ASME B16.22-2012

[Revision of ASME B16.22-2001 (R2010)]

Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings

AN AMERICAN NATIONAL STANDARD

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Three Park Avenue • New York, NY • 10016 USA

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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 this 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.

Requests for interpretations or suggestions for revisions should be sent to the Secretary, B16 Committee, The American Society of Mechanical Engineers, Three 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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ASME B16.22-2012
SUMMARY OF CHANGES

Following approval by the ASME B16 Committee and ASME, and after public review, ASME B16.22-2012 was approved by the American National Standards Institute on October 22, 2012.

ASME B16.22-2012 includes the following changes identified by a margin note, **(12)**. In addition, in the main text, portions of section 1 were moved to section 2, and subsequent sections and their paragraphs were renumbered accordingly. All paragraph references were then revised as needed.

Page	*Location*	*Change*
1	3	Revised in its entirety
	4.1	Added and subsequent paragraphs redesignated
3	Table 2	(1) Title and General Notes revised (2) Under 93°C, entries revised
6	9	(1) Former para. 1.2 revised and redesignated as para. 9.1 (2) Subsequent paragraphs redesignated
9	Table I-1	Column heads and General Note revised
12	Table II-2	Title and General Notes revised
13	Table II-4	Column heads and General Note revised
14	Mandatory Appendix III	Updated
15	Nonmandatory Appendix A	Revised
16	Nonmandatory Appendix B	Revised

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), B280 (air conditioning and refrigeration service), and 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 Units of Measure

The values stated in either SI (metric) or U.S. Customary (in.-lb) units of measure shall be regarded separately as standard. Within the main text, SI units are given. For convenience, the customary units are shown in Mandatory Appendix II. The values stated in each system are not exact equivalents; therefore, each system shall be used independently of the other.

NOTE: Combining values from the two systems may result in 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 (12)

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 (12)

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.