments and anchorages are the responsibility of the user and shall be designed by a qualified person.

**7-1.3.2 Installation Location of Winches**

Winches shall be installed in a manner that allows proper rope spooling on the drums.

## Chapter 7-2

# Inspection, Testing, and Maintenance

### SECTION 7-2.1: INSPECTION

#### 7-2.1.1 General

(a) All inspections shall be performed by a designated person. Any deficiencies identified shall be examined and a determination made by a qualified person as to whether they constitute a hazard and, if so, what additional steps need to be taken to address the hazard.

(b) There are five types of inspections.

- (1) initial inspection and test
- (2) daily inspection and functional test
- (3) frequent inspection
- (4) periodic inspection
- (5) inspection of equipment not in regular use

#### 7-2.1.2 Initial Inspection and Test

(a) An initial inspection and test is a visual and audible examination of the winch and the supporting structure conducted by a designated person to verify compliance with the applicable provisions of [Chapter 7-1](#).

(b) Prior to use, new, repaired, and modified winches and supporting structures shall be inspected by a designated person.

(c) Inspection of altered, repaired, and modified winches may be limited to the parts of the winch or supporting structure affected by the alteration, repair, or modification, as determined by a qualified person.

(d) The winch shall be tested in accordance with the requirements of [Section 7-2.2](#).

(e) Prior to use, adjustments and repairs necessary to satisfy the requirements of this section shall be made in accordance with [para. 7-2.3.3](#).

(f) The initial inspection shall include any additional items specified by the manufacturer or a qualified person.

(g) The initial inspection of a new winch shall be documented as the first periodic inspection. See [para. 7-2.1.5\(f\)](#).

#### (21) 7-2.1.3 Daily Inspection and Test

(a) A daily inspection and operational test is a visual and audible examination of the equipment conducted by a designated person each day the winch is used. As a minimum, the following items shall be inspected and tested:

- (1) control mechanisms for proper operation

(2) limit devices for proper operation

(3) deterioration or leakage in air or hydraulic systems

(4) ropes in accordance with ASME B30.30

(5) indication of loose, damaged, or missing structural components including supports and anchorages

(6) any additional items specified by the manufacturer or a qualified person

(b) Prior to use, any adjustments, repairs, or replacements required shall be accomplished in accordance with [para. 7-2.3.3](#).

(c) Written records are not required for daily inspections.

#### 7-2.1.4 Frequent Inspection

(21)

(a) A frequent inspection is a visual and audible examination of the equipment conducted by a designated person.

(b) Equipment shall be inspected at intervals determined by a qualified person. The inspection intervals shall be based on the following types of service:

- (1) normal service — monthly
- (2) heavy service — weekly to monthly
- (3) severe service — daily to weekly

(c) As a minimum, the following items shall be inspected:

- (1) items described in [para. 7-2.1.3](#)
- (2) electrical apparatus for
  - (-a) malfunctioning
  - (-b) signs of excessive deterioration
  - (-c) dirt and moisture accumulation
- (3) control and drive mechanisms for
  - (-a) improper adjustment
  - (-b) excessive wear
- (4) tubing, piping, electrical cables, or hoses and their fittings for damage
- (5) markings, warnings, and instructions that are illegible or missing
- (6) fluids for adequate condition and supply
- (7) gearboxes and lubrication systems for
  - (-a) oil levels
  - (-b) clogged filters
- (8) hydraulic oil reservoir for proper level(s)
- (9) ropes in accordance with ASME B30.30
  - (-a) rope end securement and fittings at the working end for

B30.10 (-1) hooks, if used, in accordance with ASME

(-2) rigging hardware, if used, in accordance with ASME B30.26

(-3) custom devices, if used, in accordance with ASME B30.20

(10) warning device's proper operation

(11) any additional items specified by the winch manufacturer

(d) A qualified person shall determine whether conditions found during the inspection require further evaluation or disassembly or constitute a hazard that requires the equipment to be taken out of service.

(e) Adjustments, repairs, or replacements shall be made, as necessary, in accordance with [para. 7-2.3.3](#).

(f) Written records are not required for frequent inspections.

### 7-2.1.5 Periodic Inspection

(a) A periodic inspection and test is a visual and audible examination of the equipment conducted by a designated person.

(b) Equipment shall be inspected at intervals determined by a qualified person. The inspection intervals shall be based on the following types of service:

(1) normal service — 6 months to 12 months

(2) heavy service — 3 months to 6 months

(3) severe service — 1 month to 3 months

(c) A qualified person shall determine whether conditions found during the inspection require further evaluation or disassembly or constitute a hazard that requires the equipment to be taken out of service.

(d) As a minimum, the following items shall be inspected:

(1) items described in [para. 7-2.1.4](#)

(2) pins, bearings, shafts, gears, rollers, and locking and clamping devices for

(-a) excessive wear

(-b) cracking

(-c) distortion

(-d) corrosion

(3) brake and clutch system parts and linings for

(-a) excessive wear

(-b) severe distortion

(-c) damage

(4) pawls and ratchets for

(-a) excessive wear

(-b) deformation

(5) chain and chain drive sprockets for

(-a) excessive wear

(-b) excessive chain stretch

(6) power source, if integral to winch, for

(-a) improper performance

(-b) noncompliance with manufacturer's requirements

(7) any additional items specified by the manufacturer or a qualified person

(e) Prior to use, adjustments, repairs, or replacements shall be made, as necessary, in accordance with [para. 7-2.3.3](#).

(f) Written records of the most recent periodic inspection shall be maintained and shall include the condition of the winch.

### 7-2.1.6 Winches Not in Regular Service

(a) A standby winch or a winch that has been taken out of service and been idle for a period of 1 month or more, but less than 6 months, shall be given a frequent inspection before being placed in service.

(b) A standby winch or a winch that has been taken out of service and been idle for a period of over 6 months shall be given a periodic inspection before being put into service.

## SECTION 7-2.2: TESTING

### 7-2.2.1 Operational Tests

(a) Operational testing shall be performed when required by [paras. 7-2.1.2](#) through [7-2.1.5](#) to verify proper operation of the following:

(1) drum rotation

(2) clutches, brakes, and pawls

(3) limit devices and all other aids

(b) Tests shall be conducted under no-load conditions and from minimum to maximum speed as applicable.

### 7-2.2.2 Load Test

(a) All new winches shall be load tested by the final stage manufacturer. This load test shall be used to verify the integrity of the winch and mounting structure. The load test shall not be less than the load required to verify the maximum design performance criteria.

(1) The load shall not be less than 110% of the rated load nor more than 125% of the rated load, unless otherwise recommended by the manufacturer or a qualified person.

(2) The winch shall have a minimum of five wraps of rope on the drum during the load test.

(3) The load shall be applied to the winch and held by the winch brake(s).

(4) A written report of the test shall be prepared and placed on file by the final stage manufacturer.

(b) For altered, modified, or repaired winches a qualified person shall determine if a load test is required, and if so, the load test shall include the following as minimum requirements:

(1) The load shall not be less than 110% of the rated load nor more than 125% of the rated load, unless otherwise recommended by the manufacturer or a qualified person.

(2) The winch shall have a minimum of five wraps of rope on the drum during the load test.

(3) The load shall be applied to the winch and held by the winch brake(s).

(4) A written report of the test shall be prepared and placed on file by the final stage manufacturer.

## **SECTION 7-2.3: MAINTENANCE**

### **7-2.3.1 Preventive Maintenance**

A preventive maintenance program shall be established. The maintenance program shall be based on the winch manufacturer's or a qualified person's recommendations. Maintenance records should be made available.

### **7-2.3.2 Maintenance Procedure**

(a) Before adjustments and repairs are started on a winch, the following precautions shall be taken:

(1) Requirements of ANSI/ASSE Z244.1 for lockout/tagout shall be met for the maintenance activity to be undertaken.

(2) Drum pawls shall be engaged, or other means shall be provided to prevent inadvertent rotation of the drum.

(b) After adjustments and repairs have been made, the winch shall not be returned to service until all guards have been reinstalled, limit devices reactivated, and maintenance equipment removed.

### **7-2.3.3 Adjustments and Repairs**

(a) Adjustments and repairs shall be performed by a designated person in accordance with the instructions of the manufacturer or a qualified person.

(b) Replacement parts should be purchased from the original manufacturer or shall have qualities at least equal to the original parts.

### **7-2.3.4 Lubrication**

(a) All moving parts of the winch for which lubrication is specified should be regularly lubricated. Lubricating systems should be checked for proper delivery of lubricant. Care should be taken to follow manufacturer's recommendations as to points and frequency of lubrication, maintenance of lubricant levels, and types of lubricant used.

(b) Unless equipped for automatic or remote lubrication, all rotating machinery should be stopped while lubricants are being applied.

## **SECTION 7-2.4: ROPE INSPECTION, REPLACEMENT, AND MAINTENANCE**

(21)

Rope inspection, replacement, and maintenance shall be in accordance with ASME B30.30 and any additional requirements defined by the manufacturer or qualified person.



## Chapter 7-3 Operations

### SECTION 7-3.1: QUALIFICATIONS AND CONDUCT OF OPERATORS

#### 7-3.1.1 Operators

(a) Winches shall be operated only by the following personnel:

(1) persons who have met the requirements of para. 7-3.1.2

(2) trainees under the supervision of a designated person; the number of trainees permitted to be supervised by a single designated person, the physical location of the designated person while supervising, and the type of communication required between the designated person and the trainee shall be determined by a qualified person

(3) maintenance, inspection, and test personnel who have been trained to use the controls necessary in the performance of their duties

(b) No one other than personnel specified in (a) shall enter a winch operator's cab or operating position with the exception of persons whose duty requires them to do so, and then only in the performance of their duties and with the knowledge of the operator or other designated person.

#### (21) 7-3.1.2 Qualifications for Operators

(a) Operators shall be required by the employer to be trained and pass a written or oral examination and a practical operating examination unless able to furnish satisfactory evidence of qualifications and experience. Qualifications shall be limited to the specific type of equipment for which examined.

(1) Operator training shall include but not be limited to the following:

- (-a) preoperational inspection
- (-b) operational controls
- (-c) responses to emergencies
- (-d) communications
- (-e) manufacturer's recommendations
- (-f) equipment limitations
- (-g) general operating practices
- (-h) setup
- (-i) hazard recognition

(2) Operator training should include but not be limited to the following:

- (-a) maintenance requirements

(-b) refueling and/or power supply

(-c) basic rigging

(-d) multiple winch lifts

(b) Operators and operator trainees shall meet the following physical qualifications, unless it can be shown that failure to meet the qualifications will not affect the operation of the winch. In such cases, specialized clinical or medical judgments may be required.

(1) vision of at least 20/30 Snellen in one eye and 20/50 in the other, with or without corrective lenses.

(2) ability to distinguish colors, regardless of position, if color differentiation is required.

(3) adequate hearing to meet operational demands, with or without hearing aid.

(4) sufficient strength, endurance, agility, coordination, and speed of reaction to meet the operational demands.

(5) normal depth perception, field of vision, reaction time, manual dexterity, coordination, and no tendencies to dizziness or similar undesirable characteristics.

(6) a negative result for a substance abuse test. Testing shall be in accordance with applicable government regulations and policies of the employer.

(7) no evidence of having physical defects or emotional instability that could render a hazard to the operator or others, or that in the opinion of the examiner could interfere with the operator's performance. If evidence of this nature is found, it may be cause for disqualification.

(8) no evidence of being subject to seizures or loss of physical control; such evidence shall be sufficient reason for disqualification. Specialized medical tests may be required to determine these conditions.

#### 7-3.1.3 Responsibilities

(21)

While the organizational structure of various projects may differ, the following roles are described here for purposes of delineating responsibilities. All responsibilities listed below shall be assigned in the work site organization: (A single individual may perform one or more of these roles.)

(a) *equipment operator*: directly controls the winch's functions.

(b) *equipment owner*: has custodial control of a winch by virtue of lease or ownership.

(c) *equipment user*: arranges the winch's presence on a worksite and controls its use there.

(d) *lift director*: directly oversees the work being performed by a winch and the associated rigging crew.

(e) *rigger*: makes the connection of the load to the winch rope.

(f) *site supervisor*: exercises supervisory control over the worksite on which a winch is being used and over the work that is being performed on that site.

**7-3.1.3.1 Responsibilities of the Equipment Owner and User.** In some situations, the owner and user may be the same entity and are therefore accountable for all of the following responsibilities. In other cases, the user may lease or rent a winch from the owner without supervision, operations, maintenance, support personnel, or services from the owner. In these situations, [paras. 7-3.1.3.1.1](#) and [7-3.1.3.1.2](#) shall apply.

(21) **7-3.1.3.1.1** The equipment owner's responsibilities shall include the following:

(a) providing a winch that meets the requirements of [Chapters 7-1](#) and [7-2](#), as well as specific job requirements defined by the user.

(b) providing a winch and all necessary components, specified by the manufacturer, that meets the user's requested configuration and capacity.

(c) providing all applicable load/capacity information.

(d) providing additional technical information pertaining to the winch, necessary for winch operation, when requested by the equipment user.

(e) providing installation, operation, maintenance information, and warning decals and placards installed as prescribed by the winch manufacturer.

(f) establishing an inspection, testing, and maintenance program in accordance with [Chapter 7-2](#) and informing the equipment user of the requirements of this program.

(g) designating personnel for the purposes of inspection, maintenance, repair, transport, and installation.

(h) providing necessary technical and safety-related information available in a language specified by the winch user that can be read and understood for the purposes of operation, inspection, and maintenance of the covered equipment. If the information is not available in a language specified by the winch user, a translation of the original manufacturer's written technical and safety information shall be obtained from the manufacturer or from a translation service provider. The translation(s) shall meet the requirements of [paras. 7-0.3\(c\)](#) and [7-0.3\(d\)](#).

**7-3.1.3.1.2** The equipment user's responsibilities shall include the following:

(a) complying with the requirements of this Volume, manufacturer's requirements, and those regulations applicable at the worksite

(b) designating personnel to supervise winch activities

(c) ensuring that the winch is in proper operating condition prior to initial use at the worksite by

(1) verifying that the equipment owner has provided documentation that the winch meets the inspection and test requirements of [paras. 7-2.1.4](#) and [7-2.1.5](#) and [Section 7-2.3](#)

(2) verifying that a frequent inspection has been performed as defined in [para. 7-2.1.4](#)

(d) verifying that the winch has the necessary capacity to perform the proposed operations in the planned configuration

(e) using equipment operators that meet the requirements of [para. 7-3.1.2](#) and are qualified to perform the tasks that will be required with the winch to which they are assigned to operate

(f) ensuring the designated operator(s) has been notified of adjustments or repairs that have not yet been completed, prior to commencing winch operations

(g) designating personnel for inspections as required in [Sections 7-2.1](#) and [7-2.4](#)

(h) designating personnel for the purposes of maintenance, repair, transport, and installation, as applicable

(i) ensuring that all personnel involved in maintenance, repair, transport, installation, and inspection, as applicable, are aware of their responsibilities, assigned duties, and the associated hazards

(j) ensuring that the inspection, testing, and maintenance programs specified by the equipment are followed

**7-3.1.3.2 Responsibilities of Site Supervisor and Lift Director.** In some situations, the site supervisor and lift director may be the same person.

**7-3.1.3.2.1** The site supervisor's responsibilities shall include the following:

(a) ensuring that the winch meets the requirements of [Chapter 7-2](#) prior to initial site usage

(b) determining if additional regulations are applicable to winch operations

(c) ensuring that a qualified person is designated as the lift director

(d) ensuring that winch operations are coordinated with other jobsite activities that will be affected by or will affect winch operations

(e) ensuring that the area for the winch is adequately prepared. The preparation includes, but is not limited to, the following:

(1) sufficient room to install the winch, as applicable

(2) an operating area that is suitable for the winch with respect to support capability and obstructions to winch operation

(3) traffic control as necessary to restrict unauthorized access to the winch's working area

(f) ensuring that work involving the installation of the winch is supervised by a qualified person

(g) ensuring that equipment operators meet the requirements of [para. 7-3.1.2](#)