

ASME B30.22-2016
(Revision of ASME B30.22-2010)

Articulating Boom Cranes

**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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Mechanical Engineers**

Two Park Avenue • New York, NY • 10016 USA

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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 an 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, 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 organized 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 just addressing 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 either 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 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 B30.22 was issued in 1987, and new editions were published in 1993, 2000, 2005, and 2010. The 2010 edition incorporated the addition of responsibilities, hand signals, and more comprehensive information on operation near electric power lines.

This 2016 edition contains revisions to all chapters. The most notable changes include installation requirements, clarification of testing, lift director responsibilities, and setup and operating practices.

This Volume, which was approved by the B30 Committee and by ASME, was approved by ANSI and designated as an American National Standard on April 27, 2016.

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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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SAFETY STANDARD FOR CABLEWAYS, CRANES, DERRICKS, HOISTS, HOOKS, JACKS, AND SLINGS

B30 STANDARD INTRODUCTION

(16)

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 Standard 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
- 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 Hoists (Underhung)
- B30.17 Overhead and Gantry Cranes (Top Running Bridge, Single Girder, Underhung Hoist)
- 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 Ropes¹

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.

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.

¹ This volume is currently in the development process.

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

Secretary, B30 Standard Committee
ASME Codes and Standards
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 Standard Committee.

SECTION IX: REQUESTS FOR INTERPRETATION

The B30 Standard Committee will render an interpretation of the provisions of the B30 Standard. Such requests should be directed to

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ASME Codes and Standards
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).
Question: 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.

Upon receipt by the Secretary, the request will be forwarded to the relevant B30 Subcommittee for a draft response, which will then be subject to approval by the B30 Standard Committee prior to its formal issuance.

Interpretations to the B30 Standard will be published in the subsequent edition of the respective volume, and will be available online at <http://cstools.asme.org/>.

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 Standard 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 B30.22-2016

SUMMARY OF CHANGES

Following approval by the ASME B30 Committee and ASME, and after public review, ASME B30.22-2016 was approved by the American National Standards Institute on April 27, 2016.

In ASME B30.22-2016, figures and tables have been redesignated. ASME B30.22-2016 also includes editorial changes, revisions, and corrections, which are identified by a margin note, **(16)**.

| <i>Page</i> | <i>Location</i> | <i>Change</i> |
|-------------|---------------------------|---|
| ix–xi | B30 Standard Introduction | Updated |
| 1–7 | Chapter 22-0 | Chapter title revised |
| | Section 22-0.1 | (1) First and second paragraphs revised (2) Subparagraphs (a) through (e) revised |
| | 22-0.2.1 | (1) Title revised (2) Definitions of <i>wheel-mounted</i> and <i>crawler-mounted</i> revised |
| | 22-0.2.2 | (1) Definition of <i>alterations (modification)</i> and <i>vehicle</i> added (2) Definitions of <i>appointed, authorized, carrier, and designated person</i> deleted (3) Definitions of <i>operational aid, shall, and should</i> revised |
| | Fig. 22-0.2.1-5 | Revised |
| | Fig. 22-0.2.1-6 | Revised |
| | Fig. 22-0.2.1-7 | Revised |
| | Fig. 22-0.2.1-8 | Revised |
| | Fig. 22-0.2.1-9 | (1) Deleted and Fig. 22-0.2.1-11 renumbered as Fig. 22-0.2.1-4 (2) Fig. 22-0.2.1-10 deleted |
| 14 | Section 22-0.5 | Added, old Section 22-0.5 redesignated as Section 22-0.7 and revised |
| | Section 22-0.6 | Added |
| 15 | Fig. 22-0.4-1 | Revised |
| 16–18 | 22-1.1.1 | Subparagraph (a) in-text table revised |
| | 22-1.1.2 | Revised in its entirety |
| | 22-1.1.3 | Subparagraph (a)(4) revised |
| 19 | 22-1.2.3 | (1) Subparagraph (b)(2)(-a) revised (2) In subpara. (c), Note added, and subpara. (d) added |

| <i>Page</i> | <i>Location</i> | <i>Change</i> | |
|-------------|-----------------|---|--|
| 20 | 22-1.5.1 | Subparagraph (c) revised | |
| | 22-1.5.2 | Subparagraph (d) revised | |
| | 22-1.5.3 | Subparagraphs (b) and (d) revised | |
| | 22-1.5.5 | (1) Subparagraph (a) revised (2) Note added | |
| | 22-1.6.1 | (1) Subparagraph (c) revised (2) Subparagraph (d) deleted | |
| 21 | Section 22-1.7 | Revised in its entirety | |
| | 22-1.8.2.2 | Revised | |
| | 22-1.8.3 | Revised | |
| 22 | 22-1.8.7 | Revised in its entirety | |
| | 22-1.8.7.1 | Added | |
| | 22-1.8.8 | Added | |
| | Section 22-1.9 | Revised | |
| 23 | 22-2.1.1 | General paragraph added, and subsequent paragraphs redesignated | |
| | 22-2.1.2 | Subparagraph (a) revised | |
| | 22-2.1.3 | First paragraph revised and subparagraph (l) added | |
| | 22-2.1.4 | First and second paragraphs revised | |
| 24, 25 | 22-2.1.5 | Subparagraph (b) revised | |
| | 22-2.1.6 | (1) In newly redesignated para. 22-2.1.6, subparagraphs (a) and (b) revised (2) Old para. 22-2.1.6 deleted | |
| | Section 22-2.2 | Revised | |
| | 22-2.2.1 | Subparagraph (a) revised | |
| | 22-2.2.2 | Revised in its entirety | |
| | 22-2.2.3 | Added | |
| | 22-2.3.2 | Subparagraph (c) revised | |
| | 22-2.3.3 | (1) Title and subparas. (a) and (d) revised (2) Subparagraph (e) redesignated as (g), and new subparas. (e) and (f) added | |
| | 26 | 22-2.4.1 | Revised |
| | | 22-2.4.2 | Subparagraphs (b)(2) and (b)(2)(-b) revised |
| 28 | 22-3.1.1 | Subparagraph (b) revised | |
| 29–35 | 22-3.1.3 | Definition for <i>lift director</i> added | |
| | 22-3.1.3.1.1 | Subparagraph (e) revised | |
| | 22-3.1.3.1.2 | Subparagraphs (f), (h), (k), and (l) revised | |

| <i>Page</i> | <i>Location</i> | <i>Change</i> |
|-------------|---------------------|--|
| | 22-3.1.3.2 | (1) Title revised (2) Paragraph added |
| | 22-3.1.3.2.1 | New paragraph designator added above old 22-3.1.3.2(a) |
| | 22-3.1.3.2.2 | Added |
| | Fig. 22-3.1.3.1.2-1 | Renumbered as Fig. 22-3.3.4-1 |
| | 22-3.1.3.3.1 | Revised in its entirety |
| | 22-3.1.3.3.2 | Revised in its entirety |
| | 22-3.2.1 | (1) Title revised (2) Subparagraphs (b) and (c) revised |
| | 22-3.2.2 | (1) Subparagraph (b)(2) revised (2) Subparagraph (b)(5) added |
| | 22-3.2.3 | New 22-3.2.3 added, old paragraph redesignated as 22-3.2.4 |
| | 22-3.2.4 | Redesignated as 22-3.2.5 and revised in its entirety |
| | 22-3.2.5 | Redesignated as 22-3.2.6 and revised in its entirety |
| | 22-3.2.7 | Added |
| | 22-3.2.8 | Added |
| | Section 22-3.3 | (1) Revised in its entirety, and subsequent paragraphs and references renumbered accordingly (2) Paragraphs 22-3.3.2 through 22-3.3.2.5 redesignated as Section 22-3.4 through para. 22-3.4.5 and references renumbered accordingly |
| 36–38 | Fig. 22-3.3.2.1-1 | Renumbered as Fig. 22-3.4.1-1 and revised |
| | Table 22-3.3.2.2-1 | Renumbered as Table 22-3.4.2-1 |

ARTICULATING BOOM CRANES

Chapter 22-0

Scope, Definitions, Personnel Competence, Translations, and References

(16)

(16) SECTION 22-0.1: SCOPE OF B30.22

The scope includes cranes of the types described in para. 22-0.2.1 that are articulated by hydraulic cylinders and powered by internal combustion engines or electric motors and that are mounted on a mobile chassis or stationary installation. Articulating cranes equipped with a load hoist mechanism to broaden their versatility are covered by this Volume.

Some basic machine types within this scope are convertible for excavating work and other uses not considered to be lifting service. The requirements of this Volume are applicable only to such machines when used as lifting cranes. When cranes within the scope of this Volume are used for service other than lifting service, the manufacturer or (when not available from the manufacturer) a qualified person shall establish the ratings, operating limitations, maintenance, testing, and inspection requirements that apply during that use.

Exemptions from this Volume include

- (a) units with a maximum rated capacity of 2,000 lb (907 kg) or less
- (b) units with booms constructed of nonconductive-type materials
- (c) units equipped with or designed primarily for personnel baskets, platforms, ladders, etc.
- (d) units when equipped with nonlifting attachments
- (e) units while used in forestry and logging applications
- (f) telescoping boom cranes that do not articulate (covered under ASME B30.5)
- (g) scrap and material handlers as defined in ASME B30.25

SECTION 22-0.2: DEFINITIONS

(16) 22-0.2.1 Mounting of Articulating Boom Cranes

commercial truck-mounted: a crane, consisting of a rotating mast, mainframe or base, boom, and one or more operator's stations, such as ground controls (Fig. 22-0.2.1-1), top seat controls (Fig. 22-0.2.1-2), or remote controls

(Fig. 22-0.2.1-3), mounted on a frame attached to a commercial truck chassis, with or without a payload capability, whose power source may power the crane. The function is to lift, lower, and swing loads at various radii.

crawler-mounted: a crane, consisting of a rotating mast, mainframe or base, operator's station(s), and boom, mounted on crawler treads for travel. It may be equipped with a single control station or have separate stations for driving and operating. Its function is to lift, lower, and swing loads at various radii. See Fig. 22-0.2.1-4.

stationary: a crane, consisting of a rotating mast, mainframe or base, and boom, mounted on a stationary structure. The function is to lift, lower, and swing loads at various radii from a fixed center of rotation. See Fig. 22-0.2.1-5.

trailer- or railcar-mounted: a crane, consisting of a rotating mast, mainframe or base, and boom, mounted on a trailer or railcar. The function is to lift, lower, and swing loads at various radii. See Figs. 22-0.2.1-6 and 22-0.2.1-7.

traveling base-mounted: a crane, consisting of a rotating mast, boom, mainframe or base, and one or more operator's stations, mounted on a traveling base. The function is to lift, lower, and swing loads at various radii. See Fig. 22-0.2.1-8.

wheel-mounted: a crane, consisting of a rotating mast, mainframe or base, operator's station(s), and boom, mounted on commercial truck vehicle, a trailer, or an off-road vehicle equipped with axles and rubber-tired wheels. It may be equipped with a single control station or have separate stations for driving and operating. Its function is to lift, lower, and swing loads at various radii. See Figs. 22-0.2.1-1, 22-0.2.1-2, 22-0.2.1-3, 22-0.2.1-7, 22-0.2.1-8, and 22-0.2.1-9.

22-0.2.2 General Definitions

(16)

accessory: a secondary part or assembly of parts that contributes to the overall function and usefulness of a crane.