ASME B16.26-2018

(Revision of ASME B16.26-2013)

Cast Copper Alloy Fittings for Flared Copper Tubes

AN AMERICAN NATIONAL STANDARD

The American Society of Mechanical Engineers

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The American Society of Mechanical Engineers
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

The development of a standard for brass fittings for flared copper water tubes was initiated by a subcommittee of the Copper Tube and Fitting Manufacturers Standardization Committee in 1929. When a general agreement had been reached, the draft of the proposed standard was submitted to Sectional Committee A40 on Minimum Requirements for Plumbing and Standardization of Plumbing Equipment of the American Standards Association (ASA). Sectional Committee A40 was jointly sponsored by the American Society of Sanitary Engineering and The American Society of Mechanical Engineers (ASME).

Final ASA approval and designation as an American Standard, ASA A40.2-1936, was granted January 20, 1936.

The Standard remained unchanged and without reaffirmation until 1955, when this activity was transferred from Sectional Committee A40 to Sectional Committee B16 on Standardization of Pipe Flanges and Fittings, under the sponsorship of ASME, the Mechanical Contractors Association of America, Inc., and the Manufacturers Standardization Society of the Valve and Fittings Industry.

Sectional Committee B16 Subcommittee No. 9 on Solder-Joint Fittings was instructed to develop a revised standard. The revised draft of this Standard was submitted to industry for criticism and comment. The final draft was approved by Sectional Committee B16 and its sponsors by letter ballot. ASA approval and designation as ASA B16.26-1958 was granted on February 12, 1958. Beginning in 1965, consideration was given to reviewing the Standard in light of progress made in the production of these fittings. Subcommittee No. 9 completed its work by recommending the updating of referenced standards and thread specifications and including additional material. Following approval by the USA Standards Committee and Sponsors, the revision was approved by the new USA Standards Institute on April 21, 1967.

In 1982, American National Standards Committee B16 was reorganized as an ASME Committee operating under procedures accredited by the American National Standards Institute (ANSI). In the 1988 edition, metric units were omitted, and references to other standards were updated. Following approval by the B16 Main Committee and the ASME Supervisory Board, and after public review, the Standard was approved as an American National Standard by ANSI on August 23, 1988.

In the 2006 edition, metric units became the primary reference units while U.S. Customary units were maintained in either parenthetical or separate forms. SI values were positioned in the main text; U.S. Customary values were positioned in Mandatory Appendix I. The Scope was clarified, and a section on hydrostatic testing was added, along with a quality assurance recommendation in Nonmandatory Appendix B. Additional information concerning the design of the tube flare was also incorporated, in answer to user requests for such information, and was reported in Nonmandatory Appendix A. Following approval by the B16 Main Committee and the ASME Supervisory Board, and after public review, the Standard was approved as an American National Standard by ANSI on May 23, 2006.

In the 2011 edition, references to ASME standards were revised to no longer list specific edition years; the latest edition of ASME publications applies unless stated otherwise. Materials manufactured to other editions of the referenced ASTM standards have been 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. Following approval by the Standards Committee and the ASME Board on PTCS, the revision to the 2006 edition was approved as an American National Standard by ANSI on August 9, 2011 with the designation ASME B16.26-2011.

In the 2013 edition, provisions were included to recognize low-lead alloys to comply with revisions to the U.S. Safe Drinking Water Act that took effect in 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 designation ASME B16.26-2013.

In this 2018 edition, section 5 was revised to add marking requirements for lead-free fittings made using either bismuth- or silicon-containing alloys to identify that the alloy contains these elements. This language was previously included in the ASME B16.18 standard and was added here to retain consistency in marking requirements across the range of lead-free copper alloy fittings standards. The U.S Customary tables formerly in Mandatory Appendix I have been merged with the SI tables in the main text; the tables have been redesignated, Mandatory Appendix I has been deleted, and the cross-references have been updated accordingly. In addition, all reference standards in what was formerly Mandatory Appendix II were updated. Following approval by the ASME B16 Standards Committee, approval as an American National Standard was given by ANSI on August 3, 2018, with the new designation ASME B16.26-2018.

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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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 B16.26-2018
SUMMARY OF CHANGES

Following approval by the ASME B16 Standards Committee and ASME, and after public review, ASME B16.26-2018 was approved by the American National Standards Institute on August 3, 2018.

In ASME B16.26-2018, the U.S. Customary tables formerly in Mandatory Appendix I have been merged with the SI tables in the main text; the tables have been redesignated, Mandatory Appendix I has been deleted, and the cross-references have been updated accordingly. In addition, this edition includes the following changes identified by a margin note, **(18)**. 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	5	Revised *(17-739)*
1	6	Breakdowns *(a)* and *(b)* editorially revised
4	Table 8-1	General Note added editorially
4	Table 8-2	General Note added editorially
5	Mandatory Appendix I	(1) Former Mandatory Appendix II, updated *(18-800)* (2) Second sentence editorially revised

LIST OF CHANGES IN RECORD NUMBER ORDER

Record Number	Change
17-739	Revised section 5 to add marking requirements for lead-free fittings made using either bismuth- or silicon-containing alloys to identify that the alloy contains these elements.
18-800	Updated references in Mandatory Appendix I, formerly Mandatory Appendix II.

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CAST COPPER ALLOY FITTINGS FOR FLARED COPPER TUBES

1 SCOPE

This Standard establishes specifications for cast copper alloy fittings and nuts used with flared seamless copper tube conforming to ASTM B88 (water and general plumbing systems). Included are requirements for the following:

(a) pressure ratings
(b) size
(c) marking
(d) material
(e) dimensions
(f) threading
(g) hydrostatic testing

2 GENERAL

2.1 References

Codes, standards, and specifications containing provisions to the extent referenced herein constitute requirements of this Standard. These reference documents are listed in Mandatory Appendix I.

2.2 Convention

For determining conformance with this Standard, the convention for fixing significant digits where limits (maximum and minimum values) are specified shall be as defined in ASTM E29. This requires that an observed or calculated value be rounded off to the nearest unit in the last right-hand digit used for expressing the limit. Decimal values and tolerances do not imply a particular method of measurement.

2.3 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.

2.4 Quality Systems

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

2.5 Service Conditions

Criteria for selection of materials suitable for particular fluid service are not within the scope of this Standard.

3 PRESSURE RATINGS

The fittings covered by this Standard are designed for a maximum cold-water service pressure of 1 200 kPa (175 psig).

4 SIZE

The sizes of the fittings shown in Table 7.1-1 correspond to standard water tube size as defined in ASTM B88.

5 MARKING (18)

Each fitting shall be marked with the manufacturer's name or trademark and other applicable markings as required by MSS SP-25. Marking of fittings less than nominal size ½ is optional.

Fittings manufactured from cast copper alloys containing silicon shall be permanently marked with the designation Si.

Fittings manufactured from cast copper alloys containing bismuth shall be permanently marked with the designation B or Bi.

6 MATERIAL (18)

(a) Castings intended for use in applications up to 204°C (400°F) shall be of a copper alloy produced to meet

(1) the requirements of ASTM B62 for copper alloy UNS No. C83600, or

(2) the chemical and tensile requirements of ASTM B584 for copper alloy UNS No. C83800 or C84400 and in all other respects comply with the requirements of ASTM B62

(b) Castings intended for use in potable water applications up to 93°C (200°F) shall be low lead (0.25% or less) and shall be

(1) of a copper alloy produced to meet the requirements of ASTM B584 for copper alloy UNS No. C87850 or C89833, or

(2) of other cast copper alloys, provided the fittings produced meet mechanical and corrosion-resistant properties needed for potable water application

7 DIMENSIONS

7.1 Fitting and Nut

The dimensions and tolerances of fittings and nuts shall be as shown in Table 7.1-1. Design of the sealing surfaces

of the fitting and nut shall be at the discretion of the manufacturer.

7.2 Tube Flare

Dimensions relating to the flared end of the tube are described in Nonmandatory Appendix A, Table A-1.

8 THREADING (18)

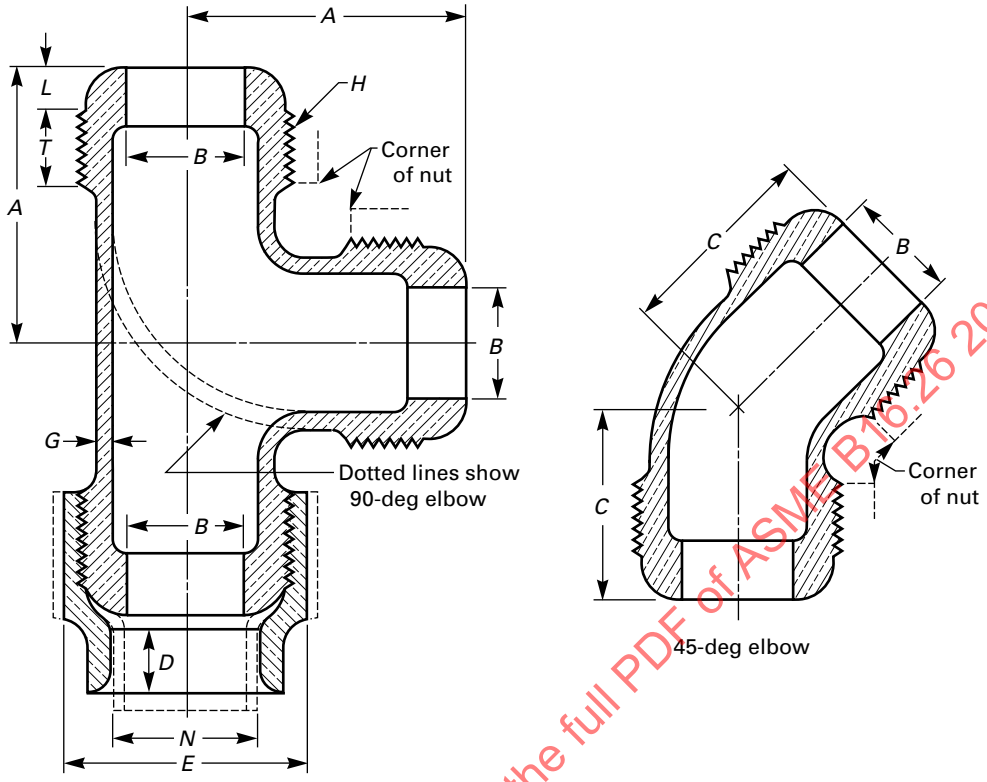
Straight threads shall conform to ASME B1.1 Class 2A external and Class 2B internal. The dimensions of straight threads are given in Tables 8-1 and 8-2.

Taper pipe threads (NPT) shall conform to ASME B1.20.1.

9 HYDROSTATIC TEST

Hydrostatic testing is not required.

Table 7.1-1 General Dimensions — Cast Copper Alloy Fittings for Flared Copper Tubes



Standard Water Tube Size	Outside Diameter of Tube, mm (in.)	Diameter of Fitting Bore, *B*, mm (in.) [Note (1)]	Minimum Center-to-Face, *A*, mm (in.)	Minimum Center-to-Face of 45-deg Elbow, *C*, mm (in.)	Length of Seat Projection, *L*, mm (in.)	Minimum Metal Thickness, *G*, mm (in.)	Diameter of Bore of Nut, *N*, mm (in.) [Note (1)]	Minimum Length of Bore in Nut, *D*, mm (in.)	Width Across Flats of Nut, *E*, mm (in.)	Number of Flats on Nuts
3/8	12.7 (0.50)	9.62 (0.375)	36 (1.42)	27.0 (1.06)	6.5 (0.25)	2.4 (0.09)	13.1 (0.52)	5.0 (0.19)	27.4 (1.08)	6
1/2	15.9 (0.62)	12.70 (0.500)	39 (1.53)	29.0 (1.12)	6.5 (0.26)	2.4 (0.09)	16.7 (0.65)	6.5 (0.25)	31.0 (1.22)	6
3/4	22.2 (0.88)	19.05 (0.750)	45 (1.78)	32.0 (1.26)	7.0 (0.28)	2.5 (0.10)	23.0 (0.90)	9.5 (0.38)	37.6 (1.48)	6
1	28.6 (1.12)	25.40 (1.000)	53 (2.09)	37.5 (1.44)	7.5 (0.30)	2.8 (0.11)	29.4 (1.15)	12.5 (0.50)	48.4 (1.90)	6
1 1/4	34.9 (1.38)	31.75 (1.250)	58 (2.28)	40.0 (1.56)	8.0 (0.32)	3.2 (0.12)	35.7 (1.41)	16.0 (0.63)	54.8 (2.16)	8
1 1/2	41.3 (1.62)	38.10 (1.500)	65 (2.56)	44.0 (1.75)	8.5 (0.34)	3.3 (0.13)	42.1 (1.66)	19.0 (0.75)	65.1 (2.56)	8
2	54.0 (2.12)	50.80 (2.000)	78 (3.06)	52.0 (2.06)	9.5 (0.38)	4.0 (0.15)	54.8 (2.16)	25.5 (1.00)	82.9 (3.26)	10

GENERAL NOTE: Nuts with 45-deg taper seat or convex curved seat are interchangeable on ball-joint fittings.

NOTE: (1) Tolerance on diameter of bores through fitting and nut, all sizes, is ±0.12 mm (±0.005 in.).

(18) **Table 8-1 Thread Specifications: External Threads on Fittings — Class 2A**

Standard Water Tube Size	Thread Designation, *H*	Length of Thread, *T*, mm (in.)	Major Diameter, mm (in.)		Pitch Diameter, mm (in.)		Maximum Minor Diameter, mm (in.)
			Max.	Min.	Max.	Min.	
3/8	7/8–14 UNF	11.0 (0.43)	22.184 (0.8734)	21.923 (0.8631)	21.005 (0.8270)	20.869 (0.8216)	19.959 (0.7858)
1/2	1–14 UNS	11.0 (0.43)	25.356 (0.9983)	25.096 (0.9880)	24.178 (0.9519)	24.037 (0.9463)	23.131 (0.9107)
3/4	1 1/4–14 UNS	12.5 (0.50)	31.709 (1.2484)	31.448 (1.2381)	30.530 (1.2020)	30.394 (1.1966)	29.484 (1.1608)
1	1 5/8–12 UNS	14.0 (0.56)	41.229 (1.6232)	40.940 (1.6118)	39.855 (1.5691)	39.706 (1.5632)	38.663 (1.5210)
1 1/4	1 7/8–12 UN	15.5 (0.62)	47.579 (1.8732)	47.290 (1.8618)	46.205 (1.8191)	46.053 (1.8131)	44.983 (1.7710)
1 1/2	2 1/4–12 UN	17.5 (0.69)	57.104 (2.2482)	56.815 (2.2368)	55.730 (2.1941)	55.576 (2.1880)	54.508 (2.1460)
2	2 7/8–12 UN	20.5 (0.81)	72.976 (2.8731)	72.688 (2.8617)	71.602 (2.8190)	71.443 (2.8127)	70.380 (2.7709)

GENERAL NOTE: Thread Designation, *H*, and Length of Thread, *T*, are illustrated in Table 7.1-1.

(18) **Table 8-2 Thread Specifications: Internal Threads on Nuts — Class 2B**

Standard Water Tube Size	Thread Designation, *H*	Length of Thread, *T*, mm (in.)	Maximum Major Diameter, mm (in.)	Pitch Diameter, mm (in.)		Minor Diameter, mm (in.)	
				Max.	Min.	Max.	Min.
3/8	7/8–14 UNF	11.0 (0.43)	22.225 (0.8750)	21.224 (0.8356)	21.047 (0.8286)	20.68 (0.814)	20.27 (0.798)
1/2	1–14 UNS	11.0 (0.43)	25.400 (1.0000)	24.406 (0.9609)	24.222 (0.9536)	23.82 (0.938)	23.44 (0.923)
3/4	1 1/4–14 UNS	12.5 (0.50)	31.750 (1.2500)	30.749 (1.2106)	30.572 (1.2036)	30.18 (1.188)	29.79 (1.173)
1	1 5/8–12 UNS	14.0 (0.56)	41.275 (1.6250)	40.093 (1.5785)	39.901 (1.5709)	39.45 (1.553)	38.99 (1.535)
1 1/4	1 7/8–12 UN	15.5 (0.62)	47.625 (1.8750)	46.448 (1.8287)	46.251 (1.8209)	45.80 (1.803)	45.34 (1.785)
1 1/2	2 1/4–12 UN	17.5 (0.69)	57.150 (2.2500)	55.976 (2.2038)	55.776 (2.1959)	55.32 (2.178)	54.86 (2.160)
2	2 7/8–12 UN	20.5 (0.81)	73.025 (2.8750)	71.869 (2.8291)	71.651 (2.8209)	71.20 (2.803)	70.74 (2.785)

GENERAL NOTE: Thread Designation, *H*, and Length of Thread, *T*, are illustrated in Table 7.1-1.

(18)

MANDATORY APPENDIX I
REFERENCES

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.

ASME B1.1, Unified Inch Screw Threads (UN and UNR Thread Form)
ASME B1.20.1, Pipe Threads, General Purpose (Inch)
Publisher: The American Society of Mechanical Engineers (ASME), Two Park Avenue, New York, NY 10016-5990 (www.asme.org)

ASTM B62-17, Standard Specification for Composition Bronze or Ounce Metal Castings
ASTM B88-16, Standard Specification for Seamless Copper Water Tube
ASTM B584-14, Standard Specification for Copper Alloy Sand Castings for General Applications
ASTM E29-13, Standard 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)

ISO 9000:2015, Quality management systems — Fundamentals and vocabulary[1]
ISO 9001:2015, Quality management systems — Requirements[1]
ISO 9004:2009, Managing for the sustained success of an organization — A quality management approach[1]
Publisher: International Organization for Standardization (ISO), Central Secretariat, Chemin de Blandonnet 8, Case Postale 401, 1214 Vernier, Geneva, Switzerland (www.iso.org)

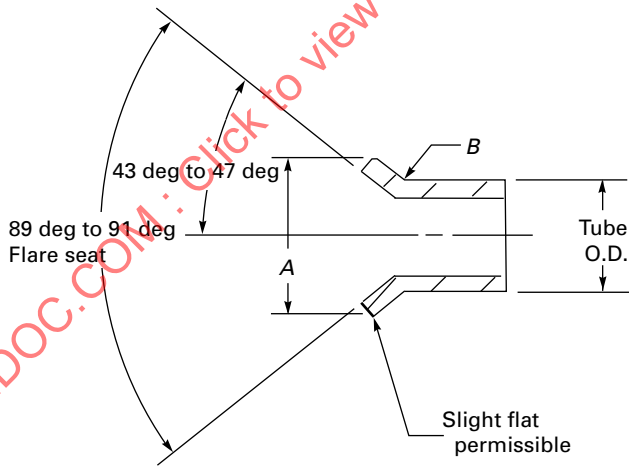
MSS SP-25-2013, Standard Marking System for Valves, Fittings, Flanges, and Unions
Publisher: Manufacturers Standardization Society of the Valve and Fittings Industry, Inc. (MSS), 127 Park Street, NE, Vienna, VA 22180-4602 (www.msshq.org)

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

NONMANDATORY APPENDIX A
FLARED TUBE DIMENSIONS

See Table A-1 for dimensions relating to the flared end of the tube.

Table A-1 Flared Tube Dimensions



Standard Water Tube Size	Outside Diameter of Tube, mm (in.)	Minimum Flared Tube Diameter, *A*, mm (in.)	Maximum Flared Tube Diameter, *A*, mm (in.)	Flare Radius, *B*, ±0.03 mm (±0.01 in.)
3/8	12.7 (0.50)	16 (0.63)	17 (0.67)	0.05 (0.02)
1/2	15.9 (0.62)	19 (0.75)	20 (0.79)	0.05 (0.02)
3/4	22.2 (0.88)	26 (1.01)	27 (1.05)	0.05 (0.02)
1	28.6 (1.12)	33 (1.31)	34 (1.35)	0.05 (0.02)
1 1/4	34.9 (1.50)	40 (1.56)	41 (1.60)	0.05 (0.02)
1 1/2	41.3 (1.62)	48 (1.87)	49 (1.91)	0.05 (0.02)
2	54.0 (2.12)	62 (2.44)	63 (2.48)	0.05 (0.02)

GENERAL NOTE: Considerations such as the effects of wall thickness on working pressures, length of thread engagements, etc. shall be the responsibility of the user.