

ASME B30.20-2021
(Revision of ASME B30.20-2018)

Below-the-Hook Lifting Devices

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

AN AMERICAN NATIONAL STANDARD



**The American Society of
Mechanical Engineers**

ASME B30.20-2021
(Revision of ASME B30.20-2018)

Below-the-Hook Lifting Devices

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

AN AMERICAN NATIONAL STANDARD



**The American Society of
Mechanical Engineers**

Two Park Avenue • New York, NY • 10016 USA

Date of Issuance: November 30, 2021

The next edition of this Standard is scheduled for publication in 2024. This Standard will become effective 1 year after the Date of Issuance.

ASME issues written replies to inquiries concerning interpretations of technical aspects of this Standard. Interpretations are published on the ASME website under the Committee Pages at <http://cstools.asme.org/> as they are issued.

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

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

ASME is the registered trademark of The American Society of Mechanical Engineers.

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

ASME does not "approve," "rate," or "endorse" an item, construction, proprietary device, or activity.

ASME does not take any position with respect to the validity of any patent rights asserted in connection with any items mentioned in this document, and does not undertake to insure anyone utilizing a standard against liability for infringement of any applicable letters patent, nor assume any such liability. Users of a code or standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, are entirely their own responsibility.

Participation by federal agency representative(s) or person(s) affiliated with industry is not to be interpreted as government or industry endorsement of this code or standard.

ASME accepts responsibility for only those interpretations of this document issued in accordance with the established ASME procedures and policies, which precludes the issuance of interpretations by individuals.

No part of this document may be reproduced in any form,
in an electronic retrieval system or otherwise,
without the prior written permission of the publisher.

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

Copyright © 2021 by
THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS
All rights reserved
Printed in U.S.A.

CONTENTS

| | | |
|---------------------------------|------------------------------------------------------------------------------|-----------|
| Foreword | | v |
| Committee Roster | | vii |
| B30 Standard Introduction | | ix |
| Summary of Changes | | xii |
| Chapter 20-0 | Scope, Definitions, Personnel Competence, Translations, and Reference | 1 |
| Section 20-0.1 | Scope of ASME B30.20 | 1 |
| Section 20-0.2 | Definitions — General | 1 |
| Section 20-0.3 | Definitions for Chapter 20-1 | 1 |
| Section 20-0.4 | Definitions for Chapter 20-2 | 2 |
| Section 20-0.5 | Definitions for Chapter 20-3 | 2 |
| Section 20-0.6 | Definitions for Chapter 20-4 | 3 |
| Section 20-0.7 | Definitions for Chapter 20-5 | 3 |
| Section 20-0.8 | Definitions for Chapter 20-6 | 4 |
| Section 20-0.9 | Personnel Competence | 4 |
| Section 20-0.10 | Translations | 4 |
| Section 20-0.11 | References to Other Codes and Standards | 4 |
| Chapter 20-1 | Structural and Mechanical Lifting Devices | 5 |
| Section 20-1.1 | Scope | 5 |
| Section 20-1.2 | Marking, Construction, and Installation | 5 |
| Section 20-1.3 | Inspection, Testing, and Maintenance | 9 |
| Section 20-1.4 | Operation | 11 |
| Section 20-1.5 | Instruction Manuals | 13 |
| Chapter 20-2 | Vacuum Lifting Devices | 14 |
| Section 20-2.1 | Scope | 14 |
| Section 20-2.2 | Marking, Construction, and Installation | 14 |
| Section 20-2.3 | Inspection, Testing, and Maintenance | 16 |
| Section 20-2.4 | Operation | 18 |
| Section 20-2.5 | Instruction Manuals | 20 |
| Chapter 20-3 | Close Proximity Operated Lifting Magnets | 21 |
| Section 20-3.1 | Scope | 21 |
| Section 20-3.2 | Marking, Construction, and Installation | 22 |
| Section 20-3.3 | Inspection, Testing, and Maintenance | 23 |
| Section 20-3.4 | Operation | 25 |
| Section 20-3.5 | Instruction Manuals | 28 |
| Chapter 20-4 | Remotely Operated Lifting Magnets | 29 |
| Section 20-4.1 | Scope | 29 |
| Section 20-4.2 | Marking, Construction, and Installation | 29 |
| Section 20-4.3 | Inspection, Testing, and Maintenance | 30 |

| | | |
|---------------------|-------------------------------------------------------------|-----------|
| Section 20-4.4 | Operation | 33 |
| Section 20-4.5 | Instruction Manuals | 35 |
| Chapter 20-5 | Scrap and Material-Handling Grapples | 36 |
| Section 20-5.1 | Scope | 36 |
| Section 20-5.2 | Marking, Construction, and Installation | 36 |
| Section 20-5.3 | Inspection, Testing, and Maintenance | 36 |
| Section 20-5.4 | Operation | 39 |
| Section 20-5.5 | Instruction Manuals | 41 |
| Chapter 20-6 | Clamps | 42 |
| Section 20-6.1 | Scope | 42 |
| Section 20-6.2 | Marking, Construction, and Installation | 42 |
| Section 20-6.3 | Inspection, Testing, and Maintenance | 47 |
| Section 20-6.4 | Operation | 49 |
| Section 20-6.5 | Instruction Manuals | 51 |
| Figures | | |
| 20-1.1-1 | Structural Lifters | 6 |
| 20-1.1-2 | Mechanical Lifters | 7 |
| 20-1.1-3 | Mechanical Supporting Lifters | 8 |
| 20-2.1-1 | Vacuum Lifters | 15 |
| 20-3.1-1 | Close Proximity Operated Magnetic Lifters | 21 |
| 20-4.1-1 | Remotely Operated Magnetic Lifters | 29 |
| 20-5.1-1 | Scrap and Material-Handling Grapples | 37 |
| 20-6.1-1 | Load-Supporting Clamps | 42 |
| 20-6.1-2 | Friction-Type Pressure-Gripping Clamps | 43 |
| 20-6.1-3 | Indentation-Type Pressure-Gripping Clamps | 45 |
| 20-6.1-4 | Anchoring and Positioning Clamps | 46 |
| 20-6.1-5 | Hybrid Clamps | 46 |
| Table | | |
| 20-1.3.3-1 | Minimum Inspection for Below-the-Hook Lifting Devices | 10 |

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 1961 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.

ASME B30.20, Below-the-Hook Lifting Devices, was first published in 1985; new editions were published in 1993, 1999, 2003, and 2006. In the 2010 edition, maintenance was made mandatory, definitions were revised, and other changes were made to improve clarity. The 2013 revision added requirements for personnel competence, operating controls marking and inspection, translation of non-English documentation into English, and updates to the definition of *duty cycle* to align with revisions made to ASME BTH-1. In addition, responsibilities for Owners and Operators are defined for each piece of

equipment. The 2018 edition added rated load marking requirements for remotely operated magnets and Chapter 6 on clamps, revised product safety labeling and the permanent magnet rating factor, expanded and clarified magnet testing requirements, made revisions to align with recent changes to ASME BTH-1, and updated the operating practices sections to align with revisions to the standards applicable to the equipment used with below-the-hook lifters. The 2021 edition improves clarity and readability of inspection requirements, adds removal criteria, and contains revisions to load test requirements.

This Volume of the Standard, which was approved by the B30 Committee and by ASME, was approved by ANSI and designated as an American National Standard on September 24, 2021.

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.)

STANDARDS COMMITTEE OFFICERS

T. L. Blanton, *Chair*
E. D. Fidler, *Vice Chair*
S. D. Wood, *Vice Chair*
K. Peterson, *Secretary*

STANDARDS COMMITTEE PERSONNEL

N. E. Andrew, Neil E. Andrew and Associates, LLC
B. B. Bacon, Tennessee Valley Authority
T. L. Blanton, OGR Consulting Services, LLC
P. A. Boeckman, The Crosby Group
P. W. Boyd, The Boeing Co.
J. R. Burkey, Columbus McKinnon Corp.
B. D. Closson, Craft Forensic Services
J. A. Danielson, The Boeing Co.
D. R. Decker, Becket, LLC
L. D. DeMark, Sr., Equipment Training Solutions, LLC
D. W. Eckstine, Eckstine and Associates
E. D. Fidler, Grove U.S., LLC
M. Gardiner, ICC Forensics, LLC
J. A. Gilbert, Associated Wire Rope Fabricators
D. A. Henninger, Bridon Bekaert, The Ropes Group
G. B. Hetherston, Hetherston Consulting, LLC
M. M. Jaxtheimer, Navy Crane Center
P. R. Juhren, Morrow Equipment Co., LLC
R. M. Kohner, Landmark Engineering Services
A. J. Lusi, Jr., Lumark Consulting, LLP
L. D. Means, Means Engineering and Consulting, P.C.
M. W. Mills, Liberty Mutual Insurance
R. M. Parnell, ITI-Field Service
J. T. Perkins, All Material Handling (AMH)
K. Peterson, The American Society of Mechanical Engineers
B. A. Pickett, Systems Engineering and Forensic Services
J. A. Pilgrim, Manitowoc Cranes
S. K. Rammelsberg, McDermott
K. Reynolds, Shell Exploration and Production
J. E. Richardson, U.S. Department of the Navy
J. W. Rowland III, Consultant
A. R. Ruud, Atkinson Construction
L. K. Shapiro, Howard I. Shapiro and Associates
D. W. Smith, Jr., J.E. Spear Consulting, LP
W. J. Smith, Jr., NationsBuilder Insurance Services
R. C. Stump, Lampson International, LLC
R. G. Strain, Advanced Crane Technologies, LLC
J. Sturm, Sturm Corp.
D. Sullivan, IUOE Local 542 JATC
P. D. Sweeney, Riverside Engineering
E. P. Vliet, Consultant
J. D. Wiethorn, International Crane and Construction Safety Solutions
R. C. Wild, CJ Drilling, Inc.
S. D. Wood, Terex Corp.
R. J. Bolen, *Alternate*, Consultant
D. Boyle, *Alternate*, The Crosby Group
B. M. Casey, *Alternate*, Electric Boat
M. Chaudhanson, *Alternate*, Howard I. Shapiro and Associates
W. C. Dickerson, Jr., *Alternate*, Crane Industry Services, LLC
D. Dierker, *Alternate*, 2DM Associates, Inc.
M. Egan, *Alternate*, Safelift, LLC
S. R. Fletcher, *Alternate*, Cowles, Murphy, Glover and Associates
J. G. Gordon, *Alternate*, IUOE Local 14 Training Fund
J. B. Greenwood, *Alternate*, Navy Crane Center
C. K. Hale, *Alternate*, Columbus McKinnon Corp.
D. Jordan, *Alternate*, American International Crane Bureau
K. Kennedy, *Alternate*, Navy Crane Center
D. Lavoie, *Alternate*, Liberty Mutual Insurance
J. Lindsay, *Alternate*, Link-Belt Construction Equipment
J. P. Mihlbauer, *Alternate*, All Ship and Cargo Surveys, Ltd.
G. D. Miller, *Alternate*, Manitowoc Cranes
D. A. Moore, *Alternate*, Unified Engineering
L. S. Olver, *Alternate*, Kolo Holdings, Inc.
J. M. Randall, *Alternate*, McDermott
G. M. Ray, *Alternate*, Tennessee Valley Authority
C. L. Richardson, *Alternate*, Lone Star Rigging, LP
M. Riggs, *Alternate*, Riggsafe Solutions, Inc.
J. R. Schober, *Alternate*, American Bridge Co.
J. Schoppert, *Alternate*, NBIS Claims and Risk Management
T. Sickelsteel, *Alternate*, National Commission for the Certification of Crane Operators
C. H. Smith, *Alternate*, Morrow Equipment Co., LLC
J. E. Spear, *Alternate*, J.E. Spear Consulting, LP
J. A. Stewart, *Alternate*, Stewart Safety Consulting
J. J. Van Egeren, *Alternate*, Manitowoc Cranes
M. Zerba, *Alternate*, Lampson International, LLC
J. W. Downs, Jr., *Honorary Member*, Consultant
J. L. Franks, *Honorary Member*, Consultant
C. W. Ireland, *Honorary Member*, National Oilwell Varco
J. M. Klibert, *Honorary Member*, Lift-All Co., Inc.
R. W. Parry, *Honorary Member*, Parry Parry and Glen
J. C. Ryan, *Honorary Member*, Boh Bros. Construction Co.
D. N. Wolff, *Honorary Member*, Consultant

B30.20 SUBCOMMITTEE PERSONNEL

J. D. Edmundson, *Chair*, Konecranes Nuclear
B. Baker, Young Corp.
G. A. Bond, Wood's Powr-Grip Co., Inc.
P. Boyd, The Boeing Co.
D. Duerr, 2DM Associates, Inc.
T. Eicher, The Caldwell Group, Inc.
F. G. Heath, Heath and Associates
K. M. Jankowski, Industrial Magnetics, Inc./Walker Magnetics
T. C. Mackey, WRPS Hanford
L. Radu, Mazzella Lifting Technologies
T. Raines, Jr., CMCO
D. T. Rebbin, Bradley Lifting
P. D. Sweeney, Riverside Engineering, LLC

D. Verenski, Hunter Lift, Ltd.
T. J. Brookbank, *Alternate*, Hunter Lift, Ltd.
T. Cobb, *Alternate*, Columbus McKinnon Forge Operations — Chattanooga
J. E. Rea, *Alternate*, Bradley Lifting Corp.
M. P. Zerba, *Alternate*, Lampson International, LLC
P. B. Debuigne, *Contributing Member*, AECOM
W. A. Holley, *Contributing Member*, Framatome
M. P. McShane, *Contributing Member*, WRPS
M. Nowotarski, *Contributing Member*, Carpenter Technology
T. F. Pritchett, *Contributing Member*, Crane Inspection Service
J. W. Downs, Jr., *Honorary Member*, Downs Crane and Hoist Co.

B30 INTEREST REVIEW GROUP

O. Akinboboye, Ropetech Engineering Services
J. D. Cannon, Consultant
B. Dobbs, LEEA
M. J. Eggenberger, Berry Contracting, Inc.
A. Gomes Rocha, Industrial Training International
J. B. Greenwood, Navy Crane Center
N. C. Hargreaves, Hargreaves Consulting, LLC
H. A. Hashem, Saudi Aramco

J. Hui, School of Civil Engineering, Nanyang
A. C. Mattoli, Prowinch, LLC
J. Mellott-Green, All Canadian Training Institute, Inc.
J. P. Muhlbauer, All Ship and Cargo Surveys, Ltd.
L. S. Olver, Kolo Holdings, Inc.
G. L. Owens, Consultant
A. Payne, Bureau of Safety and Environmental Enforcement
C.-C. Tsaur, Institute of Occupational Safety and Health

B30 REGULATORY AUTHORITY COUNCIL

C. Stribling, Jr., *Chair*, Kentucky Labor Cabinet
K. Peterson, *Secretary*, The American Society of Mechanical Engineers
R. D. Jackson, U.S. Department of Labor
D. E. Latham, Maryland Department of Labor, Licensing and Regulation
M. J. Nelmidia, State of California, Occupational Safety and Health Standards Board

C. S. Pelhamer, New York City Department of Buildings
T. Taylor, Minnesota Department of Labor and Industry
G. M. Thomas, South Carolina Department of Labor, Licensing and Regulation
A. G. Omran, *Alternate*, New York City Department of Buildings
N. Reynolds, *Alternate*, Maryland Occupational Safety and Health

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 Recovered 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 Transporters¹
- B30.32 Unmanned Aircraft Systems (UAS) Used in Inspection, Testing, Maintenance, and Lifting Operations¹

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.

¹This volume is currently in the development process.