ASME B16.22-2013

(Revision of ASME B16.22-2012)

Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings

AN AMERICAN NATIONAL STANDARD

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Two Park Avenue • New York, NY • 10016 USA

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

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FOREWORD

Standardization of cast and wrought solder-joint fittings was initiated in Subcommittee 11 of American Standards Association (ASA) Sectional Committee A40 on Plumbing Requirements and Equipment. Development work culminated in the publication of ASA A40.3-1941. The standard benefited from work done by A. R. Maupin of the National Bureau of Standards, both before and during its development, on the strength of solder joints.

In 1949, work on these fittings was transferred to Sectional Committee B16, which established Subcommittee 9 (now Subcommittee J) with a scope broader than plumbing applications. The first standard developed was approved as ASA B16.18-1950, Cast-Brass Solder Joint Fittings. It was then decided to revise A40.3 as a B16 standard covering only wrought solder-joint fittings. This effort was facilitated by a 1950 draft prepared by joint effort of the Copper and Brass Research Association and the Manufacturers Standardization Society of the Valve and Fittings Industry (MSS). The draft, after review and approval by Subcommittee 9 and the Sectional Committee, was approved as B16.22-1951.

Revisions were published as ASA B16.22-1963 and, after reorganization of ASA as the American National Standards Institute (ANSI), as ANSI B16.22-1973. In these editions, updated practices, new materials, and new types of fittings were incorporated into the standard, as well as editorial improvements and updating of referenced specifications and standards.

In 1979, Subcommittee I (formerly 9, now J) added metric dimensional equivalents and made other minor improvements. This revision was approved by ANSI, after approval by the Committee and secretariat organizations, as ANSI B16.22-1980.

In 1982, American National Standards Committee B16 was reorganized as an ASME Committee operating under procedures accredited by ANSI.

In 1989, Subcommittee J removed metric equivalents and updated referenced standards.

In 1995, Subcommittee J defined bursting strength, defined standard gaging method for threaded ends, revised solder-joint lengths for $\frac{1}{8}$-in. size external and internal ends, and revised minimum wall-thickness values based on a comprehensive bursting-test study. Following approval by the Standards Committee and ASME, approval as an American National Standard was given by ANSI on July 24, 1995, with the new designation ASME B16.22-1995.

In 1998, editorial revisions, which included the addition of a new section on quality systems and a change in the designation of ASTM B32 alloys, were issued as an addendum. This addendum to the 1995 Edition of ASME B16.22, after approval by the ASME B16 Committee and ASME, was approved as ASME B16.22a-1998.

In the 2001 Edition, Subcommittee J converted the physical requirements to SI (metric) units of measure, added requirements for tube stops, clarified ovulate and alignment requirements, and made numerous editorial revisions. Alloy E and Alloy HB were incorporated into the table listing pressure–temperature ratings for the soldering and brazing materials, plus values for the 95–5 tin–antimony solder were revised. These revisions to pressure–temperature ratings reflected the data from a National Institute of Standards and Technology (NIST) solder-joint testing study, initiated in 1993 to develop stress rupture and strength data on copper tube sleeve joints using various solders. Following approval by the ASME B16 Standards Committee, approval as an American National Standard was given by ANSI on October 11, 2001, with the new designation ASME B16.22-2001.

In the 2012 Edition, the phrase “pressure–temperature ratings” replaced “working pressure” throughout the text. Following approval by the ASME B16 Standards Committee, approval as an American National Standard was given by ANSI on October 22, 2012, with the new designation ASME B16.22-2012.

In this 2013 Edition, provisions have been included to recognize low lead alloys to comply with the U.S. Safe Drinking Water Act which will be effective January, 2014. Following approval by the ASME B16 Standards Committee, approval as an American National Standard was given by ANSI on July 29, 2013, with the new designation ASME B16.22-2013.

Requests for interpretations or suggestions for revisions should be sent to the Secretary, B16 Standards Committee, The American Society of Mechanical Engineers, Two Park Avenue, New York, NY 10016-5990.

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, 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

As an alternative, inquiries may be submitted via e-mail to: SecretaryB16@asme.org.

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 B16 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.

The request for 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 B16 Standards Committee regularly holds meetings that are open to the public. Persons wishing to attend any meeting should contact the Secretary of the B16 Standards Committee.

ASME B16.22-2013
SUMMARY OF CHANGES

Following approval by the ASME B16 Committee and ASME, and after public review, ASME B16.22-2013 was approved by the American National Standards Institute on July 29, 2013.

ASME B16.22-2013 includes the following change identified by a margin note, **(13)**.

Page	*Location*	*Change*
6	6	Subparagraph (b) revised for potable water applications

WROUGHT COPPER AND COPPER ALLOY SOLDER-JOINT PRESSURE FITTINGS

1 SCOPE

This Standard establishes specifications for wrought copper and wrought copper alloy, solder-joint, seamless fittings, designed for use with seamless copper tube conforming to ASTM B88 (water and general plumbing systems), ASTM B280 (air conditioning and refrigeration service), and ASTM B819 (medical gas systems), as well as fittings intended to be assembled with soldering materials conforming to ASTM B32, brazing materials conforming to AWS A5.8, or with tapered pipe thread conforming to ASME B1.20.1.

This Standard is allied with ASME B16.18, which covers cast copper alloy pressure fittings. It provides requirements for fitting ends suitable for soldering. This Standard covers the following:

(a) pressure–temperature ratings
(b) abbreviations for end connections
(c) size 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. Within the text, the U.S. Customary units are shown in parentheses or in separate tables that appear in Mandatory Appendix II. 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 III. It is not considered practical to identify the specific edition of each standard and specification in the individual references. Instead, the specific edition reference is identified in Mandatory Appendix III.

2.3 Quality Systems

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

3 PRESSURE–TEMPERATURE RATINGS

3.1 Rating of Fittings and Joints

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

3.1.1 Solder Joints. Pressure–temperature ratings for solder joints to the dimensions of Table 1 (Table II-1), made with typical commercial solders, are given in Table I-1 (Table II-4).

The internal pressure–temperature rating of the system with solder joints shall be the lowest of the values shown in Table 2 (Table II-2) and Table I-1 (Table II-4) and those of the tube, valves, and appurtenances.

3.1.2 Braze Joints. Pressure–temperature ratings for braze joints to the dimensions of Table 1 (Table II-1), made with typical commercial brazing materials, shall be considered equal to the values given in Table 2 (Table II-2).

The internal pressure–temperature rating of the system with braze joints shall be the lowest of the values shown in Table 2 (Table II-2) and those of the tube, values, and appurtenances.

3.2 Bursting Strength

Fittings manufactured to the Standard shall have an ambient temperature bursting strength of at least four times the 38°C (100°F) internal pressure rating as shown in Table 2 (Table II-2).

4 TERMINOLOGY

4.1 Size

The size of the fittings shown in Table 1 (Table II-1) corresponds to standard water tube size as shown in ASTM B88. The size of the threaded ends corresponds to nominal pipe size as shown in ASME B1.20.1.

Fittings are designated by the size of the openings in the sequence illustrated in Fig. 1.