



**Summary of Substantive Changes
between the 2013 and the 2018 editions of
ASME B16.22, “Wrought Copper and Copper Alloy Solder Joint Pressure Fittings”**

Presented to the IAPMO Standards Review Committee on February 11, 2019

General: The change to this standard should not have an impact on currently listed products. The substantive change is:

- Renamed Tables 1, 2, 3, I-1, II-1, II-2, II-3, and II-4 (see Sections 3, 4, 9, 10, 11, and 12).
- Included additional allowances for threaded ends to allow a bead with or without ribs to retain consistency with the requirements of the ASME B16.18 standard (see Section 10.3).
- Updated references in Mandatory Appendix II, formerly Mandatory Appendix III.

Section 3, Pressure-Temperature Ratings: Renamed Tables 1, 2 and I-1 as follows:

3.1.1 Solder Joints. Pressure-temperature ratings for solder joints to the dimensions of ~~Table 1 (Table II-1)~~ Table 3.1.1-1, 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)~~ Table 3.1.1-2 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)~~ Table 3.1.1-1, made with typical commercial brazing materials, shall be considered equal to the values given in ~~Table 2 (Table II-2)~~ Table 3.1.1-2. 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)~~ Table 3.1.1-2 and those of the tube, valves, 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)~~ Table 3.1.1-2.

Section 4.1, Size: Renamed Table 1 and Figure 1 as follows:

4.1 Size

The size of the fittings shown in ~~Table 1 (Table II-1)~~ Table 3.1.1-1 corresponds to standard water pipe size as shown in ASTM 888. The size of the threaded ends corresponds to nominal pipe size as shown in ASME 81.20.1. Fittings are designated by the size of the openings in the sequence illustrated in ~~Fig. 1 (Figure 4.1-1)~~ Figure 4.1-1.



Section 9, Inspection Tolerance: Renamed Table 1, Table 3 and Figure 1 as follows:

9.2 Linear Dimensions

An inspection tolerance, as shown in ~~Table 3 (Table II-3)~~ [Table 9.2-1](#), shall be allowed on center-to-shoulder, center-to-center, center-to-threaded-end, and shoulder-to-threaded-end dimensions on all fittings having internal (C) solder ends, as well as on center-to-solder-end and solder-end-to-threaded-end dimensions on all fittings having external (FIG) solder ends. Coupling inspection limits for shoulder-to-shoulder and shoulder-to-end dimensions shall be double those shown in ~~Table 3 (Table II-3)~~ [Table 9.2-1](#), except that the minus tolerance applied to dimension L (~~see Fig. 1~~) [Figure 4.1-1](#) shall not result in a dimension less than 1.5 mm (0.06 in.). The largest opening in the fitting shall govern the tolerance to be applied to all openings. 9.3 Ovality of Fitting End (C or FTG) Maximum ovality of the fitting solder-joint end shall not exceed 1 % of the maximum diameters shown in ~~Table 1 (Table II-1)~~ [Table 3.1.1-1](#). The average of the maximum and minimum diameters shall be within the dimensions shown in the Table.

9.4 Inside Diameter of Fitting

The minimum cross-sectional area of the inside diameter through the fitting body shall not be less than the theoretical minimum area defined by diameter O in ~~Table 1 (Table II-1)~~ [Table 3.1.1-1](#). The out-of-roundness condition of the cross-sectional area shall not exceed the value shown in ~~Table 1 (Table II-1)~~ [Table 3.1.1-1](#). For reducer or adapter fittings, the smallest end diameter shall apply, provided that this diameter does not restrict the other outlets.

9.5 Wall Thickness

The minimum wall thickness shall not be less than that shown in ~~Table 1 (Table II-1)~~ [Table 3.1.1-1](#).

Section 10.3, Design of Threaded Ends: Included additional allowances for threaded ends to allow a bead with or without ribs to retain consistency with the requirements of the ASME B16.18 standard as follows:

10.3 Design of Threaded Ends

The wrenching section of internally threaded ends shall be polygonal [or bead with or without ribs](#), and the wrenching section of externally threaded ends shall be furnished with ~~either~~ polygon, [ribs](#) or flats, at the manufacturer's option.

Section 11, Alignment: Renamed Figure 3 as follows:

11 ALIGNMENT

The maximum allowable deviation in the angular alignment of any end from the specified axis position shall be Y_i deg (1 deg total). See ~~Fig. 3~~ [Figure 11-1](#).

Section 12.1, Preferred Gaging Method of Solder-Joint Ends: Renamed Table 1 as follows:

12.1 Preferred Gaging Method of Solder-Joint Ends

The preferred method of gaging the diameter tolerances for external and internal ends shall be by the use of plain plug and ring gages designed to hold the product within the limits established in ~~Table 1 (Table II-1)~~ [Table 3.1.1-1](#). Gage tolerances shall be Class ZM, as defined in ASME B4.4M.



Appendix II, Mandatory Appendix II: Updated references and added ANSI B4.4M as follows:

Mandatory Appendix ## II

The following is a list of standards and specifications referenced in this Standard, showing the year of approval.

[ANSI B4.4M, Inspection of Workpieces](#)

[Publisher: American National Standards Institute \(ANSI\), 25 West 43rd Street, New York, NY 10036 \(www.ansi.org\)](#)

2010 ASME Boiler and Pressure Vessel Code, Section II, ~~Part B—Nonferrous Material Specifications Materials, Part D—Properties~~

ASME B1.20.1-~~1983 (R2006)~~, Pipe Threads, General Purpose (Inch)

ASME B4.4M-~~1981 (R1994)~~, Inspection of Workpieces

ASME B16.18-~~1984 (R2005)~~, Cast Copper Alloy Solder Joint Pressure Fittings

ASME B31.1-~~2010~~, Power Piping

ASME B31.9-~~2008~~, Building Services Piping

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

ASTM B32-08 (2014), Specification for Solder Metal

ASTM B88-~~09~~ 16, Specification for Seamless Copper Water Tube

ASTM B280-~~08~~ 16, Specification for Seamless Copper Tube for Air Conditioning and Refrigeration Field Service

ASTM B819-00 (R2006)-(2011), Specification for Seamless Copper Tube for Medical Gas Systems

ASTM B828-~~02 (R2010)~~ 16, Standard Practice for Making Capillary Joints by Soldering of Copper and Copper Alloy Tube and Fittings

ASTM E29-~~08~~ 13, Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications

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

AWS A5.8M-~~2004~~ 2011, Specification for Filler Metals for Brazing and Braze Welding¹

Publisher: American Welding Society (AWS), 8669 NW 36 Street, No. 130, Doral, FL 33166 (www.aws.org)

ISO 9000:2005 2015, Quality management systems - Fundamentals and vocabulary¹

ISO 9001:2008 2015COR 1-2009, Quality management systems - Requirements¹

ISO 9004:2009, Quality management systems - Guidelines for performance improvements¹

Publisher: International Organization for Standardization (ISO) Central Secretariat, 1, ch. de la Voie-Creuse, Case postale 56, CH-1211, Geneva 20, Switzerland/Suisse (www.iso.org)

MSS SP-25-~~2008~~ 2013, Standard Marking System for Valves, Fittings, Flanges and Unions *Publisher: Manufacturers Standardization Society of the Valve and Fittings Industry, Inc. (MSS), 127 Park Street, NE, Vienna, VA 22180 (www.mss-hq.org)*

¹ May also be obtained from American National Standards Institute (ANSI), 25 West 43rd Street, New York, NY 10036.