ASME B16.22-2018
(Revision of ASME B16.22-2013)

Proposed Revision of:

Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings

Draft Date 06/2021
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 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. 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 II. 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 II.

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 on 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 3.1.1-1, made with typical commercial solders, are given in Table I-1. The internal pressure-temperature rating of the system with solder joints shall be the lowest of the values shown in Table 3.1.1-2 and Table I-1 and those of the tube, valves, and appurtenances.

3.1.2 Braze Joints. Pressure-temperature ratings for braze joints to the dimensions of Table 3.1.1-1, made with typical commercial brazing materials, shall be considered equal to the values given in 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 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 4 times the 38°C (100°F) internal pressure rating as shown in Table 3.1.1-2.

4 TERMINOLOGY
4.1 Size
The size of the fittings shown in Table 3.1.1-1 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 Figure 4.1-1.

4.2 Abbreviations
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 end (female) NPTI
WROUGHT COPPER AND COPPER ALLOY SOLDER-JOINT PRESSURE FITTINGS

1 SCOPE

This Standard establishes specifications for wrought copper and copper alloy, solder-joint, seamless pressure fittings designed for use by soldering or brazing 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). Fittings made in accordance with this standard are, as well as fittings 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 with ASME B16.18, which covers cast 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 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
The following is a list of publications referenced in this Standard. Unless otherwise specified, the latest edition of ASME publications shall apply. Materials manufactured to other editions of the referenced ASTM standards shall be permitted to be used to manufacture fittings meeting the requirements of this Standard as long as the fitting manufacturer verifies the material meets the requirements of the referenced edition.

ANSI B4.4M, Inspection of Workpieces
Publisher: American National Standards Institute (ANSI), 25 West 43rd Street, New York, NY 10036 (www.ansi.org)

ASME Boiler and Pressure Vessel Code, Section II, Materials, Part D — Properties
ASME B1.20.1, Pipe Threads, General Purpose (Inch)
ASME B4.4M, Inspection of Workpieces
ASME B16.18, Cast Copper Alloy Solder Joint Pressure Fittings
ASME B31.1, Power Piping
ASME B31.9, Building Services Piping
Publisher: The American Society of Mechanical Engineers (ASME), Two Park Avenue, New York, NY 10016-5990 (www.asme.org)

ASTM B32-08 (2014), Standard Specification for Solder Metal
ASTM B88-16, Standard Specification for Seamless Copper Water Tube
ASTM B280-16, Standard Specification for Seamless Copper Tube for Air Conditioning and Refrigeration Field Service

ASTM B819-00 (2011), Standard Specification for Seamless Copper Tube for Medical Gas Systems
ASTM B828-16, Standard Practice for Making Capillary Joints by Soldering of Copper and Copper Alloy Tube and Fittings
ASTM E29-13, Standard Practice for Using Significant Digits in Test Data to Determine Conformance with Specification
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 A5.9M-2011, Specification for Filler Metals for Brazing and Brazed Welding
Publisher: American Welding Society (AWS), 8669 NW 36 Street, No. 130, Miami, FL 33166 (www.aws.org)

ISO 9000:2015, Quality management systems — Fundamentals and vocabulary
ISO 9001:2015, Quality management systems — Requirements
ISO 9004:2009, Managing for the sustained success of an organization — A quality management approach
Publisher: International Organization for Standardization (ISO), Central Secretariat, Chemin de Blandonnet 8, Case Postale 401, 1214 Vernier, Geneva, Switzerland (www.iso.org)

MSS SP-25-2013, 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 22180-4602 (www.msshq.org)

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

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ASME B16.18, Cast Copper Alloy Solder Joint Pressure Fittings
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Publisher: The American Society of Mechanical Engineers (ASME), Two Park Avenue, New York, NY 10016-5990 (www.asme.org)

ASTM B32-08 (2014), Standard Specification for Solder Metal
ASTM B88-1620, Standard Specification for Seamless Copper Water Tube
ASTM B280-1620, Standard Specification for Seamless Copper Tube for Air Conditioning and Refrigeration Field Service

ASTM B819-09-(2011)-19 Standard Specification for Seamless Copper Tube for Medical Gas Systems
ASTM B828-16, Standard Practice for Making Capillary Joints by Soldering of Copper and Copper Alloy Tube and Fittings
ASTM E29-13(2019), Standard Practice for Using Significant Digits in Test Data to Determine Conformance with Specification
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/A5.8-2011-AMD 1, Specification for Filler Metals for Brazing and Braze Welding
Publisher: American Welding Society (AWS), 8669 NW 36 Street, No. 130, Miami, FL 33166 (www.aws.org)

ISO 9000:2015, Quality management systems — Fundamentals and vocabulary
ISO 9001:2015, Quality management systems — Requirements
ISO 9004:20092018, Managing for the sustained success of an organization — A quality management approach
Publisher: International Organization for Standardization (ISO), Central Secretariat, Chemin de Blandonnet 8, Case Postale 401, 1214 Vernier, Geneva, Switzerland (www.iso.org)

MSS SP-25-20132018, 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 22180-4602 (www.msshq.org)

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