ASME B30.30-2023
(Revision of ASME B30.30-2019)

Ropes

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

AN AMERICAN NATIONAL STANDARD

The American Society of Mechanical Engineers

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

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This code or standard was developed under procedures accredited as meeting the criteria for American National Standards. The standards committee that approved the code or standard was balanced to ensure that individuals from competent and concerned interests had an opportunity to participate. The proposed code or standard was made available for public review and comment, which provided an opportunity for additional public input from industry, academia, regulatory agencies, and the public-at-large.

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The endnotes and preamble in this document (if any) are part of this American National Standard.

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The American Society of Mechanical Engineers
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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 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 on the Correspondence With the B30 Committee page, 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 ASME B30.30, which was approved by the B30 Committee and ASME, was approved by ANSI and designated an American National Standard on January 29, 2019.

This edition adds new provisions for a qualified person to reflect current industry practice, adds definitions to support new diameter reduction criteria and clarifies and updates some definitions, revises the rope certificate, revises Table 30-1.4.7-1, and adds a table for reduction in diameter indicating rope removal, as well as other updates.

This Volume of the Standard, which was approved by the B30 Standards Committee and by ASME, was approved by ANSI and designated as an American National Standard on October 18, 2023.

ASME B30 COMMITTEE
Safety Standard for Cableways, Cranes, Derricks, Hoists, Hooks, Jacks, and Slings

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

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(23)

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Revisions and Errata. The committee processes revisions to this Standard on a continuous basis 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 in the next edition of the Standard.

In addition, the committee may post errata on the committee web page. Errata become effective on the date posted. Users can register on the committee web page to receive e-mail notifications of posted errata.

This Standard is always open for comment, and the committee welcomes proposals for revisions. Such proposals should be as specific as possible, citing the paragraph number, the proposed wording, and a detailed description of the reasons for the proposal, including any pertinent background information and supporting documentation.

Cases. The committee does not issue cases for this Standard.

Interpretations. Upon request, the committee will issue an interpretation of any requirement of this Standard. An interpretation can be issued only in response to a request submitted through the online Interpretation Submittal Form at https://go.asme.org/InterpretationRequest. Upon submitting the form, the inquirer will receive an automatic e-mail confirming receipt.

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Interpretations are published in the ASME Interpretations Database at https://go.asme.org/Interpretations as they are issued.

Committee Meetings. The B30 Standards Committee regularly holds meetings that are open to the public. Persons wishing to attend any meeting should contact the secretary of the committee. Information on future committee meetings can be found on the committee web page at https://go.asme.org/B30committee.

(23)

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[1]

B30.32 Unmanned Aircraft Systems (UAS) Used in Inspection, Testing, Maintenance, and Load-Handling Operations

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.

[1] 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. The effective date of any Volume of the B30 Standard that adopts and references this Volume shall be in accordance with the effective-date provisions of that 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: 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.

ASME B30.30-2023
SUMMARY OF CHANGES

Following approval by the ASME B30 Committee and ASME, and after public review, ASME B30.30-2023 was approved by the American National Standards Institute on October 18, 2023.

ASME B30.30-2023 includes the following changes identified by a margin note, **(23)**.

Page	*Location*	*Change*
ix	Correspondence With the B30 Committee	Added
x	B30 Standard Introduction	Updated
1	Section 30-0.1	Revised
1	Section 30-0.2	(1) Definitions of *birdcage*, *denier*, *fleet angle*, *guy*, *high modulus polyethylene (HMPE)*, *low-torque (reduced-torque) wire rope*, *tenacity*, *tex*, and *yarn* revised (2) Definitions of *break-in*; *crossover point*; *diameter, measured,* d_m; *diameter, nominal, d*; *diameter, reference,* d_{ref}; *flange point*; *intermediary*; *nominal rope length*; and *repetitive pickup point* added
2	Figure 30-0.2-1	Second image deleted
3	Figure 30-0.2-3	Locations of *d* and *D* added
5	Section 30-0.5	Updated
8	30-1.4.2	Subparagraph (b) added and subsequent subparagraphs redesignated
9	30-1.4.6	Subparagraph (c) deleted and subsequent subparagraphs redesignated
9	30-1.5.1	Subparagraph (i) added
10	Table 30-1.4.4-1	Rows B30.2 and B30.19 and General Note (c) revised
12	Table 30-1.4.7-1	Revised
13	30-1.5.5	(1) First paragraph and subpara. (d) revised (2) Subparagraphs (e) and (i) added and subsequent subparagraphs redesignated (3) Note deleted and Notes (1) and (2) added
14	30-1.7.4	(1) Subparagraphs (b)(1), (g), and (k) revised (2) Subparagraph (b)(8) revised and redesignated as (b)(2) and subsequent subparagraphs redesignated (3) Subparagraphs (k)(1) and (k)(2) added
16	30-1.8.2	Subparagraph (a) and Note following subpara. (a) revised
17	Table 30-1.8.2-1	Added and former Table 30-1.8.2-1 redesignated as Table 30-1.8.2-2
18	Figure 30-1.8.2-1	Added and former Figures 30-1.8.2-1 through 30-1.8.2-9 redesignated as Figures 30-1.8.2-2 through 30-1.8.2.10, respectively
19	Figure 30-1.8.2-4	In former Figure 30-1.8.2-3, second image deleted

Page	*Location*	*Change*
17	30-1.8.4	(1) Subparagraph (b) revised (2) Subparagraph (d) added
28	30-2.4.3	Revised
28	30-2.4.4	Former in-text table designated as Table 30-2.4.4-1
28	30-2.4.7	Revised
29	30-2.5.5	(1) First paragraph and subparas. (d) and (h) [formerly (g)] revised (2) Subparagraph (e) added and subsequent subparagraphs redesignated (3) Note deleted and Notes (1) and (2) added

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Chapter 30-0
Scope, Definitions, Personnel Competence, Translations, and References

(23) SECTION 30-0.1: SCOPE OF ASME B30.30

Volume B30.30 includes provisions that apply to the construction, selection, installation, attachment, testing, inspection, maintenance, repair, use, and replacement of wire rope, hybrid rope, synthetic fiber rope, and rope-lifting components used in conjunction with equipment addressed in the volumes of the ASME B30 Standard. These provisions apply to a particular volume when ASME B30.30 is referenced and as specified in that volume.

(23) SECTION 30-0.2: DEFINITIONS

aramid fiber: a manufactured, high modulus fiber made from a long-chain synthetic aromatic polyamide in which at least 85% of the amide linkages join two aromatic rings.

birdcage: a rope condition that results in deformation when the outer strands are displaced away from the rope axis. It is usually the result of shock loading or localized twisting in a rope (see Figure 30-0.2-1).

braid: a rope or textile structure formed by intertwining strands.

double braid: a rope constructed from an inner hollow braided rope (core) surrounded by another hollow braided rope (cover) (also known as braid-on-braid or two-in-one braid).

single braid: rope structure consisting of multiple strands that may be intertwined in a plain or twill pattern.

break-in: initial pull-down phase in a rope's service life just after installation when initial loading is applied and where individual components adjust and set in among one another at operating conditions.

crossover point: in multiple-layer spooling of rope on a drum, those points of rope contact where the rope crosses the preceding rope layer.

crown break: a wire break located on the outside of the rope that occurs above the strand-to-strand contact points with both ends visible (see Figure 30-0.2-2).

D/d ratio: the ratio of the pitch diameter of the sheave or drum, D, to the nominal rope diameter, d (see Figure 30-0.2-3).

denier: a mass-per-unit-length measure equal to the weight in grams of 9 000 m of the material. Denier is a value in which the lower numbers represent the finer sizes and the higher numbers the coarser sizes.

design factor: the minimum breaking force of the rope in a rope system divided by the maximum static tension in the rope.

diameter, measured, d_m: actual diameter derived from direct measurement.

diameter, nominal, d: conventional diameter value by which a rope is named, designated, or ordered.

diameter, reference, d_{ref}: measured diameter from a section of rope that has not been subjected to significant bending, wear, or other sources of cross-sectional deformation or degradation, taken after break-in.

dogleg, minor: a bend or deformation exhibiting no associated strand distortion and that cannot be observed while the rope is under tension.

dogleg, severe: a permanent, localized, irreparable bend or deformation in a wire rope that restricts the natural adjustment of the rope's components during operation due to strand distortion. It is caused by improper use or handling and results in an indeterminate loss of strength in the rope (see Figure 30-0.2-4).

fiber core: a wire rope center component consisting of man-made or natural (vegetable) materials whose purpose is to support the outer strands of the wire rope and is not included as one of the load-bearing components of the wire rope when calculating the minimum breaking force.

flange point: the point of contact between the rope and the drum flange where the rope changes layers.

fleet angle: the angle between a rope's position on a drum or sheave and a line perpendicular to the axis of the drum or sheave through the center of the nearest fixed sheave (see Figure 30-0.2-5).

groove corrugation: a repetitive pattern in the groove of a sheave or drum caused by wear at the contact point with each rope strand that may cause rope wear and distortion.