ASME B16.18-2021
(Revision of ASME B16.18-2018)

Cast Copper Alloy Solder Joint Pressure Fittings

AN AMERICAN NATIONAL STANDARD

The American Society of Mechanical Engineers

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Two Park Avenue • New York, NY • 10016 USA

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ASME issues written replies to inquiries concerning interpretations of technical aspects of this Standard. Periodically certain actions of the ASME B16 Committee may be published as Cases. Cases and interpretations are published on the ASME website under the Committee Pages at http://cstools.asme.org/ as they are issued.

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

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FOREWORD

This American National Standard for solder joint fittings was originally developed by a subcommittee of American Standards Association (ASA) Sectional Committee A40 on Minimum Requirements for Plumbing and Standardization of Plumbing Equipment, organized in August 1928, under the procedures of the ASA. Subcommittee No. 11 on Solder-Joint Fittings for Tubing was appointed in October 1936.

At its first meeting, the Subcommittee was informed of the investigation of solder joints being carried out by the National Bureau of Standards (now the National Institute of Standards and Technology). It was decided that the Subcommittee's scope should cover only solder fittings for use in plumbing. A subgroup was appointed to study the tolerances of commercial fittings, including depth of bore, laying lengths, and diameters of copper tube.

A draft standard was sent to the Subcommittee in February 1939; a revision was distributed in August to selected organizations and individuals for review. A new Subcommittee draft dated April 1940 was approved by Sectional Committee A40, the sponsor, and following ASA approval, was published in January 1941 as ASA A40.3-1941.

In 1949, the sponsors agreed to transfer responsibility for solder joint fittings to Sectional Committee B16 of ASA, because the fittings were being used in many applications other than plumbing. Subcommittee 9, Standardization of Solder Joint Fittings was established and charged with developing a revised standard. An April 1949 draft was distributed for industry review, resulting in recommended changes. A new draft was approved by Sectional Committee B16, sponsor organizations, and ASA, and published as ASA B16.18-1950.

Work began in 1958 on a revision, including improvements in language. It was approved by B16, sponsor organizations, and ASA, and published as ASA B16.18-1963. Starting in 1969, a comprehensive review resulted in revisions to clarify the text and to permit additional material. Final approval was granted by the American National Standards Institute [ANSI (formerly ASA)] on March 2, 1972, for publication as ANSI B16.18-1972.

The Subcommittee, now Subcommittee I, began a new revision on 1974, resulting in the addition of supply and return tees, baseboard tees, and flush bushings, as well as metrication, and change of "bronze" to "copper alloy." The draft that was finally approved was published as ANSI B16.18-1978.

In 1982, American National Standards Committee B16 became the ASME B16 Standards Committee, operating with the same scope under ASME procedures accredited by ANSI. Subsequently, Subcommittee I merged with Subcommittee J, which had a related scope. A general review was then started, resulting in a number of editorial changes and a few pictorial corrections. Following approval by Subcommittee J, the B16 Standards Committee, and ASME, ANSI granted approval on January 13, 1984, for publication of the standard as ANSI B16.18-1984. The standard was reaffirmed in 1994 with no change.

The 2001 edition of B16.18 contained a defined bursting strength, defined standard gaging method of threaded ends, and other clarifications and updates to text. Following approval by the Standards Committee and ASME, the edition was approved as an American National Standard on October 17, 2001, with the designation ASME B16.18-2001.

In the 2012 edition, new copper alloys were added for potable water applications. Also, references to ASME standards were revised to no longer list specific edition years; the latest edition of ASME publications applied, unless stated otherwise. Materials manufactured to other editions of the referenced ASTM standards were permitted to be used to manufacture fittings meeting the requirements of this Standard as long as the fitting manufacturer verified that the material met the requirements of the referenced edition. Following approval by the B16 Standards Committee and the ASME Board on Pressure Technology Codes and Standards, the 2012 edition was approved as an American National Standard by ANSI on January 13, 2012, with the new designation ASME B16.18-2012.

In the 2018 edition, the Material section was revised to add low-lead requirements for castings intended for use in potable water systems. Following approval by the ASME B16 Standards Committee, ASME B16.18-2018 was approved as an American National Standard by ANSI on February 16, 2018.

In this 2021 edition, the Scope has been revised, and the references in Mandatory Appendix I have been updated. Following approval by the ASME B16 Standards Committee, ASME B16.18-2021 was approved by ANSI on November 12, 2021.

ASME B16 COMMITTEE
Standardization of Valves, Flanges, Fittings, and Gaskets

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

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CORRESPONDENCE WITH THE B16 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 or a case, and attending Committee meetings. Correspondence should be addressed to:

Secretary, B16 Standards Committee
The American Society of Mechanical Engineers
Two 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 to provide 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 and 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 B16 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 B16 Standards Committee.

Requests for interpretation should preferably be submitted through the online Interpretation Submittal Form. The form is accessible at http://go.asme.org/InterpretationRequest. Upon submittal of the form, the Inquirer will receive an automatic e-mail confirming receipt.

If the Inquirer is unable to use the online form, he/she may e-mail the request to the Secretary of the B16 Standards Committee at SecretaryB16@asme.org, or mail it to the above address. 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 in one or two words.
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. Please provide a condensed and precise question, composed in such a way that a “yes” or “no” reply is acceptable.
Proposed Reply(ies):	Provide a proposed reply(ies) in the form of “Yes” or “No,” with explanation as needed. If entering replies to more than one question, please number the questions and replies.
Background Information:	Provide the Committee with any background information that will assist the Committee in understanding the inquiry. 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 the format described above may be rewritten in the appropriate format by the Committee prior to being answered, which may inadvertently change the intent of the original request.

Moreover, ASME does not act as a consultant for specific engineering problems or for the general application or understanding of the Standard requirements. If, based on the inquiry information submitted, it is the opinion of the Committee that the Inquirer should seek assistance, the inquiry will be returned with the recommendation that such assistance be obtained.

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 B16 Standards Committee regularly holds meetings and/or telephone conferences that are open to the public. Persons wishing to attend any meeting and/or telephone conference should contact the Secretary of the B16 Standards Committee.

ASME B16.18-2021
SUMMARY OF CHANGES

Following approval by the ASME B16 Standards Committee and ASME, and after public review, ASME B16.18-2021 was approved by the American National Standards Institute on November 12, 2021.

ASME B16.18-2021 includes the following changes identified by a margin note, **(21)**. The Record Numbers listed below are explained in more detail in the "List of Changes in Record Number Order" following this Summary of Changes.

Page	*Location*	*Change (Record Number)*
1	1	Former first paragraph revised in its entirety *(19-1237)*
6	Table 8.2-1	Second column editorially revised
23	Mandatory Appendix I	Updated *(21-598)*

LIST OF CHANGES IN RECORD NUMBER ORDER

Record Number	Change
19-1237	Revised the Scope.
21-598	Updated references in Mandatory Appendix I.

CAST COPPER ALLOY SOLDER JOINT PRESSURE FITTINGS

(21) 1 SCOPE

This Standard establishes requirements for cast copper alloy solder joint pressure fittings designed for use by soldering or brazing with seamless copper water tube conforming to ASTM B88. Fittings made in accordance with this Standard are intended to be assembled with soldering materials conforming to ASTM B32, brazing materials conforming to AWS A5.8, or tapered pipe thread conforming to ASME B1.20.1.

This Standard is allied to ASME B16.22 for wrought copper alloy pressure fittings and ASME B16.50, which covers wrought pressure fittings for brazing only.

This Standard provides requirements for fitting ends of suitable depth to achieve required pressure ratings when joined by either soldering or brazing. It establishes requirements for the following:

(a) pressure–temperature ratings
(b) abbreviations for end connections
(c) sizes and method of designating openings of fittings
(d) marking
(e) material
(f) dimensions and tolerances
(g) tests

2 GENERAL

2.1 Relevant Units

This Standard states values in both SI (metric) and U.S. Customary units. These systems of units are to be regarded separately as standard. In this Standard, the SI units are shown in parentheses. The values stated in each system are not exact equivalents; therefore, it is required that each system of units be used independently of the other. Combining values from the two systems constitutes nonconformance with the Standard.

2.2 References

Standards and specifications adopted by reference in this Standard are shown in Mandatory Appendix I, which is part of this Standard. It is not considered practical to identify the specific edition of each standard and specification in the individual references. Instead, the specific editions are identified in Mandatory Appendix I.

2.3 Quality System

Requirements relating to the product manufacturer's quality system programs are described in Nonmandatory Appendix C.

3 PRESSURE–TEMPERATURE RATINGS

3.1 Rating of Fitting and of Joint

The internal pressure–temperature ratings of the fittings are shown in Table 3.1-1.

The internal pressure–temperature rating for a solder joint fitting is dependent not only on fitting and tube strength, but also on the composition of the solder used for the joint and selection of valves and appurtenances.

The internal pressure–temperature rating of the system shall be the lowest of the values shown in Table 3.1-1, the solder joint, and those of the tube, valves, or appurtenances.

The maximum recommended pressure–temperature ratings for solder joints using the dimensions of Table 8.2-2, made with typical commercial solders, are given in Nonmandatory Appendix A.

3.2 Bursting Strength

Burst strength at 73°F ± 5°F (23°C ±2°C) shall be not less than 4 times the 100°F (38°C) internal working-pressure rating shown in Table 3.1-1. For reducing fittings, the applicable internal working pressure shall be that of the largest size of end connection.

4 FITTING SIZE AND ENDS

The size of the fittings shown in Table 8.2-2 and Table A-1 corresponds to standard water tube size as shown in ASTM B88, Standard Specification for Seamless Copper Water Tube. The size of the threaded ends corresponds to nominal pipe size as shown in ANSI/ASME B1.20.1.

Fittings are designated by the size of the openings in the sequence illustrated in Figure 4-1.

The following symbols are used to designate the type of fitting end:

C = solder-joint fitting end made to receive copper tube diameter (female)
F = internal ANSI standard taper pipe thread (female) NPT