ASME B18.3-2026
[Revision of ASME B18.3-2012 (R2017)]

Socket Cap, Shoulder, and Set Screws, and Hex and Spline Keys (Inch Series)

AN AMERICAN NATIONAL STANDARD

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

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FOREWORD

American National Standards Committee B18 for the standardization of bolts, screws, nuts, rivets, and similar fasteners was organized in March 1922 as Sectional Committee B18. It was originally under the aegis of the American Engineering Standards Committee [(later the American Standards Association (ASA), then 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 and the American Society of Mechanical Engineers (ASME) as joint sponsors.

Subcommittee No. 9* on Socket Head Cap and Set Screws was organized in April 1929 and completed its first report in November 1931. Seven successive drafts were issued during which the content of the proposal was considerably extended and refined, and in March 1933, copies were distributed to industry for criticism and comment. The suggestions received were reviewed carefully, and in April 1935, the proposal was presented to the members of Sectional Committee B18 for letter ballot vote. Following the acceptance by the two sponsor organizations, it was designated as an American Standard (ASA B18.3) in February 1936 by the ASA.

For the purpose of keeping the work of the Subcommittee in line with the developments in industry, the Committee prepared a supplement to this Standard in the form of a table covering the dimensions of hexagonal and fluted socket head shoulder screws (stripper bolts), which received approval of the ASA in April 1944 and was designated ASA B18.3a.

In March 1945, the Subcommittee submitted certain fundamental changes and additions to this Standard, and the Sectional Committee recommended issuance of a completely revised standard. Following approval of the Sectional Committee, the revised Standard was approved by the sponsor organizations and the ASA and designated an American Standard in April 1947.

In accordance with ASA procedure, a review of this Standard was undertaken in 1950 and certain additional changes were recommended by the Subcommittee. Cap screw sizes No. 0 and 1 and set screw sizes No. 0, 1, 2, 3, and 4 were added to satisfy increasing demand from various industries. Material, hardness, and thread fit were included to provide a more complete standard. A draft dated November 1951 was distributed to industry for criticism and comment. A further revision, dated November 1953, was presented to Sectional Committee B18 for letter ballot vote. Following approval of the Sectional Committee and sponsors, the proposal was submitted to the ASA. It was approved and designated an American Standard on August 26, 1954.

Shortly after the 1954 Standard was issued, work was begun on the development of standards covering flat countersunk head cap screws, button head cap screws, and cap screws up to 4 in. in diameter. As these proposals evolved with comments received from various industries, it became evident that a major revision was required, particularly in regard to insufficient bearing surface under the head on some sizes as well as increased socket sizes to permit higher set-up torque. The resulting proposed revision was presented to Sectional Committee B18 for letter ballot vote. Following approval of the Sectional Committee and sponsors, the proposal was submitted to the ASA. It was approved and designated an American Standard on December 21, 1961.

Continued surveillance of the 1961 Standard by the Subcommittee indicated by 1966 that a complete revision was necessary to provide recognition of technical improvements in materials and manufacturing methods. Work over the next 2 years culminated in a March 1968 draft proposal incorporating revisions that more clearly defined materials for all products; applied Unified radius root threads to all cap screws; made refinements to underhead fillets; extended size coverage for flat countersunk head cap screws to include $\frac{7}{8}$ in. through $1\frac{1}{2}$ in. diameters, and tabulation of body and grip lengths for sizes 0 in. through 1 in.; increased key engagements in socket set screws and implementation of minimum hexagon key engagement in short-length set screws; added width across corner dimensions for hexagon keys and bits; and included appendices covering drill and counterbore sizes for socket head cap screws (1960 Series), and gages and gaging for spline sockets.

Following acceptance of this draft by the Subcommittee, it was approved by letter ballot of USA Standards Committee B18 and the sponsor organizations, and submitted to the USASI. It was approved and designated a USA Standard on September 19, 1969.

A periodic review of this Standard undertaken by Subcommittee 3 in 1973 resulted in agreement to revise it to reflect clarification of the underhead fillet on socket head cap screws, add coverage on drilled socket head cap screws, lengthen the thread undercut on socket head shoulder screws, and extend the coverage on the latter to include the $1\frac{1}{2}$-in., $1\frac{3}{4}$-in., and 2-in. sizes. A proposal incorporating these changes together with numerous editorial corrections was prepared and,

*As of April 1, 1966, Subcommittee 9 had been redesignated as Subcommittee 3.

subsequent to Subcommittee acceptance, approved by letter ballot to American National Standards Committee B18. Following approval by the sponsor organizations, the proposal was submitted to ANSI and designated an American National Standard on November 1, 1976.

The Subcommittee's 1980 periodic review resulted in agreement that this Standard be revised to clarify the notes on screw point chamfers; to reflect standard tooling in socket tolerances for large sockets and in counterbore sizes; and to reference ASTM A574 for the appropriate mechanical and chemical requirements.

A proposal containing these changes, as well as many editorial corrections, was prepared for and balloted by letter ballot to the ASME Committee B18. Following approval by the sponsor organization, the proposal was submitted to ANSI and designated an American National Standard on January 4, 1982.

The Committee's 1985 review of this Standard resulted in agreement that it be revised to clarify the dimensions with respect to plated products, and to incorporate by reference the new ASTM documents for the appropriate mechanical, chemical, and testing requirements for the button head, flat countersunk head, and set screw products. A proposal containing these changes, as well as editorial corrections, was prepared and balloted by letter ballot to ASME Committee B18. Following approval by ASME, the proposal was submitted to ANSI and designated an American National Standard on August 7, 1986.

The Committee's 1990 review determined that this Standard needed significant revisions to clarify and update the Standard. These revisions addressed the technical changes in manufacturing methods and changes in the standards community by recognizing and integrating established quality standards into this Standard. In addition, designated characteristics for each product and product identification were established and gaging techniques for countersunk screws were added. These changes were balloted and approved by the ASME B18 Committee. The proposal was submitted to the ANSI and designated an American National Standard on January 14, 1998.

The Committee's 2000 review determined that there were many technical printing errors that had to be revised. Inspection definitions were added to clarify bearing surface, runout, and straightness for various products. The radius under the head for socket head screws was clarified by the addition of drawings showing the radius on thread to the head socket screws, and also showing the radius on socket screws with an unthreaded shoulder. The protrusion gage dimensions were changed on flat head socket cap screws. The thread requirements for short-length socket set screws were also changed. A standard was also developed for low head socket cap screws. These changes were balloted and approved by the ASME B18 Committee. The proposal was submitted to ANSI and designated as an American National Standard on July 8, 2003.

In 2010, a task group was formed to review this Standard. Spline driven fasteners and their associated keys were removed from this Standard and users who wished to use this type of fastener were referred to the 2003 edition. The Type VI (Six Lobe) drive style was added as a mandatory appendix. The tolerance for protrusion requirements on flat head socket cap screws was increased. An alternative method for measuring protrusion was included that corresponds with the metric document ISO 10642.

Some sizes were added and slight changes were made to the requirements for drilled heads.

In this 2026 edition, the Subcommittee has added spline socket set screws and their keys back into this Standard based on manufacturer feedback. They have also revised the thread inspection requirements for short-length socket set screws to match those in the 2003 edition.

Additionally, in recognition of the market growth in coated socket products and their increased usage in low-clamp strength applications, the Subcommittee has added lower-strength material options and thread classes suitable for coating and for use in such applications. They have also clarified coating requirements for all socket products.

ASME B18.3-2026 was approved by the American National Standards Institute on July 13, 2026.

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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In addition, the committee may post errata on the committee web page. Errata become effective on the date posted. Users can register on the committee web page to receive email notifications of posted errata.

This Standard is always open for comment, and the committee welcomes proposals for revisions. Such proposals should be as specific as possible, citing the paragraph number, the proposed wording, and a detailed description of the reasons for the proposal, including any pertinent background information and supporting documentation.

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(a) The most common applications for cases are

(1) to permit early implementation of a revision based on an urgent need

(2) to provide alternative requirements

(3) to allow users to gain experience with alternative or potential additional requirements prior to incorporation directly into the Standard

(4) to permit the use of a new material or process

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(1) a statement of need and background information

(2) the urgency of the case (e.g., the case concerns a project that is underway or imminent)

(3) the Standard and the paragraph, figure, or table number

(4) the editions of the Standard to which the proposed case applies

(d) A case is effective for use when the public review process has been completed and it is approved by the cognizant supervisory board. Approved cases are posted on the committee web page.

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Interpretations are published in the ASME Interpretations Database at https://go.asme.org/Interpretations as they are issued.

Committee Meetings. The B18 Standards Committee regularly holds meetings that are open to the public. Persons wishing to attend any meeting should contact the secretary of the committee. Information on future committee meetings can be found on the committee web page at https://go.asme.org/B18committee.

ASME B18.3-2026
SUMMARY OF CHANGES

Following approval by the ASME B18 Standards Committee and ASME, and after public review, ASME B18.3-2026 was approved by the American National Standards Institute on July 13, 2026.

The figures and tables in ASME B18.3-2026 have been redesignated per their parent paragraph. In addition, ASME B18.3-2026 includes the following changes identified by a margin note, **(26)**.

Page	*Location*	*Change*
1	1.1	Revised
1	1.2.1	Revised
1	1.4	Revised
1	1.5	Revised
2	1.7	Former paras. 1.7 and 1.8 deleted and subsequent paragraphs redesignated
2	1.8	Former para. 1.10 revised
2	1.9	Former para. 1.11 updated
3	2.1.3	Added
3	2.2	Last sentence revised
3	2.3	Added
4	2.4	Added
4	2.5	Added
4	2.6	Former para. 2.3 revised and redesignated
5	Table 1.2.1-1	In former Table 1, General and numbered Notes editorially revised
13	Table 1.2.1-4	(1) In former Table 4, for nominal size 3, nominal length 4.00, grip gaging length, L_G, revised (2) General Note (d) editorially revised
18	Table 1.2.1-6	In former Table 6, Note (1) revised
20	Table 1.2.1-7	In former Table 7, Note (5) editorially redesignated as General Note (b)
22	Table 1.2.3-1	In former Table 8, General and numbered Notes editorially revised
27	Table 1.2.4-1	In former Table 11, numbered Notes revised and editorially redesignated
30	Table 1.2.5-1	In former Table 12, General and numbered Notes revised and editorially redesignated
32	Table 1.3-1	In former Table 13, General and numbered Notes revised
36	Table 1.4-1	Former Table 14 revised in its entirety
44	Table 1.4-3	In former Table 6, illustrations from former Figure 1 added
46	Table 1.5-1	(1) In former Table 7, former Note (6) revised (2) General and numbered Notes editorially redesignated
48	Table 1.5-2	Added

Page	*Location*	*Change*
51	Table 2.1.3-1	Added
53	Mandatory Appendix I	Title revised
53	I-1	Revised
53	I-3	Added and subsequent paragraph redesignated
53	I-4	Revised
62	Mandatory Appendix IV	Added
68	B-5	Revised
69	B-7	Added
70	Nonmandatory Appendix C	Editorially revised
71	Nonmandatory Appendix D	Added

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SOCKET CAP, SHOULDER, AND SET SCREWS, AND HEX AND SPLINE KEYS (INCH SERIES)

1 INTRODUCTORY NOTES

1.1 Scope (26)

This is an American National Standard that covers complete general and dimensional data for various types of hexagon and spline (fluted) socket cap screws, shoulder screws, set screws, and hexagon and spline keys. Also included are appendices that provide specifications for hexagon and spline socket gages and gaging, tables showing applicability of keys and bits to various socket screw types and sizes, drill and counterbore sizes for socket head cap screws, alternate material specifications, coating information, and formulas used for dimensional data. However, where questions arise concerning acceptance of product, the dimensions in the tables shall govern over recalculation by formula. Recess dimensions for Type VI recesses are given in Mandatory Appendix III. See Federal Specification FF-S-86 for military and aerospace socket products.

1.2 Socket Cap Screws

The head types covered by this Standard are specified in paras. 1.2.1 through 1.2.5.

1.2.1 Socket Head Cap Screws. The socket head shall have a flat chamfered top surface with smooth or knurled cylindrical sides and a flat bearing surface. Specifications are given in Tables 1.2.1-1 through 1.2.1-7. Both hexagon and spline socket types are included. Dimensions for drilled holes and counterbores are included in Table A-1. (26)

1.2.2 Drilled Hexagon Socket Head Cap Screws. Specifications for hexagon socket head cap screws having two, four, and six holes drilled in the head for lock wire applications are given in Table 1.2.1-7.

1.2.3 Socket Flat Countersunk Head Cap Screws. The flat countersunk head shall have a flat top surface and a conical-bearing surface with an angle of approximately 82 deg. Specifications are given in Tables 1.2.3-1 through 1.2.3-3.

1.2.4 Socket Button Head Cap Screws. The button head shall have a low rounded top surface with a large flat bearing surface. Specifications are given in Table 1.2.4-1.

1.2.5 Socket Low Head Cap Screws. These are similar to socket head cap screws, except they have reduced head height and a smaller socket size. They are designed to be used in applications where height clearance is a problem. Specifications are given in Table 1.2.5-1.

1.3 Socket Head Shoulder Screws

The socket head shoulder screw is a hexagon socket head screw having a cylindrical shoulder under the head. Specifications are given in Table 1.3-1.

1.4 Socket Set Screws (26)

The socket set screw is a screw threaded the entire length except for its length of point. Set screws made to this Standard are intended for use in compressive stress applications. The point is designed to bear on a mating part. The common point styles are cup, flat, oval, cone, and half dog. Specifications for hexagon and spline socket set screws are shown in Tables 1.4-1 through 1.4-3.

1.5 Keys and Bits for Driving Socket Screws (26)

The tools for driving socket screws are hexagon or spline keys and bits. Tables 1.5-1 and 1.5-2 contain the requirements for hexagon and spline keys and bits, respectively.