ASME B30.13-2022
(Revision of ASME B30.13-2017)

Storage/Retrieval (S/R) Machines and Associated Equipment

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

AN AMERICAN NATIONAL STANDARD



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Two Park Avenue • New York, NY • 10016 USA

Date of Issuance: April 8, 2022

The next edition of this Standard is scheduled for publication in 2027. 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 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 designated 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 ASME B30.13, entitled Controlled Mechanical Storage Cranes, was published in 1977. New editions were published in 1985, 1991, 1996, 2003, 2011, and 2017. In this 2022 edition, revisions have been made to incorporate requirements from ASME B30.26 and ASME B30.30, and the references have been updated.

This Volume of the Standard, which was approved by the B30 Standard Committee and ASME, was approved by ANSI and designated as an American National Standard on March 1, 2022.

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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B30 STANDARD INTRODUCTION (22)

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 Lifting 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. 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/InterpretationForm.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.

ASME B30.13-2022
SUMMARY OF CHANGES

Following approval by the ASME B30 Committee and ASME, and after public review, ASME B30.13-2022 was approved by the American National Standards Institute on March 1, 2022.

ASME B30.13-2022 includes the following changes identified by a margin note, **(22)**.

Page	*Location*	*Change*
vii	B30 Standard Introduction	Updated
1	13-0.2.2	(1) Definition of *minimum breaking force* deleted (2) Definition of *rope* revised
4	Section 13-0.3	Title and first sentence revised, and ASME references added
11	13-1.10.1	Revised in its entirety
11	13-1.10.2	Revised
11	13-1.10.3	Revised in its entirety
15	Section 13-2.4	Revised in its entirety

Chapter 13-0
Scope, Definitions, References, and Personnel Competence

SECTION 13-0.1: SCOPE OF B30.13

Within the general scope defined in Section I, ASME B30.13 applies to storage/retrieval (S/R) machines and associated equipment, such as aisle-transfer cars and aisle equipment (as defined in para. 13-0.2.1), and interfaces with other material-handling equipment covered under other standards. The provisions of this Volume applying to S/R machines shall apply equally to the construction, installation, inspection, testing, maintenance, and operation of aisle-transfer cars and any load-handling equipment that is part of or attached to S/R machines or aisle-transfer cars.

SECTION 13-0.2: DEFINITIONS

13-0.2.1 Types of Equipment

storage/retrieval (S/R) machine: a machine operating on floor or other mounted rail(s) used for transferring a load from a storage compartment to a pickup and deposit (P and D) station and from a P and D station to a storage compartment. The movement of the storage/retrieval machine may be both vertical and parallel in the aisle. A storage/retrieval machine is sometimes called a storage crane or S/R machine, but it is different from a stacker crane. A typical unit-load storage/retrieval machine is shown in Figure 13-0.2.1-1.

aisle-transfer car: a machine or vehicle for transferring an S/R machine from aisle to aisle and that normally runs on a rail or rails (see Figure 13-0.2.1-2).

automatic S/R machine: an S/R machine that, when activated, operates through a preset program cycle or cycles.

operator-ridden S/R machine: an S/R machine, with a cab attached to the machine and with an operator in the cab, whose movements can be controlled either manually or automatically (see Figure 13-0.2.1-3).

(22) 13-0.2.2 General

aisle conductors: electrical feeders along the runway that provide power to the equipment.

automatic or automatically: pertains to equipment functions that do not require the attention of the operator during their functional operation.

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

bumper: an energy absorbing device for reducing impact when a moving S/R machine reaches the end of its permitted travel, or when two moving S/R machines come into contact.

cab: the operator's compartment on the equipment.

carriage: that part of an S/R machine by which a load is moved in the vertical direction.

carriage free-fall stop: a mechanism used to prevent or stop uncontrolled descent of the carriage in event of loss of support.

carriage-mounted cab: an operator's cab that is attached to the carriage of an S/R machine and moves vertically with the carriage.

clearance: the distance between loads, structure, and equipment calculated to allow for operating and installation tolerances, deflections, load displacement, and load integrity.

collectors: contacting devices for collecting current from aisle conductors.

control braking: a method of controlling speed by removing energy from the moving body or by imparting energy in the opposite direction.

control voltage: electrical voltage used in the control components and circuits.

design load: the maximum length, width, height, and weight of a load handled, including any pallet, container, slave pallet, or stacking tolerances.

drift point: a point on a travel motion master switch or on a manual controller that maintains the brake released while the motor is not energized. This allows for coasting.

emergency-stop switch: a manually or automatically operated switch to cut off power independently of the regular operating controls.

fault condition: a malfunction caused by overload, travel beyond set limits, emergency stop, or failure of components essential to safe operation of the equipment.

heavy service: service that involves operating at 85% to 100% of the rated load, or in excess of 10 lift cycles/hr, as a regular specified procedure.

hoist: a machinery unit that is used for lifting and lowering.