ASME B18.5-2012
(Revision of ASME B18.5-2008)

REAFFIRMED 2023

# Round Head Bolts (Inch Series)



AN AMERICAN NATIONAL STANDARD

The American Society of Mechanical Engineers

INTENTIONALLY LEFT BLANK

ASME B18.5-2012
(Revision of ASME B18.5-2008)

# Round Head Bolts (Inch Series)

AN AMERICAN NATIONAL STANDARD

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

Date of Issuance: August 13, 2012

This Standard will be revised when the Society approves the issuance of a new edition.

ASME issues written replies to inquiries concerning interpretations of technical aspects of this Standard. Periodically, certain actions of the ASME B18 Committee may be published as Cases. Cases and interpretations are published on the ASME Web site under the Committee Pages at http://cstools.asme.org/ as they are issued.

Errata to codes and standards may be posted on the ASME Web site 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 used 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.



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

# CONTENTS

# FOREWORD

American National Standards Committee B18 for the standardization of bolts, screws, nuts, rivets, and similar fasteners was originated in March 1922 as Sectional Committee B18, under the aegis of the American Engineering Standards Committee [later the American Standards Association, the United States of America Standards Institute, and as of October 6, 1969, the American National Standards Institute, Inc. (ANSI)], with the Society of Automotive Engineers (SAE) and the American Society of Mechanical Engineers (ASME) as joint sponsors. Subcommittee 5 was subsequently established and charged with the responsibility for technical content of standards covering round unslotted head bolts.

The initial proposal completed by the Subcommittee in February of 1923 consisted of standards covering head dimensions for carriage, step, and round head machine bolts. Circulation of the original draft and numerous revisions thereto culminated in a document that was issued as a Tentative American Standard on February 20, 1928.

In 1934, Subcommittee 5 initiated work on a revision of the standard to bring it into line with altered consumer requirements and refinements in manufacturing technology. A proposal containing dimensional changes and additional data was duly approved and issued as a revision in 1939.

Early in 1947, Subcommittee 5 commenced to conduct an extensive review of the existing document and to expand it into a complete product standard. Over the ensuing three years, the Subcommittee developed a proposal incorporating the adoption of a shorter depth of square neck and the addition of coverage for commonly used elevator bolts and T-head bolts plus a round head short square neck bolt used extensively by the farm equipment industry in thin metals. Subsequent to acceptance by the Subcommittee, the B18 Committee, and sponsor organizations, the proposal was submitted to the American Standards Association for approval and designation as an American National Standard. This was granted on March 12, 1952.

In 1966, the Subcommittee, recognizing the need for updating the standard, undertook development of a revision. Numerous meetings and work sessions resulted in Subcommittee acceptance of a draft incorporating changes to clarify intent and overcome inconsistencies in specifications and format with related documents. Included were the redimensioning of countersunk type heads, the adoption of new tolerances on bolt length, the addition of straightness requirements, and the elimination of coverage for ribbed head type elevator bolts. Following letter ballot approval by the B18 Standards Committee and the sponsor organizations, the revision was submitted to ANSI and was designated an American National Standard on January 20, 1971.

In 1977, the Subcommittee again recognized the need for a revision. Following letter ballot approval by the B18 Standards Committee, the revision was approved by the Secretariat and ANSI on September 8, 1978.

The B18 Committee began a revision in 1984 to upgrade the standard to include information on identification symbols and to add quality assurance provisions.

In December 1986, the ASME B18 Committee agreed to combine Subcommittee 5 into Subcommittee 2, since the product lines each Subcommittee addresses are quite similar.

The B18 Committee further agreed the designation of the Subcommittee 2 and 5 documents not be changed, since this would adversely affect current reference to these Standards.

Following approval by the B18 Committee, the previous edition was approved by ANSI on December 27, 1990.

A reaffirmation of this Standard was balloted and approved by the B18 Standards Committee and B18 Subcommittee 2 on December 27, 2007.

The revision, ASME B18.5-2008, was approved by the American National Standards Institute on March 27, 2008.

The B18 Committee undertook a revision of ASME B18.5 in 2011 at the request of several parties to improve the detail to which the square necks on various bolts covered by this Standard are specified and inspected. Dimensions for square length and minimum across corner dimensions

were added and a recommended square neck gaging method was added in a mandatory appendix. Various other minor changes were made to the standard to make it compatible with recent format changes adopted for all B18 standards.

Suggestions for improvement of this Standard are welcome. They should be addressed to the Secretary, ASME B18 Standards Committee, Three Park Avenue, New York, NY 10016-5990.

This revision, ASME B18.5-2012, was approved by ANSI on July 3, 2012.

# ASME B18 COMMITTEE
# Standardization of Bolts, Nuts, Rivets, Screws, Washers, and Similar Fasteners

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

## STANDARDS COMMITTEE OFFICERS

**J. Greenslade,** *Chair*
**D. S. George,** *Vice Chair*
**W. H. King,** *Vice Chair*
**C. J. Gomez,** *Secretary*

## STANDARDS COMMITTEE PERSONNEL

**V. Cartina,** Autocraft Industrial
**D. A. Clever,** *Contributing Member,* Consultant
**A. P. Cockman,** Ford Motor Co.
**C. D. de la Garza,** TSP, Inc.
**D. S. George,** Ramco Specialties
**C. J. Gomez,** The American Society of Mechanical Engineers
**J. Greenslade,** Industrial Fasteners Institute
**J. J. Grey,** *Contributing Member,* Fastener Consulting Services, Inc.
**A. Herskovitz,** *Contributing Member,* Consultant
**J. Hubbard,** Leland-Powell Fasteners, Inc.
**J. C. Jennings,** *Contributing Member,* Naval Surface Warfare Center
**W. H. King,** Porteous Fastener Co.
**M. D. Prasad,** *Contributing Member,* Global M&F Solutions, Inc.
**S. Savoji,** *Contributing Member,* ITW Medalist
**Q. M. Smith III,** Oregon DOT
**D. J. Soscia,** General Dynamics Electric Boat Corp.
**W. R. Stevens,** Ramco
**R. D. Strong,** Doerken Corp.
**S. W. Vass,** *Contributing Member,* Consultant
**C. B. Wackrow,** MNP Corp.
**W. K. Wilcox,** Consultant
**C. B. Williamson,** Fastenal Co.
**C. J. Wilson,** Consultant
**J. G. Zeratsky,** *Contributing Member,* National Rivet and Manufacturing Co.

## SUBCOMMITTEE 2 — EXTERNALLY DRIVEN FASTENERS

**J. Greenslade,** *Chair,* Industrial Fasteners Institute
**C. B. Williamson,** *Vice Chair,* Fastenal Co.
**T. Anderson,** Bay Bolt
**V. Cartina,** Autocraft Industrial
**L. Claus,** ATF, Inc.
**A. P. Cockman,** Ford Motor Co.
**C. D. de la Garza,** TSP, Inc.
**B. A. Dusina,** Federal Screw Works
**M. A. Elmi,** Consultant
**J. S. Foote,** Trade Association Management, Inc.
**M. C. Friel,** Haydon Bolts, Inc.
**D. S. George,** Ramco Specialties
**A. Herskovitz,** Consultant
**M. W. Holubecki,** Electric Boat Corp.
**J. Hubbard,** Leland-Powell Fasteners, Inc.
**J. C. Jennings,** *Contributing Member,* Naval Surface Warfare Center
**W. H. King,** Porteous Fastener Co.
**R. Leemans,** John Deere
**J. F. McCarrick,** Defense Supply Center Philadelphia
**R. B. Meade,** Atrona Material Testing Laboratories, Inc.
**A. Savoji,** ITW Medalist
**R. M. Serabin,** Freundlich Supply Co.
**D. F. Sharp,** GMS Structural Engineers
**G. M. Simpson,** Semblex Corp.
**Q. M. Smith III,** Oregon DOT
**D. J. Soscia,** General Dynamics Electric Boat Corp.
**W. R. Stevens,** Ramco
**J. J. Stoczanskyj,** Beacon Fasteners and Components, Inc.
**R. D. Strong,** Doerken Corp.
**R. L. Tennis,** Consultant
**S. W. Vass,** Consultant
**C. B. Wackrow,** MNP Corp.
**W. K. Wilcox,** Consultant
**C. J. Wilson,** Consultant

# CORRESPONDENCE WITH THE B18 COMMITTEE

**General.** ASME Standards are developed and maintained with the intent to represent the consensus of concerned interests. As such, users of this Standard may interact with the Committee by requesting interpretations, proposing revisions, and attending Committee meetings. Correspondence should be addressed to:

Secretary, B18 Standards Committee
The American Society of Mechanical Engineers
Three Park Avenue
New York, NY 10016-5990
http://go.asme.org/Inquiry

**Proposing Revisions.** Revisions are made periodically to the Standard 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 periodically.

The Committee welcomes proposals for revisions to this Standard. Such proposals should be as specific as possible, citing the paragraph number(s), the proposed wording, and a detailed description of the reasons for the proposal, including any pertinent documentation.

**Proposing a Case.** Cases may be issued for the purpose of providing alternative rules when justified, to permit early implementation of an approved revision when the need is urgent, or to provide rules not covered by existing provisions. Cases are effective immediately upon ASME approval and shall be posted on the ASME Committee Web page.

Requests for Cases shall provide a Statement of Need and Background Information. The request should identify the standard, the paragraph, figure or table number(s), and be written as a Question and Reply in the same format as existing Cases. Requests for Cases should also indicate the applicable edition(s) of the standard to which the proposed Case applies.

**Interpretations.** Upon request, the B18 Standards Committee will render an interpretation of any requirement of the Standard. Interpretations can only be rendered in response to a written request sent to the Secretary of the B18 Standards Committee.

The request for an interpretation should be clear and unambiguous. It is further recommended that the inquirer submit his/her request in the following format:

Subject: Cite the applicable paragraph number(s) and the topic of the inquiry.
Edition: Cite the applicable edition of the Standard for which the interpretation is being requested.
Question: Phrase the question as a request for an interpretation of a specific requirement suitable for general understanding and use, not as a request for an approval of a proprietary design or situation. The inquirer may also include any plans or drawings that are necessary to explain the question; however, they should not contain proprietary names or information.

Requests that are not in this format may be rewritten in the appropriate format by the Committee prior to being answered, which may inadvertently change the intent of the original request.

ASME procedures provide for reconsideration of any interpretation when or if additional information that might affect an interpretation is available. Further, persons aggrieved by an interpretation may appeal to the cognizant ASME Committee or Subcommittee. ASME does not "approve," "certify," "rate," or "endorse" any item, construction, proprietary device, or activity.

**Attending Committee Meetings.** The B18 Standards Committee regularly holds meetings, which are open to the public. Persons wishing to attend any meeting should contact the Secretary of the B18 Standards Committee.

INTENTIONALLY LEFT BLANK

# ROUND HEAD BOLTS (INCH SERIES)

## 1 INTRODUCTORY NOTES

### 1.1 Scope

**1.1.1** This Standard covers the complete general and dimensional data for the various types of inch series bolts generally classified as round head bolts and recognized as American National Standard.

**1.1.2** The inclusion of dimensional data in this Standard is not intended to imply that all of the products described are stock production sizes. Consumers should consult with manufacturers concerning availability of products.

### 1.2 Bolt Types

The bolt types covered by this Standard are enumerated and described in paras. 1.2.1 through 1.2.10.

**1.2.1 Round Head Bolt (Formerly Designated Button Head Bolt).** The round head bolt shall have a circular head with a low rounded top surface and a flat bearing surface. Dimensions are given in Table 1.

**1.2.2 Round Head Square Neck Bolt (Formerly Designated Round Head Carriage Bolt).** The round head square neck bolt shall have a circular head with a low rounded top surface and a flat bearing surface, and an integrally formed square neck under the head. Dimensions are given in Table 2.

**1.2.3 Round Head Short Square Neck Bolt.** The round head short square neck bolt shall have a circular head with a low rounded top surface and a flat bearing surface, and an integrally formed short length square neck under the head. Dimensions are given in Table 3.

**1.2.4 Round Head Ribbed Neck Bolt (Formerly Designated Ribbed Neck Carriage Bolt).** The round head ribbed neck bolt shall have a circular head with a low rounded top surface and a flat bearing surface, and a ribbed or splined neck formed on the shank below the head. Dimensions are given in Table 4.

**1.2.5 Round Head Fin Neck Bolt (Formerly Designated Fin Neck Carriage Bolt).** The round head fin neck bolt shall have a circular head with a low rounded top surface and a flat bearing surface, and two diametrically opposite integrally formed fins at the junction of head with shank. Dimensions are given in Table 5.

**1.2.6 Step Bolt.** The step bolt shall have a large circular head with a low rounded top surface and a flat bearing surface, and an integrally formed square neck under the head. Dimensions are given in Table 6.

**1.2.7 Countersunk and Slotted Countersunk Bolts.** The countersunk bolt shall have a circular head with a flat top surface and a conical bearing surface having a head angle of approximately 80 deg. Countersunk bolts are available with and without a slot in the head, as specified by the purchaser. Dimensions are given in Table 7.

**1.2.8 114-deg Countersunk Square Neck Bolt (Formerly Designated Countersunk Carriage Bolt).** The 114-deg countersunk square neck bolt shall have a circular head with a flat top surface and a conical bearing surface having a head angle of approximately 114 deg, and an integrally formed square neck under the head. Dimensions are given in Table 8.

**1.2.9 Flat Countersunk Head Elevator Bolt.** The flat countersunk head elevator bolt shall have a large circular head with a flat top surface and a shallow conical bearing surface, and an integrally formed square neck under the head. Dimensions are given in Table 9.

**1.2.10 T-Head Bolt.** The T-head bolt shall have a rectangular head with a rounded top surface and a flat bearing surface. Dimensions are given in Table 10.

### 1.3 Terminology

For definitions of terms relating to fasteners or component features thereof used in this Standard, refer to ASME B18.12.

### 1.4 Dimensions

All dimensions in this Standard are given in inches, unless otherwise stated.

### 1.5 Designation

Round head bolts are designated by the following data, preferably in the sequence shown:

*(a)* product name and designation of the standard

*(b)* nominal diameter, threads per inch, and nominal length

*(c)* material grade or identification, and protective coating, if required

EXAMPLES:

(1) Round head short square neck bolt ASME B18.5, $\frac{3}{8}$-16 × 3, steel ASTM A307, Grade A, zinc plated ASTM F1941, Fe/Zn 3A.

(2) Step bolt ASME B18.5, $\frac{1}{2}$-13 × 4, stainless steel, ASTM F593 alloy group 1.