ASME B18.9-2012
(Revision of ASME B18.9-2007)

Plow Bolts

REAFFIRMED 2025

AN AMERICAN NATIONAL STANDARD

The American Society of
Mechanical Engineers

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The American Society of Mechanical Engineers

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FOREWORD

ASME Standards Committee B18 for the Standardization of Bolts, Nuts, Rivets, Screws, Washers, and Similar Fasteners (formerly American National Standards Committee B18) was organized in March 1992 as Sectional Committee B18 under the aegis of the American Engineering Standards Committee [later the American Standards Association (ASA), the United States of America Standards Institute (USASI), and, as of October 6, 1969, the American National Standards Institute (ANSI)] with the Society of Automotive Engineers (SAE) and The American Society of Mechanical Engineers (ASME) as joint sponsors. Subcommittees 2, 5, and 6 (later designated as Subcommittee 9) were subsequently established and charged with the responsibilities for the technical content of standards for external drive bolts and nuts, round unslotted head bolts, and plow bolts, respectively.

The National Association of Farm Equipment Manufacturers (NAFEM) had previously appointed a committee to standardize plow bolts. This committee was at work simplifying the list of types then in use. Its first recommendation reduced the total number to seven types representing 182 varieties. These were the No. 1 Key Head; No. 2 Round Countersunk; No. 3 Round Head, Square Neck; No. 4 Square Head; No. 5 Large Round Countersunk; No. 6 Round Head, Heavy Key; and No. 7 Round Head, Reverse Key. Later, at a general conference called by the Division of Simplified Practice, U.S. Department of Commerce, the NAFEM Committee recommended four types of plow bolts representing 42 varieties. These were the Nos. 3, 4, 6, and 7 types. Following the Washington conference in February 1924, NAFEM appointed one of its members to represent it on Subcommittee 6. The recommendations of the NAFEM Committee were carefully reviewed by Subcommittee 6, and Standard B18f-1928 was prepared and subsequently issued.

Many of the nonstandard types and variations of standard types continued to be used, one bolt manufacturer alone reporting production of 17 basic types with 54 variations in the head proportions of the No. 3 type, exclusive of diameter and length.

In 1945, the Department of Commerce Simplified Practice Committee found that the Nos. 1, 2, 3, 4, and 7 bolts were the most widely used, while the No. 6 bolt had little use. No dimensional standards existed for the Nos. 1 and 2. These findings were substantiated by a comprehensive survey conducted by the American Institute of Bolt, Nut, and Rivet Manufacturers (AIBNRM), who also found a limited requirement for the No. 8 head.

In June 1947, Subcommittee 6 was reorganized to study the problem and revise the Plow Bolt Standard. Sentiment in the industry demanded simplification, so the subcommittee revised the dimensions of the No. 3 Round Head, Square Neck bolt and recommended its adoption as the standard Regular Head Plow Bolt for new designs in place of the Nos. 4, 6, and 7 Regular Head Bolts. They concluded that the No. 1 Protruding Key Head and the No. 8 Concave Head were special with each company, particularly the latter, where the head tops have the contours required by special usage. Use of the No. 1 was not considered necessary, as standard keys are available, and the No. 2 Countersunk Head was not included since it is available as a machine bolt.

The standard was considered in the light of expanding use of medium carbon and alloy steels and in railroad equipment, deep soil plows, cleaning machinery, tractors, corn cutters, manure spreaders, hay rakes, and implements of widely varied types.

In the fall of 1947, a letter and ballot were sent out to all known manufacturers and users of plow bolts to obtain comments on the proposed dimensions of the No. 3 head and a proposal to make it the sole standard for new designs. The comments received from over 80% of the circulation indicated favor of the proposals. The greatest demand of the dissenters was for inclusion of the No. 7 head. As a result, the committee further revised the No. 3 and revised and restored the No. 7 head. It was decided to place the No. 4 regular head in an appendix, since the Nos. 3 and 7 heads could be used in most cases. The same action was taken for the No. 6 regular head. The intent was to emphasize the use of Nos. 3 and 7 regular heads for new designs. The Nos. 3, 4, 6, and 7 repair heads were brought up to date and retained in the standard.

Maximum and minimum limits were set for the square depth of the No. 3, and the "wash out" of the corners and bottoms of squares and keys were controlled by established radii. Without changing feed, head angles, or head heights, and without changing head proportions, the relationship of the feed to the minimum head diameter was so set up that some feed was always available for grinding when the head diameter was at the minimum. The maximum head diameter was adjusted so that trimming the head would be optional if the feed was at the maximum and trimming was not specifically required.

Elimination of the $^{9}/_{16}$ in. size was considered, but it was decided to include it with the comment, "This size is not recommended."

Existing American Iron and Steel Institute (AISI) plus and minus tolerances on hot rolled bar required the addition of a plus tolerance to the nominal bolt diameter in setting the maximum body diameter for the $^{9}/_{16}$ in. and larger sizes.

Thread lengths were limited by a maximum as well as a minimum. Due to wear, plow bolts function partly in shear, and it was necessary to limit the number of threads in bearing.

The specification of one key width on all sizes of the No. 7 head is indefensible from the standpoint of both usage and manufacture. To rectify this would cause tremendous confusion, since new bolts might not fit in the old holes and vice versa. If the corrected head was given a new head number, this would also be confusing, since it would be hard to distinguish from the No. 7 head now in production and use. As a result, no solution was found practicable at this time.

A revised draft was submitted to the industry for review, and every known manufacturer of plow bolts was invited to attend a meeting of the subcommittee in September 1948. Various objections were again reviewed, and this proposal, containing some refinements, was unanimously approved by the subcommittee and submitted for ballot in June 1949. Following approval of the sectional committee and sponsor organizations, this proposal was presented to ASA for approval and designation as an American Standard. This was granted on March 22, 1950.

A revision of the American Standard Plow Bolts, B18.9-1950, submitted by the sponsors of project B18, was approved by ASA on on February 12, 1958.

Subcommittee 9 was merged into Subcommittee 5 in 1977, and Subcommittee 5 was merged into Subcommittee 2 in December 1986. Committee B18 agreed the designations of the Subcommittee 2, 5, and 9 documents should not be changed, since such changes would adversely affect current references to these standards.

A proposed update revision of this Standard was circulated for letter ballot of Subcommittee 2 and Committee B18 on October 19, 1995. Following approval by Subcommittee 2 and Committee B18, this revision was approved by the secretariat and submitted to ANSI for approval as an American National Standard. This was granted on May 7, 1996.

ASME B18.9-2007 was approved as an American National Standard on March 7, 2007.

In early 2011, the B18 Committee received a request from a domestic bolt producer to modify some of the nonfunctional dimensions on the plow bolt design in Tables 1, 2, and 3 to help increase the life of the cold heading tooling used to manufacture these parts. B18 members contacted the major users of plow bolts and it was determined that the requested changes would not adversely affect the function of these bolts. Based on the user feedback, the B18 Committee undertook a complete revision of B18.9.

In addition to the requested changes made to Tables 1, 2, and 3, two more tables were added to the Standard to cover clipped head plow bolts and elliptical head plow bolts that were not previously covered. Plow bolts made to B18.9-2007 according to Tables, 1, 2, and 3 that conformed to those requirements will also conform to this revision. The format and references cited in the Standard were also brought into alignment with other recently revised B18 standards.

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

This revision was approved as an American National Standard on June 19, 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.)

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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.

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PLOW BOLTS

1 INTRODUCTION

1.1 Scope

1.1.1 This Standard covers general and dimensional data for inch series plow bolts 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 items. Consumers should consult with suppliers concerning the availability of products.

1.2 Head Types

1.2.1 This Standard recommends No. 3 head (round countersunk head square neck) plow bolts in Table 1 and No. 7 head (round countersunk reverse key head) plow bolts in Table 2 for new designs. It includes No. 3 repair head (round countersunk head square neck) plow bolts in Table 1, No. 4 repair head (square countersunk head) plow bolts in Table 3, No. 6 repair head (round countersunk heavy key head) plow bolts in Table 4, and No. 7 repair head (round countersunk reverse key head) plow bolts in Table 2 for service purposes.

1.2.2 Nonmandatory Appendix A provides dimensions of No. 4 regular head (square countersunk head) plow bolts in Table A-1, and No. 6 regular head (round countersunk heavy key head) plow bolts in Table A-2 as supplementary information, but not as part of this Standard.

1.3 Referenced Standards

The following is a list of publications referenced in this Standard. Unless otherwise specified, the referenced standard shall be the most recent issue at the time of order placement.

ASME B1.1, Unified Inch Screw Threads (UN and UNR Thread Form)

ASME B1.2, Gages and Gaging for Unified Inch Screw Threads

ASME B1.3, Screw Thread Gaging Systems for Dimensional Acceptability — Inch and Metric Screw Threads (UN, UNR, UNJ, M, and MJ)

ASME B18.12, Glossary of Terms for Mechanical Fasteners

ASME B18.18, Quality Assurance for Fasteners

ASME B18.24, Part Identifying Number (PIN) Code System Standard for B18 Fastener Products

ASME Y14.5M, Dimensioning and Tolerancing

Publisher: The American Society of Mechanical Engineers (ASME), Three Park Avenue, New York, NY 10016-5990; Order Department: 22 Law Drive, P.O. Box 2900, Fairfield, NJ 07007-2900 (www.asme.org)

ASTM A307, Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength

ASTM F468, Nonferrous Bolts, Hex Cap Screws, and Studs for General Use

ASTM F593, Stainless Steel Bolts, Hex Cap Screws and Studs

ASTM F788/F788M, Surface Discontinuities of Bolts, Screws, and Studs — Inch and Metric Series

Publisher: ASTM International (ASTM), 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959 (www.astm.org)

SAE J429, Mechanical and Material Requirements of Externally Threaded Fasteners

Publisher: Society of Automotive Engineers (SAE International), 400 Commonwealth Drive, Warrendale, PA 15096-0001 (www.sae.org)

1.4 Terminology

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

1.5 Dimensions

All dimensions in this Standard are given in inches and apply before any coating, unless otherwise specified.

Dimensioning and tolerancing in this Standard are in accordance with ASME Y14.5M, except where dimensions less than 1 in. carry a zero to the left of the decimal.

1.6 Part Identifying Number (PIN) Code System

For a recommended part identification numbering (PIN) system, see ASME B18.24.

2 GENERAL DATA

2.1 Body Diameter

2.1.1 Bolt body diameters shall not exceed the maximum specified in the dimensions of Tables 1 through 6.