ASME B16.18-2018
(Revision of ASME B16.18-2012)

Cast Copper Alloy Solder Joint Pressure Fittings

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

This American National Standard for solder joint fittings was originally developed by a subcommittee of American Standards Association (ASA) Sectional Committee A40 on Minimum Requirements for Plumbing and Standardization of Plumbing Equipment, organized in August 1928, under the procedures of the ASA. Subcommittee No. 11 on Solder-Joint Fittings for Tubing was appointed in October 1936.

At its first meeting, the Subcommittee was informed of the investigation of solder joints being carried out by the National Bureau of Standards (now the National Institute of Standards and Technology). It was decided that the Subcommittee's scope should cover only solder fittings for use in plumbing. A subgroup was appointed to study the tolerances of commercial fittings, including depth of bore, laying lengths, and diameters of copper tube.

A draft standard was sent to the Subcommittee in February 1939; a revision was distributed in August to selected organizations and individuals for review. A new Subcommittee draft dated April 1940 was approved by Sectional Committee A40, the sponsor, and following ASA approval, was published in January 1941 as ASA A40.3-1941.

In 1949, the sponsors agreed to transfer responsibility for solder joint fittings to Sectional Committee B16 of ASA, because the fittings were being used in many applications other than plumbing. Subcommittee 9, Standardization of Solder Joint Fittings was established and charged with developing a revised standard. An April 1949 draft was distributed for industry review, resulting in recommended changes. A new draft was approved by Sectional Committee B16, sponsor organizations, and ASA, and published as ASA B16.18-1950.

Work began in 1958 on a revision, including improvements in language. It was approved by B16, sponsor organizations, and ASA, and published as ASA B16.18-1963. Starting in 1969, a comprehensive review resulted in revisions to clarify the text and to permit additional material. Final approval was granted by the American National Standards Institute [ANSI (formerly ASA)] on March 2, 1972, for publication as ANSI B16.18-1972.

The Subcommittee, now Subcommittee I, began a new revision on 1974, resulting in the addition of supply and return tees, baseboard tees, and flush bushings, as well as metrication, and change of "bronze" to "copper alloy." The draft that was finally approved was published as ANSI B16.18-1978.

In 1982, American National Standards Committee B16 became the ASME B16 Standards Committee, operating with the same scope under ASME procedures accredited by ANSI. Subsequently, Subcommittee I merged with Subcommittee J, which had a related scope. A general review was then started, resulting in a number of editorial changes and a few pictorial corrections. Following approval by Subcommittee J, the B16 Standards Committee, and ASME, ANSI granted approval on January 13, 1984, for publication of the standard as ANSI B16.18-1984. The standard was reaffirmed in 1994 with no change.

The 2001 edition of B16.18 contained a defined bursting strength, defined standard gaging method of threaded ends, and other clarifications and updates to text. Following approval by the Standards Committee and ASME, the edition was approved as an American National Standard on October 17, 2001, with the designation ASME B16.18-2001.

In the 2012 edition, new copper alloys were added for potable water applications. Also, references to ASME standards were revised to no longer list specific edition years; the latest edition of ASME publications applied, unless stated otherwise. Materials manufactured to other editions of the referenced ASTM standards were permitted to be used to manufacture fittings meeting the requirements of this Standard as long as the fitting manufacturer verified that the material met the requirements of the referenced edition. Following approval by the B16 Standards Committee and the ASME Board on Pressure Technology Codes and Standards, the 2012 edition was approved as an American National Standard by ANSI on January 13, 2012, with the new designation ASME B16.18-2012.

In this 2018 edition, the Material section has been revised to add low-lead requirements for castings intended for use in potable water systems. Following approval by the ASME B16 Standards Committee, ASME B16.18-2018 was approved as an American National Standard by ANSI on February 16, 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 B16.18-2018
SUMMARY OF CHANGES

Following approval by the ASME B16 Committee and ASME, and after public review, ASME B16.18-2018 was approved by the American National Standards Institute on February 16, 2018.

In ASME B16.18-2018, the Metric tables formerly in Mandatory Appendix I have been merged with the U.S. Customary tables in the main text; the tables have been redesignated, Mandatory Appendix I deleted, and the cross-references updated accordingly. In addition, this edition includes the following changes identified by a margin note, **(18)**. The Record Number listed below is explained in more detail in the "List of Changes in Record Number Order" following this Summary of Changes.

Page	*Location*	*Change (Record Number)*
2	6	Subparagraph (b) revised *(17-1691)*
23	Mandatory Appendix I	Formerly Mandatory Appendix II, updated *(17-1691)*

LIST OF CHANGES IN RECORD NUMBER ORDER

Record Number	Change
17-1691	In section 6, subpara. (b), "either" was changed to "low lead (0.25% or less) and shall be"; in Mandatory Appendix I (formerly Mandatory Appendix II), references were updated.

CAST COPPER ALLOY SOLDER JOINT PRESSURE FITTINGS

1 SCOPE

This Standard for cast copper alloy solder joint pressure fittings designed for use with copper water tube establishes requirements for

(a) pressure–temperature ratings
(b) abbreviations for end connections
(c) sizes 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 SI 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 I, which is part of this Standard. 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 I.

2.3 Quality System

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

3 PRESSURE–TEMPERATURE RATINGS

3.1 Rating of Fitting and of Joint

The internal pressure–temperature ratings of the fittings are shown in Table 3.1-1.

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

The internal pressure–temperature rating of the system shall be the lowest of the values shown in Table 3.1-1, the solder joint, and those of the tube, valves, or appurtenances.

The maximum recommended pressure–temperature ratings for solder joints using the dimensions of Table 8.2-2, made with typical commercial solders, are given in Nonmandatory Appendix A.

3.2 Bursting Strength

Burst strength at 73°F ± 5°F (23°C ±2°C) shall be not less than 4 times the 100°F (38°C) internal working-pressure rating shown in Table 3.1-1. For reducing fittings, the applicable internal working pressure shall be that of the largest size of end connection.

4 FITTING SIZE AND ENDS

The size of the fittings shown in Table 8.2-2 and Table A-1 corresponds to standard water tube size as shown in ASTM B88, Standard Specification for Seamless Copper Water Tube. The size of the threaded ends corresponds to nominal pipe size as shown in ANSI/ASME B1.20.1.

Fittings are designated by the size of the openings in the sequence illustrated in Figure 4-1.

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 (female) NPT
FTG = solder-joint fitting end made to copper tube diameter (male)
M = external ANSI standard taper pipe thread (male) NPT

5 MARKING

Each fitting shall be permanently marked with the manufacturer's name or trademark and other applicable markings as required by MSS SP-25. Marking of fittings less than Standard Water Tube Size ½ or on any fitting where it damages soldering surfaces is not required.

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.

(18) ## 6 MATERIAL

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

(1) the requirement of ASTM B62 Alloy C83600

(2) the tensile requirements of ASTM B584 Alloy C83800 or C84400 and, in all other respects, shall comply with the requirements of ASTM B62

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

(1) of a copper alloy produced to meet the requirements of ASTM B584 Alloy 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 METAL THICKNESS

Dimensional variations occur in the casting process. Pattern equipment shall be designed to produce the metal thickness given for fittings in Table 8.2-2. The minimum wall thickness shall be not less than 90% of the body and joint wall thickness as shown in Table 8.2-2.

8 INSPECTION TOLERANCE

8.1 Convention

For determining conformance with this Standard, the convention for fixing significant digits where limits (maximum or 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.

8.2 Linear Dimensions

An inspection tolerance as shown in Table 8.2-1 shall be allowed on center-to-shoulder, center-to-center, center-to-threaded-end, and shoulder-to-threaded-end dimensions on all fittings having female solder (solder cup) ends, and on center-to-solder-end and solder-to-threaded-end dimensions on all fittings having male solder (fitting) ends.

Coupling inspection limits for shoulder-to-shoulder and shoulder-to-end dimensions shall be double those shown in Table 8.2-1, except that the minus tolerance applied to dimensions *M*, *N*, and *W* in Tables 8.2-3 shall not result in a dimension less than 0.06 in. (1.5 mm) for sizes ¼ through 1 in., inclusive, or a dimension less than 0.09 in. (2.3 mm) for the larger sizes.

The largest opening in the fitting governs the tolerance to be applied to all openings.

Tables 8.2-2 through 8.2-18 offer dimensions for pressure fittings covered by this Standard.

8.3 Ovality

Maximum ovality shall not exceed 1% of the maximum diameters shown in Table 8.2-2. The average of the maximum and minimum diameters must be within the dimensions shown in the table.

8.4 Gaging of Solder Joint Ends

8.4.1 Standard Gaging Method. The standard method of gaging the diameter tolerances for male and female ends shall be by the use of plain plug and ring gages designed to hold the product within the limits established in Table 8.2-2.

8.4.2 Optional Gaging Method. For gaging the diameter tolerance of male and female ends, the manufacturer may use direct reading instruments instead of ring and plug gages as specified in para. 8.4.1. When gaging the diameters of male and female ends using direct reading instruments, refer to para. 8.3.

8.5 Standard Gaging Method of Threaded Ends

The standard method of gaging the external and internal threaded ends shall be in accordance with the requirements of ANSI/ASME B1.20.1.

8.6 Alignment

The maximum-allowable deviation in the angular alignment of any opening shall be 0.06 in./ft (5 mm/m) (0.5%).

9 THREADED ENDS

9.1 Thread Type

Fitting threads shall be right hand, conforming to ANSI/ASME B1.20.1, Pipe Threads, General Purpose (Inch). They shall be taper threads (NPT).

9.2 Countersink or Chamfer

All internal threads shall be countersunk a distance not less than one-half the pitch of the thread at an angle approximately 45 deg with the axis of the thread, and all external threads shall be chamfered at an angle of 30 deg to 45 deg from the axis, for easier entrance in making a joint and protection of the thread. Countersinking and chamfering shall be concentric with the threads.

9.3 Threading Tolerances

Tolerance for an internal threaded end having an internal shoulder shall be from the gage reference point (notch) to one turn small. Tolerance for an internal threaded end without shoulder and for an external

threaded end shall be from one turn small to one turn large.

9.4 Thread Length

The length of threads specified in all tables shall be measured to include the countersink or chamfer.

10 CONFIGURATION OF THREADED ENDS

At the manufacturer's option, female ends of fittings may be furnished with a polygon or bead with or without ribs, and male ends of fittings may be furnished with a polygon, ribs, or flats.

11 PRODUCTION TESTING

Each fitting shall be tested for evidence of leakage by one of the following methods:

(a) Each fitting shall be pressurized with air or other compressed gas at 60 psi (410 kPa) while under water for a minimum duration of 5 sec.

(b) Each fitting shall be hydrostatically tested with water at 250 psi (1 720 kPa) for a minimum duration of 15 sec.

Table 3.1-1 Internal Pressure–Temperature Ratings for Cast Copper Alloy Fittings, psi (kPa)

Standard Water Tube Size	−20°F to 100°F (−29°C to 38°C)	150°F (66°C)	200°F (93°C)	250°F (121°C)	300°F (149°C)	350°F (177°C)	400°F (204°C)
¼	910 (6 280)	770 (5 340)	745 (5 130)	725 (5 020)	710 (4 920)	605 (4 190)	455 (3 140)
⅜	775 (5 360)	660 (4 560)	635 (4 380)	620 (4 290)	610 (4 200)	515 (3 570)	385 (2 680)
½	720 (4 970)	610 (4 220)	585 (4 060)	575 (3 980)	565 (3 890)	480 (3 310)	360 (2 480)
⅝	630 (4 350)	535 (3 700)	515 (3 550)	505 (3 480)	490 (3 410)	420 (2 900)	315 (2 170)
¾	580 (4 010)	490 (3 410)	475 (3 270)	465 (3 210)	455 (3 140)	385 (2 670)	290 (2 000)
1	490 (3 400)	420 (2 890)	400 (2 780)	395 (2 720)	385 (2 660)	325 (2 270)	245 (1 700)
1¼	435 (3 020)	370 (2 570)	355 (2 470)	350 (2 420)	340 (2 370)	290 (2 010)	215 (1 510)
1½	405 (2 810)	345 (2 390)	330 (2 300)	325 (2 250)	315 (2 200)	270 (1 870)	200 (1 400)
2	360 (2 500)	305 (2 130)	295 (2 040)	290 (2 000)	280 (1 960)	240 (1 670)	180 (1 250)
2½	335 (2 310)	285 (1 960)	270 (1 890)	265 (1 850)	260 (1 810)	220 (1 540)	165 (1 150)
3	315 (2 180)	265 (1 850)	255 (1 780)	250 (1 740)	245 (1 710)	210 (1 450)	155 (1 090)
3½	300 (2 090)	255 (1 770)	245 (1 700)	240 (1 670)	235 (1 630)	200 (1 390)	150 (1 040)
4	290 (2 020)	245 (1 710)	240 (1 650)	230 (1 610)	225 (1 580)	195 (1 340)	145 (1 010)
5	265 (1 850)	225 (1 570)	220 (1 510)	215 (1 480)	210 (1 450)	175 (1 230)	130 (920)
6	250 (1 720)	210 (1 460)	205 (1 420)	200 (1 380)	195 (1 350)	165 (1 150)	125 (860)
8	270 (1 860)	225 (1 580)	220 (1 520)	215 (1 490)	210 (1 460)	180 (1 240)	135 (930)
10	270 (1 860)	230 (1 580)	220 (1 520)	215 (1 490)	210 (1 460)	180 (1 240)	135 (930)
12	250 (1 740)	215 (1 480)	205 (1 420)	200 (1 390)	195 (1 360)	165 (1 160)	125 (870)

GENERAL NOTES:

(a) For size designation of fittings, see section 4.

(b) The internal pressure rating applies to the largest opening of the fitting.

(c) The internal pressure rating is calculated, as shown in Nonmandatory Appendix B, then rounded down to the nearest unit of 5 for psi and 10 for kPa.

Figure 4-1 Method of Designating Openings of Fittings

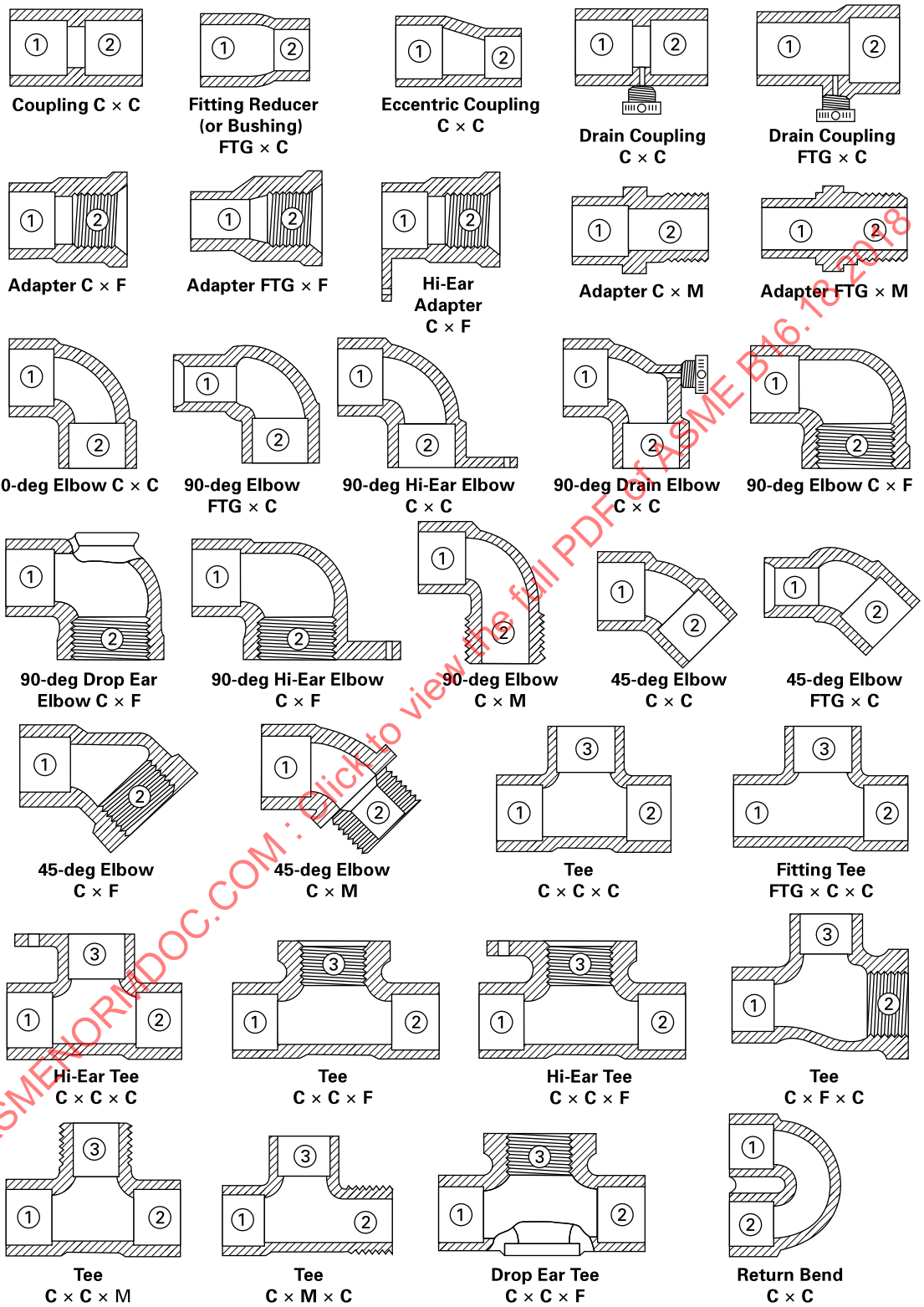
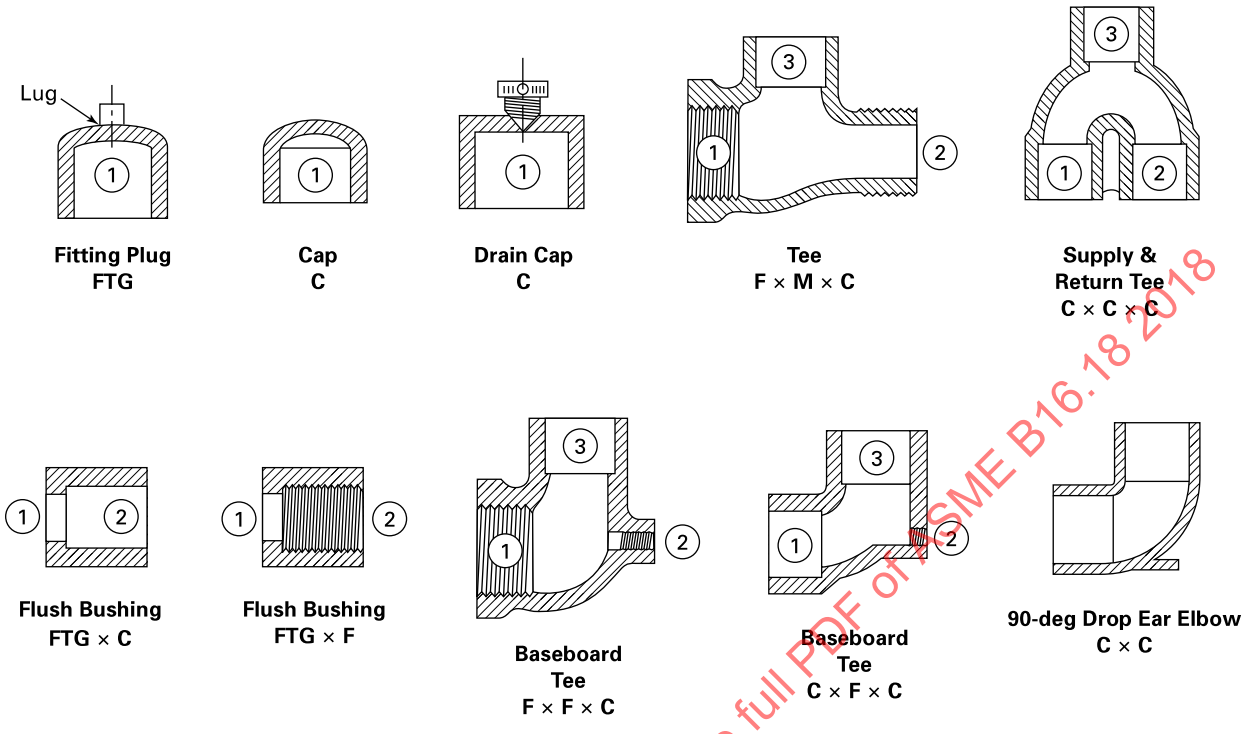


Figure 4-1 Method of Designating Openings of Fittings (Cont'd)

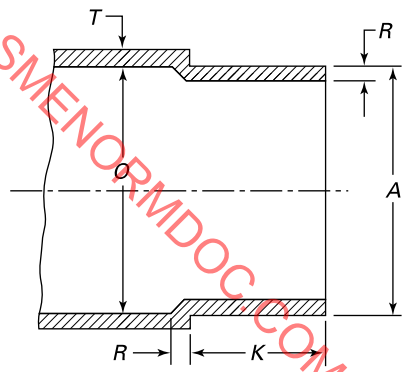


GENERAL NOTE: Fittings are designated by size in the order shown — i.e., 1 × 2 × 3.

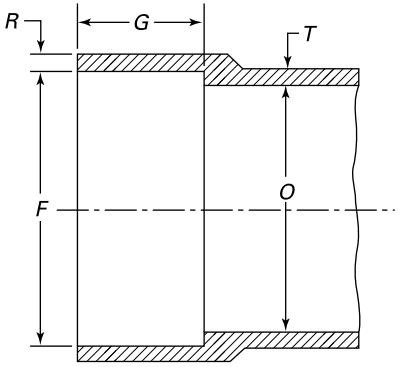
Table 8.2-1 Inspection Tolerances

Standard Water Tube and Pipe Thread Size	Plus or Minus in. (mm)
1/4, 3/8	0.05 (1.3)
1/2, 3/4	0.06 (1.5)
1 to 2 incl.	0.08 (2.0)
2 1/2 to 3 1/2 incl.	0.11 (2.8)
4, 5	0.12 (3.2)
6, 8	0.16 (4.0)
10, 12	0.20 (5.2)

Table 8.2-2 Dimensions of Solder Joint Ends



(a) Male End (FTG)



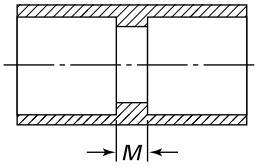
(b) Female End (C)

Standard Water Tube Size [Note (1)]	Male End			Female End			Metal Thickness [Note (3)], in. (mm)		Minimum Inside Diameter of Fitting, *O*, in. (mm)
	Outside Diameter [Note (2)], *A*, in. (mm)		Minimum Length, *K*, in. (mm)	Inside Diameter, *F*, in. (mm)		Minimum Depth, *G*, in. (mm)			
	Min.	Max.		Min.	Max.		Body, *T*	Joint, *R*	
1/4	0.373 (9.47)	0.376 (9.55)	0.38 (9.5)	0.377 (9.58)	0.381 (9.68)	0.31 (8.0)	0.08 (2.0)	0.05 (1.3)	0.31 (7.9)
3/8	0.497 (12.62)	0.501 (12.73)	0.44 (11.0)	0.502 (12.75)	0.506 (12.85)	0.38 (9.5)	0.09 (2.3)	0.05 (1.3)	0.43 (10.9)
1/2	0.622 (15.80)	0.626 (15.90)	0.56 (14.5)	0.627 (15.93)	0.631 (16.03)	0.50 (12.5)	0.09 (2.3)	0.05 (1.3)	0.54 (13.7)
3/4	0.872 (22.15)	0.876 (22.25)	0.81 (20.5)	0.877 (22.28)	0.881 (22.38)	0.75 (19.0)	0.10 (2.5)	0.06 (1.5)	0.78 (19.8)
1	1.122 (28.50)	1.127 (28.63)	0.97 (24.5)	1.128 (28.65)	1.132 (28.75)	0.91 (23.0)	0.11 (2.8)	0.07 (1.8)	1.02 (25.9)
1 1/4	1.372 (34.85)	1.377 (34.98)	1.03 (26.0)	1.378 (35.00)	1.382 (35.10)	0.97 (24.5)	0.12 (3.0)	0.07 (1.8)	1.26 (32.0)
1 1/2	1.621 (41.17)	1.627 (41.33)	1.16 (29.5)	1.628 (41.35)	1.633 (41.48)	1.09 (28.0)	0.13 (3.3)	0.08 (2.0)	1.50 (38.1)
2	2.121 (53.87)	2.127 (54.03)	1.41 (35.5)	2.128 (54.05)	2.133 (54.18)	1.34 (34.0)	0.15 (3.8)	0.09 (2.3)	1.98 (50.3)
2 1/2	2.621 (66.57)	2.627 (66.73)	1.53 (39.0)	2.628 (66.75)	2.633 (66.88)	1.47 (37.5)	0.17 (4.3)	0.10 (2.5)	2.46 (62.5)
3	3.121 (79.27)	3.127 (79.43)	1.72 (43.5)	3.128 (79.45)	3.133 (79.58)	1.66 (42.0)	0.19 (4.8)	0.11 (2.8)	2.94 (74.7)
3 1/2	3.621 (91.97)	3.627 (92.13)	1.97 (50.0)	3.628 (92.15)	3.633 (92.28)	1.91 (48.5)	0.20 (5.1)	0.12 (3.0)	3.42 (86.9)
4	4.121 (104.67)	4.127 (104.83)	2.22 (56.5)	4.128 (104.85)	4.133 (104.98)	2.16 (55.0)	0.22 (5.6)	0.13 (3.3)	3.90 (99.1)
5	5.121 (130.07)	5.127 (130.23)	2.72 (69.0)	5.128 (130.25)	5.133 (130.38)	2.66 (67.5)	0.28 (7.1)	0.17 (4.3)	4.87 (123.7)
6	6.121 (155.47)	6.127 (155.63)	3.22 (82.0)	6.128 (155.65)	6.133 (155.78)	3.09 (78.5)	0.34 (8.6)	0.20 (5.1)	5.84 (148.3)
8	8.119 (206.22)	8.127 (206.43)	4.09 (104.0)	8.128 (206.45)	8.133 (206.58)	3.97 (101.0)	0.38 (9.5)	0.31 (7.9)	7.72 (196.1)
10	10.119 (257.02)	10.127 (257.23)	4.12 (104.6)	10.128 (257.25)	10.133 (257.38)	4.00 (101.6)	0.48 (12.2)	0.48 (12.2)	9.62 (244.3)
12	12.119 (307.82)	12.127 (308.03)	4.62 (117.3)	12.128 (308.05)	12.133 (308.18)	4.50 (114.3)	0.56 (14.2)	0.56 (14.2)	11.56 (293.6)

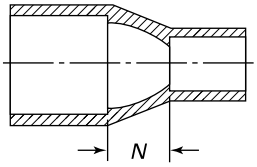
GENERAL NOTE: The sketches and designs of fittings are illustrative only. Dimensions herein shall govern in all cases.

NOTES:
(1) For size designation of fitting, see section 4.
(2) For ovality and gaging tolerances, see section 8.
(3) For metal thickness, see section 7.

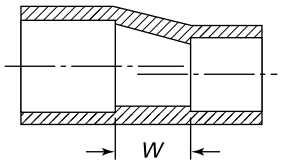
Table 8.2-3 Dimensions of Couplings



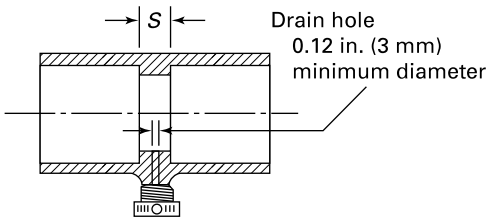
Coupling
C × C



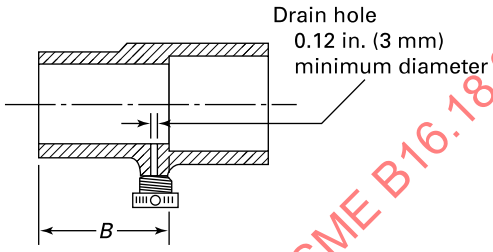
Reducing Coupling
C × C



Eccentric Coupling
C × C



Drain Coupling
C × C



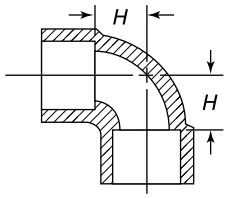
Fitting Drain Coupling
FTG × C

Straight		Reducing		Eccentric		Drain	
Standard Water Tube Size [Note (1)]	Laying Length [Note (2)], *M*, in. (mm)	Standard Water Tube Size [Note (1)]	Laying Length [Note (2)], *N*, in. (mm)	Standard Water Tube Size [Note (1)]	Laying Length [Note (2)], *W*, in. (mm)	Laying Length [Note (2)], *S*, in. (mm)	Laying Length [Note (2)], *B*, in. (mm)
¼	0.06 (1.5)	¾ × ½	0.31 (8.0)	¾ × ½	0.62 (16.0)	0.25 (6.5)	...
⅜	0.06 (1.5)	1 × ¾	0.38 (9.5)	1 × ¾	0.69 (17.5)	0.25 (6.5)	...
½	0.12 (3.0)	1¼ × 1	0.38 (9.5)	1¼ × 1	0.75 (19.0)	0.25 (6.5)	1.00 (25.5)
¾	0.12 (3.0)	1¼ × ¾	0.38 (9.5)	1¼ × ¾	0.75 (19.0)	0.25 (6.5)	1.28 (32.5)
1	0.12 (3.0)	1½ × 1¼	0.38 (9.5)	1½ × 1¼	0.69 (17.5)	0.25 (6.5)	...
1¼	0.12 (3.0)	1½ × 1	0.38 (9.5)	1½ × 1	0.69 (17.5)	0.25 (6.5)	...
1½	0.12 (3.0)	1½ × ¾	0.44 (11.0)	2 × 1½	1.12 (28.5)	0.25 (6.5)	...
2	0.19 (4.5)	2 × 1½	0.50 (12.5)	2 × 1¼	0.94 (24.0)	0.25 (6.5)	...
2½	0.19 (4.5)	2 × 1¼	0.50 (12.5)	2½ × 2	1.19 (30.0)	...	...
3	0.19 (4.5)	2 × 1	0.50 (12.5)	3 × 2½	1.25 (32.0)	...	...
3½	0.25 (6.5)	2 × ¾	0.50 (12.5)	3 × 2	1.31 (33.5)	...	...
4	0.25 (6.5)	2½ × 2	0.56 (14.5)	4 × 3	2.00 (51.0)	...	...
5	0.25 (6.5)	2½ × 1½	0.56 (14.5)	...	...	...	...
6	0.25 (6.5)	2½ × 1¼	0.62 (16.0)	...	...	...	...
8	0.62 (16.0)	2½ × 1	0.62 (16.0)	...	...	...	...
...	...	3 × 2½	0.62 (16.0)	...	...	...	...
...	...	3 × 2	0.62 (16.0)	...	...	...	...
...	...	4 × 3	0.69 (17.5)	...	...	...	...
...	...	4 × 2½	1.12 (28.5)	...	...	...	...
...	...	4 × 2	1.19 (30.0)	...	...	...	...
...	...	6 × 4	1.31 (33.5)	...	...	...	...
...	...	8 × 6	1.38 (35.0)	...	...	...	...

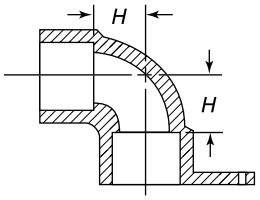
GENERAL NOTE: For dimensions not given in this Table, see Table 8.2-2.

NOTES:
(1) For size designation of fitting, see section 4.
(2) For inspection tolerances, see section 8 and Table 8.2-1.

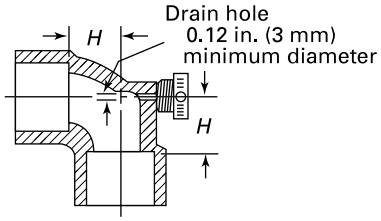
Table 8.2-4 Dimensions of Elbows, Tees, and 45-deg Elbows



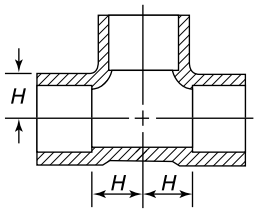
90-deg Elbow
C × C



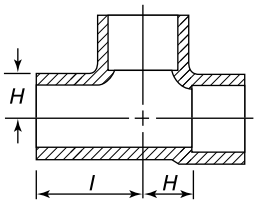
90-deg Hi-Ear Elbow
C × C
[Note (1)]



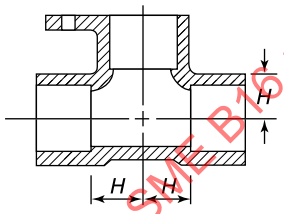
90-deg Drain Elbow
C × C



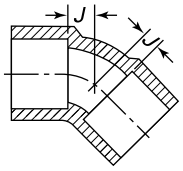
Tee
C × C × C



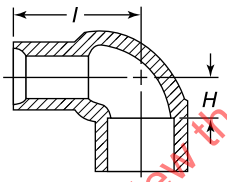
Fitting Tee
FTG × C × C



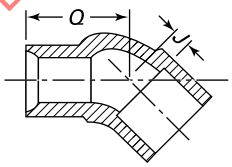
Hi-Ear Tee
C × C × C
[Note (1)]



45-deg Elbow
C × C



90-deg Elbow
FTG × C



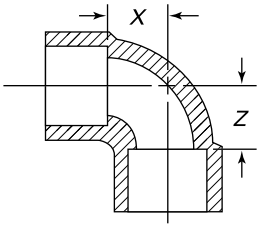
45-deg Elbow
FTG × C

Standard Water Tube Size [Note (2)]	Laying Length Tee and 90-deg Elbow [Note (3)], *H*, in. (mm)	Center-to-End 90-deg Elbow and Tee [Note (3)], *I*, in. (mm)	Laying Length 45-deg Elbow [Note (3)], *J*, in. (mm)	Center-to-End 45-deg Elbow [Note (3)], *Q*, in. (mm)
1/4	0.25 (6.5)	0.75 (19.0)	...	...
3/8	0.31 (8.0)	0.88 (22.0)	0.19 (5.0)	0.75 (19.0)
1/2	0.44 (11.0)	1.12 (28.5)	0.19 (5.0)	0.88 (22.0)
3/4	0.56 (14.5)	1.50 (38.0)	0.25 (6.5)	1.19 (30.0)
1	0.75 (19.0)	1.84 (47.0)	0.31 (8.0)	1.31 (33.5)
1 1/4	0.88 (22.0)	2.03 (51.5)	0.44 (11.0)	1.56 (39.5)
1 1/2	1.00 (25.5)	2.28 (58.0)	0.50 (12.5)	1.75 (44.5)
2	1.25 (32.0)	2.78 (70.5)	0.56 (14.5)	2.12 (54.0)
2 1/2	1.50 (38.0)	3.16 (80.0)	0.62 (16.0)	...
3	1.75 (44.5)	3.59 (91.5)	0.75 (19.0)	...
3 1/2	2.00 (51.0)	...	0.88 (22.0)	...
4	2.25 (57.0)	4.59 (116.5)	0.94 (24.0)	...
5	3.12 (79.5)	...	1.44 (36.5)	...
6	3.62 (92.0)	...	1.62 (41.5)	...
8	4.88 (124.0)	...	2.12 (54.0)	...

GENERAL NOTE: For dimensions not given in this Table, see Table 8.2-2.

NOTES:
(1) Hi-ear fittings are designed for use with 9/16 in. (14 mm) maximum width strap.
(2) For size designation of fitting, see section 4.
(3) For inspection tolerances, see section 8 and Table 8.2-1.

Table 8.2-5 Dimensions of Reducing 90-deg Elbows



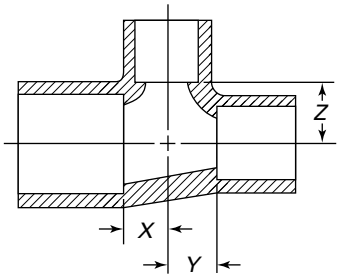
90-deg Elbow
C × C

Standard Water Tube Size [Note (1)]	Laying Length [Note (2)]	
	X, in. (mm)	*Z*, in. (mm)
3/8 × 1/4	0.25 (6.5)	0.31 (8.0)
1/2 × 3/8	0.38 (9.5)	0.44 (11.0)
3/4 × 1/2	0.44 (11.0)	0.56 (14.5)
1 × 3/4	0.62 (16.0)	0.75 (19.0)
1 × 1/2	0.50 (12.5)	0.75 (19.0)
1 1/4 × 1	0.75 (19.0)	0.88 (22.0)
1 1/4 × 3/4	0.62 (16.0)	0.88 (22.0)
1 1/4 × 1/2	0.50 (12.5)	0.88 (22.0)
1 1/2 × 1 1/4	0.88 (22.0)	1.00 (25.5)
1 1/2 × 1	0.75 (19.0)	1.00 (25.5)
1 1/2 × 3/4	0.62 (16.0)	1.00 (25.5)
2 × 1 1/2	1.00 (25.5)	1.25 (31.5)
2 × 1 1/4	0.88 (22.0)	1.25 (31.5)
2 × 1	0.75 (19.0)	1.25 (31.5)
2 × 3/4	0.62 (16.0)	1.25 (31.5)
2 1/2 × 2	1.25 (31.5)	1.50 (38.0)
2 1/2 × 1 1/2	1.00 (25.5)	1.50 (38.0)
2 1/2 × 1 1/4	0.88 (22.0)	1.50 (38.0)
2 1/2 × 1	0.75 (19.0)	1.50 (38.0)
3 × 2 1/2	1.50 (38.0)	1.75 (44.5)
3 × 2	1.25 (31.5)	1.75 (44.5)
3 × 1 1/2	1.00 (25.5)	1.75 (44.5)
3 × 1 1/4	0.88 (22.0)	1.75 (44.5)
4 × 3	1.75 (44.5)	2.25 (57.0)
4 × 2 1/2	1.50 (38.0)	2.25 (57.0)
4 × 2	1.25 (31.5)	2.25 (57.0)
6 × 4	2.62 (66.5)	3.62 (92.0)
6 × 3	2.00 (51.0)	3.62 (92.0)
8 × 6	3.88 (98.5)	4.88 (124.0)

GENERAL NOTE: For dimensions not given in this Table, see Table 8.2-2.

NOTES:
(1) For size designation of fitting, see section 4.
(2) For inspection tolerances, see section 8 and Table 8.2-1.

Table 8.2-6 Dimensions of Reducing Tees



Tee
C × C × C

Standard Water Tube Size [Note (1)]	Laying Length [Note (2)]			Standard Water Tube Size [Note (1)]	Laying Length [Note (2)]		
	X, in. (mm)	*Y*, in. (mm)	*Z*, in. (mm)		*X*, in. (mm)	*Y*, in. (mm)	*Z*, in. (mm)
3/8 × 3/8 × 1/2	0.44 (11.0)	0.44 (11.0)	0.38 (9.5)	1 1/4 × 1 × 3/4	0.62 (16.0)	0.62 (16.0)	0.88 (22.0)
3/8 × 3/8 × 1/4	0.25 (6.5)	0.25 (6.5)	0.31 (8.0)	1 1/4 × 1 × 1/2	0.50 (12.5)	0.50 (12.5)	0.88 (22.0)
1/2 × 1/2 × 3/4	0.56 (14.5)	0.56 (14.5)	0.44 (11.0)	1 1/4 × 3/4 × 1 1/4	0.88 (22.0)	0.88 (22.0)	0.88 (22.0)
1/2 × 1/2 × 3/8	0.38 (9.5)	0.38 (9.5)	0.44 (11.0)	1 1/4 × 3/4 × 1	0.75 (19.0)	0.75 (19.0)	0.88 (22.0)
1/2 × 1/2 × 1/4	0.31 (8.0)	0.31 (8.0)	0.44 (11.0)	1 1/4 × 3/4 × 3/4	0.62 (16.0)	0.62 (16.0)	0.88 (22.0)
1/2 × 3/8 × 1/2	0.44 (11.0)	0.44 (11.0)	0.44 (11.0)	1 1/4 × 1/2 × 1 1/4	0.88 (22.0)	0.88 (22.0)	0.88 (22.0)
1/2 × 3/8 × 3/8	0.38 (9.5)	0.38 (9.5)	0.44 (11.0)	1 1/4 × 1/2 × 1	0.75 (19.0)	0.75 (19.0)	0.88 (22.0)
3/4 × 3/4 × 1	0.75 (19.0)	0.75 (19.0)	0.62 (16.0)	1 1/2 × 1 1/2 × 2 1/2	1.50 (38.0)	1.50 (38.0)	1.00 (25.5)
3/4 × 3/4 × 1/2	0.44 (11.0)	0.44 (11.0)	0.56 (14.5)	1 1/2 × 1 1/2 × 2	1.25 (32.0)	1.25 (32.0)	1.00 (25.5)
3/4 × 3/4 × 3/8	0.38 (9.5)	0.38 (9.5)	0.56 (14.5)	1 1/2 × 1 1/2 × 1 1/4	0.88 (22.0)	0.88 (22.0)	1.00 (25.5)
3/4 × 1/2 × 3/4	0.56 (14.5)	0.56 (14.5)	0.56 (14.5)	1 1/2 × 1 1/2 × 1	0.75 (19.0)	0.75 (19.0)	1.00 (25.5)
3/4 × 1/2 × 1/2	0.44 (11.0)	0.44 (11.0)	0.56 (14.5)	1 1/2 × 1 1/2 × 3/4	0.62 (16.0)	0.62 (16.0)	1.00 (25.5)
3/4 × 1/2 × 3/8	0.38 (9.5)	0.38 (9.5)	0.56 (14.5)	1 1/2 × 1 1/2 × 1/2	0.50 (12.5)	0.50 (12.5)	1.00 (25.5)
1 × 1 × 1 1/2	1.00 (25.5)	1.00 (25.5)	0.75 (19.0)	1 1/2 × 1 1/4 × 1 1/2	1.00 (25.5)	1.00 (25.5)	1.00 (25.5)
1 × 1 × 1 1/4	0.88 (22.0)	0.88 (22.0)	0.75 (19.0)	1 1/2 × 1 1/4 × 1 1/4	0.88 (22.0)	0.88 (22.0)	1.00 (25.0)
1 × 1 × 3/4	0.62 (16.0)	0.62 (16.0)	0.75 (19.0)	1 1/2 × 1 1/4 × 1	0.75 (19.0)	0.75 (19.0)	1.00 (25.5)
1 × 1 × 1/2	0.50 (12.5)	0.50 (12.5)	0.75 (19.0)	1 1/2 × 1 1/4 × 3/4	0.62 (16.0)	0.62 (16.0)	1.00 (25.0)
1 × 1 × 3/8	0.44 (11.0)	0.44 (11.0)	0.75 (19.0)	1 1/2 × 1 1/4 × 1/2	0.50 (12.5)	0.50 (12.5)	1.00 (25.5)
1 × 3/4 × 1	0.75 (19.0)	0.75 (19.0)	0.75 (19.0)	1 1/2 × 1 × 1 1/2	1.00 (25.5)	1.00 (25.5)	1.00 (25.5)
1 × 3/4 × 3/4	0.62 (16.0)	0.62 (16.0)	0.75 (19.0)	1 1/2 × 1 × 1 1/4	0.88 (22.0)	0.88 (22.0)	1.00 (25.5)
1 × 3/4 × 1/2	0.50 (12.5)	0.50 (12.5)	0.75 (19.0)	1 1/2 × 1 × 1	0.75 (19.0)	0.75 (19.0)	1.00 (25.5)
1 × 1/2 × 1	0.75 (19.0)	0.75 (19.0)	0.75 (19.0)	1 1/2 × 3/4 × 1 1/2	1.00 (25.5)	1.00 (25.5)	1.00 (25.5)
1 × 1/2 × 3/4	0.62 (16.0)	0.62 (16.0)	0.75 (19.0)	1 1/2 × 1/2 × 1 1/2	1.00 (25.5)	1.00 (25.5)	1.00 (25.5)
1 × 1/2 × 1/2	0.50 (12.5)	0.50 (12.5)	0.75 (19.0)	2 × 2 × 4	2.25 (57.0)	2.25 (57.0)	1.25 (32.0)
1 1/4 × 1 1/4 × 2	1.25 (32.0)	1.25 (32.0)	0.88 (22.0)	2 × 2 × 3	1.75 (44.5)	1.75 (44.5)	1.25 (32.0)
1 1/4 × 1 1/4 × 1 1/2	1.00 (25.5)	1.00 (25.5)	0.88 (22.0)	2 × 2 × 2 1/2	1.50 (38.0)	1.50 (38.0)	1.25 (32.0)
1 1/4 × 1 1/4 × 1	0.75 (19.0)	0.75 (19.0)	0.88 (22.0)	2 × 2 × 1 1/2	1.00 (25.5)	1.00 (25.5)	1.25 (32.0)
1 1/4 × 1 1/4 × 3/4	0.62 (16.0)	0.62 (16.0)	0.88 (22.0)	2 × 2 × 1 1/4	0.88 (22.0)	0.88 (22.0)	1.25 (32.0)
1 1/4 × 1 1/4 × 1/2	0.50 (12.5)	0.50 (12.5)	0.88 (22.0)	2 × 2 × 1	0.75 (19.0)	0.75 (19.0)	1.25 (32.0)
1 1/4 × 1 × 1 1/4	0.88 (22.0)	0.88 (22.0)	0.88 (22.0)	2 × 2 × 3/4	0.62 (16.0)	0.62 (16.0)	1.25 (32.0)
1 1/4 × 1 × 1	0.75 (19.0)	0.75 (19.0)	0.88 (22.0)	2 × 2 × 1/2	0.50 (12.5)	0.50 (12.5)	1.25 (32.0)

Table 8.2-6 Dimensions of Reducing Tees (Cont'd)

Standard Water Tube Size [Note (1)]	Laying Length [Note (2)]			Standard Water Tube Size [Note (1)]	Laying Length [Note (2)]		
	X, in. (mm)	*Y*, in. (mm)	*Z*, in. (mm)		*X*, in. (mm)	*Y*, in. (mm)	*Z*, in. (mm)
2 × 1½ × 2	1.25 (32.0)	1.25 (32.0)	1.25 (32.0)	3 × 3 × ¾	0.62 (16.0)	0.62 (16.0)	1.75 (44.5)
2 × 1½ × 1½	1.00 (25.5)	1.00 (25.5)	1.25 (32.0)	3 × 3 × ½	0.50 (12.5)	0.50 (12.5)	1.75 (44.5)
2 × 1½ × 1¼	0.88 (22.0)	0.88 (22.0)	1.25 (32.0)	3 × 2½ × 3	1.75 (44.5)	1.75 (44.5)	1.75 (44.5)
2 × 1½ × 1	0.75 (19.0)	0.75 (19.0)	1.25 (32.0)	3 × 2½ × 2½	1.50 (38.0)	1.50 (38.0)	1.75 (44.5)
2 × 1½ × ¾	0.62 (16.0)	0.62 (16.0)	1.25 (32.0)	3 × 2½ × 2	1.25 (32.0)	1.25 (32.0)	1.75 (44.5)
2 × 1½ × ½	0.50 (12.5)	0.50 (12.5)	1.25 (32.0)	3 × 2½ × 1½	1.00 (25.5)	1.00 (25.5)	1.75 (44.5)
2 × 1¼ × 2	1.25 (32.0)	1.25 (32.0)	1.25 (32.0)	3 × 2½ × 1¼	0.88 (22.0)	0.88 (22.0)	1.75 (44.5)
2 × 1¼ × 1½	1.00 (25.5)	1.00 (25.5)	1.25 (32.0)	3 × 2½ × 1	0.75 (19.0)	0.75 (19.0)	1.75 (44.5)
2 × 1¼ × 1¼	0.88 (22.0)	0.88 (22.0)	1.25 (32.0)	3 × 2 × 3	1.75 (44.5)	1.75 (44.5)	1.75 (44.5)
2 × 1 × 2	1.25 (32.0)	1.25 (32.0)	1.25 (32.0)	3 × 2 × 2½	1.50 (38.0)	1.50 (38.0)	1.75 (44.5)
2 × ¾ × 2	1.25 (32.0)	1.25 (32.0)	1.25 (32.0)	3 × 2 × 2	1.25 (32.0)	1.25 (32.0)	1.75 (44.5)
2 × ½ × 2	1.25 (32.0)	1.25 (32.0)	1.25 (32.0)	3 × 2 × 1½	1.00 (25.5)	1.00 (25.5)	1.75 (44.5)
2½ × 2½ × 4	2.25 (57.0)	2.25 (57.0)	1.50 (38.0)	3 × 1½ × 3	1.75 (44.5)	1.75 (44.5)	1.75 (44.5)
2½ × 2½ × 3	1.75 (44.5)	1.75 (44.5)	1.50 (38.0)	3 × 1¼ × 3	1.75 (44.5)	1.75 (44.5)	1.75 (44.5)
2½ × 2½ × 2	1.25 (32.0)	1.25 (32.0)	1.50 (38.0)	3 × 1 × 3	1.75 (44.5)	1.75 (44.5)	1.75 (44.5)
2½ × 2½ × 1½	1.00 (25.5)	1.00 (25.5)	1.50 (38.0)	3½ × 3½ × 3	1.75 (44.5)	1.75 (44.5)	2.00 (51.0)
2½ × 2½ × 1¼	0.88 (22.0)	0.88 (22.0)	1.50 (38.0)	3½ × 3 × 3½	2.00 (51.0)	2.00 (51.0)	2.00 (51.0)
2½ × 2½ × 1	0.75 (19.0)	0.75 (19.0)	1.50 (38.0)	4 × 4 × 6	3.62 (92.0)	3.62 (92.0)	2.62 (66.0)
2½ × 2½ × ¾	0.62 (16.0)	0.62 (16.0)	1.50 (38.0)	4 × 4 × 3	1.75 (44.5)	1.75 (44.5)	2.25 (57.0)
2½ × 2½ × ½	0.50 (12.5)	0.50 (12.5)	1.50 (38.0)	4 × 4 × 2½	1.50 (38.0)	1.50 (38.0)	2.25 (57.0)
2½ × 2 × 2½	1.50 (38.0)	1.50 (38.0)	1.50 (38.0)	4 × 4 × 2	1.25 (32.0)	1.25 (32.0)	2.25 (57.0)
2½ × 2 × 2	1.25 (32.0)	1.25 (32.0)	1.50 (38.0)	4 × 4 × 1½	1.00 (25.5)	1.00 (25.5)	2.25 (57.0)
2½ × 2× 1½	1.00 (25.5)	1.00 (25.5)	1.50 (38.0)	4 × 4 × 1¼	0.88 (22.0)	0.88 (22.0)	2.25 (57.0)
2½ × 2 × 1¼	0.88 (22.0)	0.88 (22.0)	1.50 (38.0)	4 × 4 × 1	0.75 (19.0)	0.75 (19.0)	2.25 (57.0)
2½ × 2 × 1	0.75 (19.0)	0.75 (19.0)	1.50 (38.0)	4 × 4 × ¾	0.62 (16.0)	0.62 (16.0)	2.25 (57.0)
2½ × 2 × ¾	0.62 (16.0)	0.62 (16.0)	1.50 (38.0)	4 × 3 × 4	2.25 (57.0)	2.25 (57.0)	2.25 (57.0)
2½ × 2 × ½	0.50 (12.5)	0.50 (12.5)	1.50 (38.0)	4 × 3 × 3	1.75 (44.5)	1.75 (44.5)	2.25 (57.0)
2½ × 1½ × 2½	1.50 (38.0)	1.50 (38.0)	1.50 (38.0)	4 × 3 × 2½	1.50 (38.0)	1.50 (38.0)	2.25 (57.0)
2½ × 1½ × 2	1.25 (32.0)	1.25 (32.0)	1.50 (38.0)	4 × 3 × 2	1.25 (32.0)	1.25 (32.0)	2.25 (57.0)
2½ × 1½ × 1½	1.00 (25.5)	1.00 (25.5)	1.50 (38.0)	4 × 2½ × 4	2.25 (57.0)	2.25 (57.0)	2.25 (57.0)
2½ × 1¼ × 2½	1.50 (38.0)	1.50 (38.0)	1.50 (38.0)	4 × 2 × 4	2.25 (57.0)	2.25 (57.0)	2.25 (57.0)
2½ × 1 × 2½	1.50 (38.0)	1.50 (38.0)	1.50 (38.0)	4 × 2 × 3	1.75 (44.5)	1.75 (44.5)	2.25 (57.0)
2½ × ¾ × 2½	1.50 (38.0)	1.50 (38.0)	1.50 (38.0)	4 × 2 × 2	1.25 (32.0)	1.25 (32.0)	2.25 (57.0)
2½ × ½ × 2½	1.50 (38.0)	1.50 (38.0)	1.50 (38.0)	4 × 1½ × 4	2.25 (57.0)	2.25 (57.0)	2.25 (57.0)
3 × 3 × 4	2.25 (57.0)	2.25 (57.0)	1.75 (44.5)	4 × 1¼ × 4	2.25 (57.0)	2.25 (57.0)	2.25 (57.0)
3 × 3 × 2½	1.50 (38.0)	1.50 (38.0)	1.75 (44.5)	4 × 1 × 4	2.25 (57.0)	2.25 (57.0)	2.25 (57.0)
3 × 3 × 2	1.25 (32.0)	1.25 (32.0)	1.75 (44.5)	5 × 5 × 4	2.62 (66.0)	2.62 (66.0)	3.12 (79.5)
3 × 3 × 1½	1.00 (25.5)	1.00 (25.5)	1.75 (44.5)	5 × 4 × 5	3.12 (79.5)	3.12 (79.5)	3.12 (79.5)
3 × 3 × 1¼	0.88 (22.0)	0.88 (22.0)	1.75 (44.5)	6 × 6 × 8	4.88 (124.0)	4.88 (124.0)	3.88 (98.5)
3 × 3 × 1	0.75 (19.0)	0.75 (19.0)	1.75 (44.5)	6 × 6 × 4	2.62 (66.5)	2.62 (66.5)	3.62 (92.0)

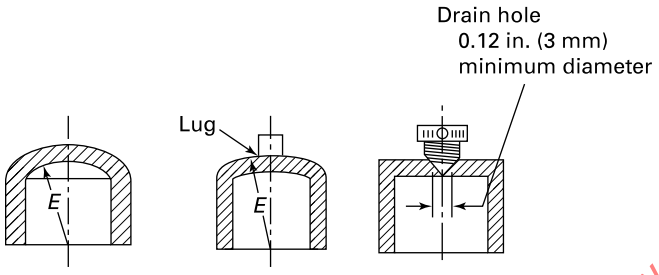
Table 8.2-6 Dimensions of Reducing Tees (Cont'd)

Standard Water Tube Size [Note (1)]	Laying Length [Note (2)]			Standard Water Tube Size [Note (1)]	Laying Length [Note (2)]		
	X, in. (mm)	*Y*, in. (mm)	*Z*, in. (mm)		*X*, in. (mm)	*Y*, in. (mm)	*Z*, in. (mm)
6 × 6 × 3	2.00 (50.5)	2.00 (50.5)	3.62 (92.0)	6 × 4 × 4	2.62 (66.5)	2.62 (66.5)	3.62 (92.0)
6 × 6 × 2½	1.88 (47.5)	1.88 (47.5)	3.62 (92.0)	6 × 3 × 6	3.62 (92.0)	3.62 (92.0)	3.62 (92.0)
6 × 6 × 2	1.62 (41.5)	1.62 (41.5)	3.62 (92.0)	6 × 2½ × 6	3.62 (92.0)	3.62 (92.0)	3.62 (92.0)
6 × 6 × 1½	1.38 (35.0)	1.38 (35.0)	3.62 (92.0)	6 × 2 × 6	3.62 (92.0)	3.62 (92.0)	3.62 (92.0)
6 × 6 × 1¼	1.25 (32.0)	1.25 (32.0)	3.62 (92.0)	8 × 8 × 6	3.88 (98.5)	3.88 (98.5)	4.88 (124.0)
6 × 6 × 1	1.12 (28.5)	1.12 (28.5)	3.62 (92.0)	8 × 8 × 4	2.88 (73.0)	2.88 (73.0)	4.88 (124.0)
6 × 4 × 6	3.62 (92.0)	3.62 (92.0)	3.62 (92.0)	...	...	...	...

GENERAL NOTE: For dimensions not given in this Table, see Table 8.2-2.

NOTES:
(1) For size designation of fitting, see section 4.
(2) For inspection tolerances, see section 8 and Table 8.2-1.

Table 8.2-7 Dimensions of Caps and Plugs



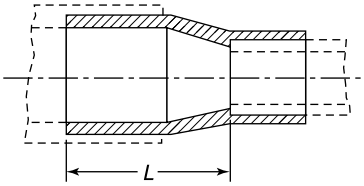
Cap C | Plug FTG | Drain Cap C

Standard Water Tube Size [Note (1)]	Caps and Plugs, Radius [Note (2)], *E*, in. (mm)
¼	0.38 (9.5)
⅜	0.50 (12.5)
½	0.62 (16.0)
¾	0.88 (22.0)
1	1.12 (28.5)
1¼	1.38 (35.0)
1½	1.62 (41.5)
2	2.12 (54.0)
2½	2.62 (66.5)
3	3.12 (79.5)
3½	3.62 (92.0)
4	4.12 (105.0)
5	5.12 (130.0)
6	6.12 (155.5)

GENERAL NOTES:
(a) For dimensions not given in this Table, see Table 8.2-2.
(b) Casting of lug or square on plugs shall be optional.

NOTES:
(1) For size designation of fitting, see section 4.
(2) Caps may have either flat or rounded top.

Table 8.2-8 Dimensions of Fitting Reducers



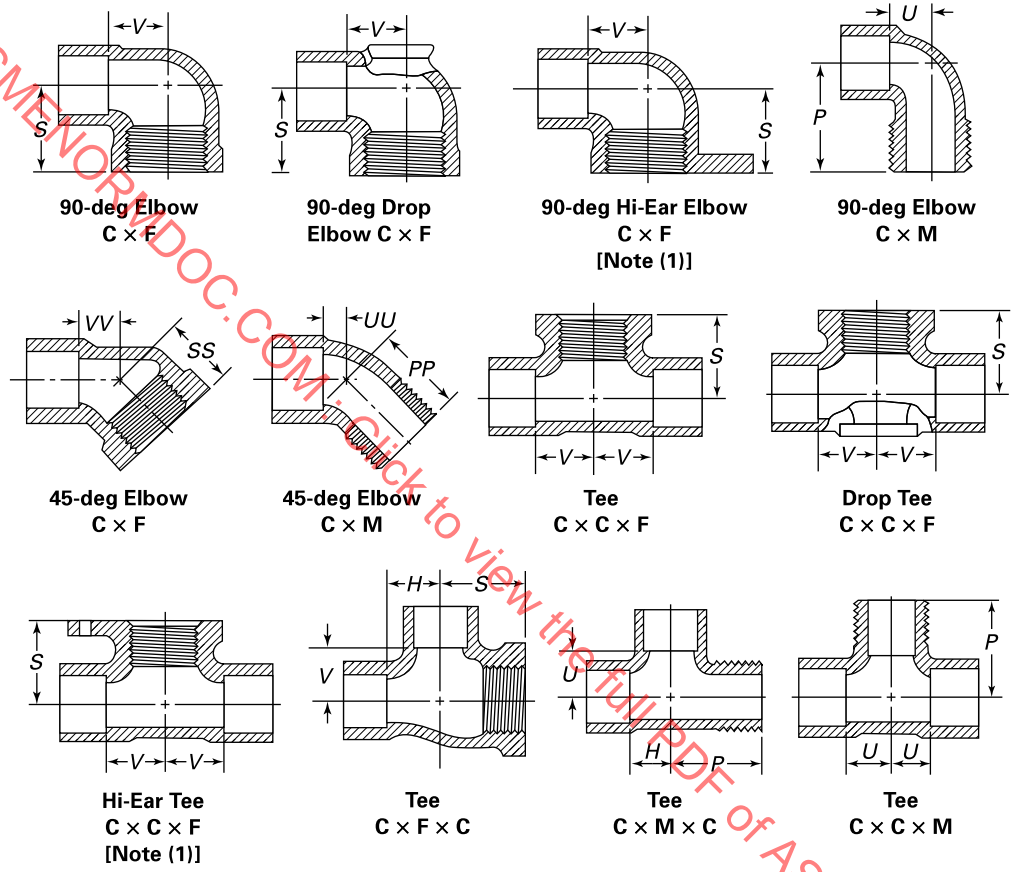
Fitting Reducer
(or Bushing)
FTG × C

Standard Water Tube Size [Note (1)]	Length, *L*, in. (mm)
3/8 × 1/4	0.69 (17.5)
1/2 × 3/8	0.94 (24.0)
1/2 × 1/4	0.94 (24.0)
3/4 × 1/2	1.19 (30.0)
3/4 × 3/8	1.25 (32.0)
1 × 3/4	1.50 (38.0)
1 × 1/2	1.50 (38.0)
1 1/4 × 1	1.62 (41.5)
1 1/4 × 3/4	1.62 (41.5)
1 1/4 × 1 1/2	1.62 (41.5)
1 1/2 × 1 1/4	1.81 (46.0)
1 1/2 × 1	1.81 (46.0)
1 1/2 × 3/4	1.81 (46.0)
2 × 1 1/2	2.12 (54.0)
2 × 1 1/4	2.12 (54.0)
2 × 1	2.12 (54.0)
2 1/2 × 2	2.38 (60.5)
2 1/2 × 1 1/2	2.38 (60.5)
2 1/2 × 1 1/4	2.38 (60.5)
3 × 2 1/2	2.62 (66.5)
3 × 2	2.62 (66.5)
3 × 1 1/2	2.62 (66.5)
4 × 3	3.44 (87.5)
4 × 2 1/2	3.44 (87.5)
4 × 2	3.44 (87.5)

GENERAL NOTE: For dimensions not given in this Table, see Table 8.2-2.

NOTE: (1) For size designation of fitting, see section 4.

Table 8.2-9 Dimensions of Solder Joint Elbows and Tees With Pipe Thread Ends (Straight Sizes)



Standard Water Tube and Pipe Thread Size [Note (2)]	Internal Threads [Note (3)]					External Threads [Note (3)]				
	Center-to-End [Note (4)]		Laying Length [Note (4)]			Center-to-End [Note (4)]		Laying Length [Note (4)]		
	Elbow and Tee, *S*, in. (mm)	45-deg Elbow, *SS*, in. (mm)	Elbow and Tee, *V*, in. (mm)	Tee, *H*, in. (mm)	45-deg Elbow, *VV*, in. (mm)	Elbow and Tee, *P*, in. (mm)	45-deg Elbow, *PP*, in. (mm)	Elbow and Tee, *U*, in. (mm)	Tee, *H*, in. (mm)	45-deg Elbow, *UU*, in. (mm)
1/4	0.56 (14.5)	...	0.38 (9.5)	...	...	0.94 (24.0)	...	0.25 (6.5)	...	...
3/8	0.69 (17.5)	0.69 (17.5)	0.44 (11.0)	0.31 (8.0)	0.19 (4.5)	1.06 (27.0)	0.81 (20.5)	0.31 (8.0)	0.31 (8.0)	0.19 (4.5)
1/2	0.88 (22.0)	0.94 (24.0)	0.56 (14.5)	0.44 (11.0)	0.19 (4.5)	1.31 (33.5)	1.00 (25.5)	0.44 (11.0)	0.44 (11.0)	0.19 (4.5)
3/4	1.00 (25.5)	1.00 (25.5)	0.69 (17.5)	0.56 (14.5)	0.25 (6.5)	1.50 (38.0)	1.19 (30.0)	0.56 (14.5)	0.56 (14.5)	0.25 (6.5)
1	1.25 (32.0)	1.19 (30.0)	0.88 (22.0)	0.75 (19.0)	0.31 (8.0)	1.64 (41.5)	1.31 (33.5)	0.75 (19.0)	0.75 (19.0)	0.31 (8.0)
1 1/4	1.50 (38.0)	...	1.00 (25.5)	0.88 (22.0)	...	2.00 (51.0)	...	0.88 (22.0)	...	...
1 1/2	1.62 (41.5)	...	1.12 (28.5)	1.00 (25.5)	...	2.19 (55.5)	...	1.00 (25.5)	...	...

Table 8.2-9 Dimensions of Solder Joint Elbows and Tees With Pipe Thread Ends (Straight Sizes) (Cont'd)

Standard Water Tube and Pipe Thread Size [Note (2)]	Internal Threads [Note (3)]					External Threads [Note (3)]				
	Center-to-End [Note (4)]		Laying Length [Note (4)]			Center-to-End [Note (4)]		Laying Length [Note (4)]		
	Elbow and Tee, *S*, in. (mm)	45-deg Elbow, *SS*, in. (mm)	Elbow and Tee, *V*, in. (mm)	Tee, *H*, in. (mm)	45-deg Elbow, *VV*, in. (mm)	Elbow and Tee, *P*, in. (mm)	45-deg Elbow, *PP*, in. (mm)	Elbow and Tee, *U*, in. (mm)	Tee, *H*, in. (mm)	45-deg Elbow, *UU*, in. (mm)
2	1.94 (49.0)	...	1.38 (35.0)	1.25 (32.0)	...	2.62 (66.5)	...	1.25 (32.0)	...	...
2½	2.50 (63.5)	...	1.62 (41.5)	...	...	...	...	...	...	...
3	2.81 (71.5)	...	1.94 (49.0)	...	...	...	...	...	...	...
4	3.44 (87.5)	...	2.44 (62.0)	...	...	...	...	...	...	...
6	4.88 (124.0)	...	3.88 (98.5)	...	...	...	...	...	...	...

GENERAL NOTES:

(a) For dimensions of threaded ends, see ASME B16.15. For configuration of threaded ends, see section 10. For dimensions of solder joint ends, see Table 8.2-2.

(b) For dimensions of reducing tees and elbows, see Table 8.2-10.

NOTES:

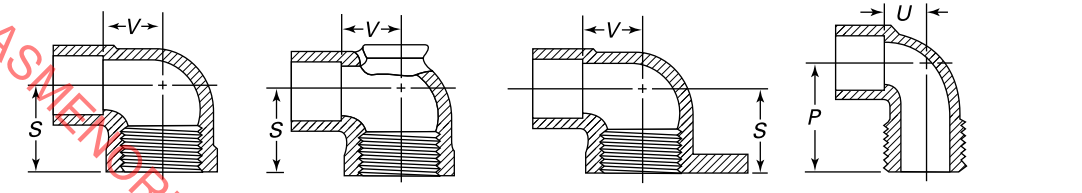
(1) Hi-ear fittings are designed for use with $^{9}/_{16}$ in. (14 mm) maximum width strap.

(2) For size designation of fitting, see section 4.

(3) For threads of threaded ends, see section 9.

(4) For inspection tolerances, see section 8 and Table 8.2-1.

Table 8.2-10 Dimensions of Solder Joint Elbows and Tees With Pipe Thread Ends (Reducing Sizes)



90-deg Elbow C × F | 90-deg Drop Elbow C × F | 90-deg Hi-Ear Elbow C × F [Note (1)] | 90-deg Elbow C × M

Tee C × C × F | Drop Tee C × C × F | Hi-Ear Tee C × C × F [Note (1)] | Tee C × F × C

Standard Water Tube and Pipe Thread Size [Note (2)]	Internal Threads [Note (3)]							External Threads [Note (3)]	
	Center-to-End, *S*			Laying Length [Note (4)] *V*			Laying Length [Note (4)] *H*	Center-to-End, *P*	Laying Length, *U* [Note (4)]
	90-deg Elbow C×F, in. (mm)	Tee C×C×F, in. (mm)	Tee C×F×C, in. (mm)	90-deg Elbow C×F, in. (mm)	Tee C×C×F, in. (mm)	Tee C×F×C, in. (mm)	Tee C×F×C, in. (mm)	90-deg Elbow C×M, in. (mm)	90-deg Elbow C×M, in. (mm)
$\frac{3}{8} \times \frac{3}{8} \times \frac{1}{2}$	...	0.81 (20.5)	...	...	0.56 (14.5)	...	...	...	...
$\frac{3}{8} \times \frac{1}{2}$	0.81 (20.5)	...	...	0.56 (14.5)	...	...	...	1.25 (32.0)	0.44 (11.0)
$\frac{1}{2} \times \frac{1}{2} \times \frac{3}{4}$	...	0.94 (23.5)	...	...	0.69 (17.5)	...	...	...	...
$\frac{1}{2} \times \frac{3}{4}$	0.94 (24.0)	...	...	0.69 (17.5)	...	...	...	1.38 (35.0)	0.56 (14.5)
$\frac{1}{2} \times \frac{1}{2} \times \frac{3}{8}$	...	0.81 (20.5)	...	...	0.50 (12.5)	...	...	...	...
$\frac{1}{2} \times \frac{3}{8}$	0.81 (20.5)	...	...	0.50 (12.5)	...	...	...	1.12 (28.5)	0.31 (8.0)
$\frac{3}{4} \times \frac{3}{4} \times 1$	...	1.12 (28.5)	...	...	0.88 (22.0)	...	...	...	...
$\frac{3}{4} \times 1$	1.12 (28.5)	...	...	0.88 (22.0)	...	...	...	1.69 (43.0)	0.75 (19.0)
$\frac{3}{4} \times \frac{3}{4} \times \frac{1}{2}$	...	0.94 (24.0)	0.94 (24.0)	...	0.56 (14.5)	0.69 (17.5)	0.44 (11.0)	...	...
$\frac{3}{4} \times \frac{1}{2}$	0.94 (24.0)	...	...	0.56 (14.5)	...	...	...	1.44 (36.5)	0.44 (11.0)
$\frac{3}{4} \times \frac{3}{4} \times \frac{3}{8}$	...	0.88 (22.0)	...	...	0.50 (12.5)	...	...	...	...
$\frac{3}{4} \times \frac{3}{8}$	0.88 (22.0)	...	...	0.50 (12.5)	...	...	...	...	...
$\frac{3}{4} \times \frac{1}{2} \times \frac{3}{4}$	...	...	0.94 (24.0)	...	...	0.56 (14.5)	0.56 (14.5)	...	...
$\frac{3}{4} \times \frac{1}{2} \times \frac{1}{2}$	...	0.94 (24.0)	0.88 (22.0)	...	0.56 (14.5)	0.56 (14.5)	0.44 (11.0)	...	...

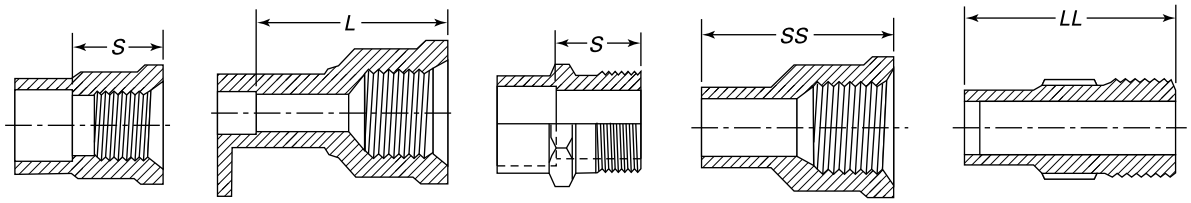
Table 8.2-10 Dimensions of Solder Joint Elbows and Tees With Pipe Thread Ends (Reducing Sizes) (Cont'd)

Standard Water Tube and Pipe Thread Size [Note (2)]	Internal Threads [Note (3)]							External Threads [Note (3)]	
	Center-to-End, *S*			Laying Length [Note (4)]				Center-to-End, *P*	Laying Length, *U* [Note (4)]
				V			*H*		
	90-deg Elbow C×F, in. (mm)	Tee C×C×F, in. (mm)	Tee C×F×C, in. (mm)	90-deg Elbow C×F, in. (mm)	Tee C×C×F, in. (mm)	Tee C×F×C, in. (mm)	Tee C×F×C, in. (mm)	90-deg Elbow C×M, in. (mm)	90-deg Elbow C×M, in. (mm)
1 × 1¼	1.38 (35.0)	...	...	1.00 (25.5)	...	...	...	...	...
1 × 1 × ¾	...	1.19 (30.0)	...	...	0.69 (17.5)	...	...	...	...
1 × ¾	1.19 (30.0)	...	...	0.69 (17.5)	...	...	...	1.62 (41.5)	0.56 (14.5)
1 × 1 × ½	...	1.12 (28.5)	...	...	0.56 (14.5)	...	...	...	...
1 × 1 × ⅜	...	1.06 (27.0)	...	...	0.50 (12.5)	...	...	...	...
1 × ¾ × 1	...	1.25 (32.0)	1.19 (30.0)	...	0.88 (22.0)	0.75 (19.0)	0.75 (19.0)	...	...
1 × ¾ × ¾	...	1.19 (30.0)	...	...	0.69 (17.5)	...	...	...	...
1 × ¾ × ½	...	1.12 (28.5)	...	...	0.56 (14.5)	...	...	...	...
1 × ½ × 1	...	...	1.12 (28.5)	...	...	0.75 (19.0)	0.75 (19.0)	...	...
1 × ½	1.12 (28.5)	...	...	0.56 (14.5)	...	...	...	...	...
1¼ × 1¼ × 1	...	1.44 (36.5)	...	...	0.88 (22.0)	...	...	...	...
1¼ × 1	1.44 (36.5)	...	...	0.88 (22.0)	...	...	...	...	...
1¼ × 1¼ × ¾	...	1.31 (33.5)	...	...	0.69 (17.5)	...	...	...	...
1¼ × 1¼ × ½	...	1.25 (32.0)	...	...	0.56 (14.5)	...	...	...	
1¼ × 1¼ × ⅜	...	1.19 (30.0)	...	...	0.50 (12.5)	...	...	...	...
1¼ × ¾ × 1	...	...	1.19 (30.0)	...	...	0.88 (22.0)	0.75 (19.0)	...	...
1½ × 1½ × 1	...	1.50 (38.0)	1.38 (35.0)	...	0.88 (22.0)	1.12 (28.5)	0.75 (19.0)	...	...
1½ × 1½ × ¾	...	1.44 (36.5)	...	...	0.69 (17.5)	...	...	...	...
1½ × 1½ × ½	...	1.38 (35.0)	...	...	0.56 (14.5)	...	...	...	...
1½ × ¾ × 1	...	...	1.19 (30.0)	...	...	1.00 (25.5)	0.75 (19.0)	...	...
2 × 2 × 1½	...	1.88 (47.5)	...	...	1.12 (28.5)	...	...	...	...
2 × 2 × 1	...	1.75 (44.5)	...	...	0.88 (22.0)	...	...	...	...
2 × 2 × ¾	...	1.69 (43.0)	...	...	0.69 (17.5)	...	...	...	...
2 × 2 × ½	...	1.62 (41.5)	...	...	0.56 (14.5)	...	...	...	...
2½ × 2½ × ¾	...	2.06 (52.5)	...	...	0.69 (17.5)	...	...	...	...

GENERAL NOTE: For dimensions of threaded ends, see ASME B16.15. For configuration of threaded ends, see section 10. For dimensions of solder joint ends, see Table 8.2-2.

NOTES:
(1) Hi-ear fittings are designed for use with $^{9}/_{16}$ in. (14 mm) maximum width strap.
(2) For size designation of fitting, see section 4.
(3) For threads of threaded ends, see section 9.
(4) For inspection tolerance, see section 8 and Table 8.2-1.

Table 8.2-11 Dimensions of Solder Joint Adapters and Fitting Adapters With Pipe Thread Ends (Straight and Reducing Sizes)



Adapter C × F | Hi-Ear Adapter C × F [Note (1)] | Adapter C × M | Fitting Adapter FTG × F | Fitting Adapter FTG × M

Standard Water Tube and Pipe Thread Size [Note (2)]			End-to-End		
Solder Joint	Pipe Thread	Shoulder-to-End, *S*, in. (mm)	*SS*, in. (mm)	*LL*, in. (mm)	End-to-Tube Stop, *L*, in. (mm)
1/4	3/8	0.62 (16.0)	...	...	...
1/4	1/4	0.62 (16.0)	...	1.00 (25.5)	...
3/8	1/2	0.75 (19.0)	...	1.25 (32.0)	...
3/8	3/8	0.62 (16.0)	1.06 (27.0)	1.12 (28.5)	...
1/2	1	1.00 (25.5)	...	...	...
1/2	3/4	0.88 (22.0)	1.44 (36.5)	1.47 (37.5)	...
1/2	1/2	0.75 (18.0)	1.38 (35.0)	1.38 (35.0)	1.25 (32.0)
1/2	3/8	0.62 (16.0)	1.22 (31.0)	1.25 (32.0)	...
3/4	1	1.00 (25.5)	1.81 (46.0)	1.91 (48.5)	...
3/4	3/4	0.88 (22.0)	1.66 (42.0)	1.72 (43.5)	...
3/4	1/2	0.75 (19.0)	1.62 (41.5)	1.62 (41.5)	...
1	1 1/4	1.06 (27.0)	2.09 (53.0)	2.16 (55.0)	...
1	1	1.00 (25.5)	1.97 (50.0)	2.09 (53.0)	...
1	3/4	0.88 (22.0)	1.81 (46.0)	1.91 (48.5)	...
1 1/4	2	1.12 (28.5)	...	2.38 (60.5)	...
1 1/4	1 1/2	1.06 (27.0)	2.22 (56.5)	2.28 (58.0)	...
1 1/4	1 1/4	1.06 (27.0)	2.03 (51.5)	2.22 (56.5)	...
1 1/4	1	1.06 (27.0)	2.03 (51.5)	2.12 (54.0)	...
1 1/2	2	1.12 (28.5)	...	2.50 (63.5)	...
1 1/2	1 1/2	1.06 (27.0)	2.22 (56.5)	2.41 (61.0)	...
1 1/2	1 1/4	1.06 (27.0)	2.22 (56.5)	2.34 (59.5)	...
1 1/2	1	1.00 (25.5)	...	2.25 (57.0)	...
2	2	1.12 (28.5)	2.53 (64.5)	2.75 (70.0)	...
2	1 1/2	1.12 (28.5)	...	2.66 (67.5)	...
2 1/2	2 1/2	1.38 (35.0)	3.09 (78.5)	3.12 (79.5)	...
3	3	1.50 (38.0)	3.22 (82.0)	3.41 (86.5)	...
4	4	1.69 (43.0)	3.81 (97.0)	4.12 (105.0)	...
6	6	2.00 (50.5)	5.34 (135.5)	5.75 (146.0)	...
8	8	2.25 (57.0)	...	...	...

GENERAL NOTES:
(a) For threaded ends, see section 9.

Table 8.2-11 Dimensions of Solder Joint Adapters and Fitting Adapters With Pipe Thread Ends (Straight and Reducing Sizes) (Cont'd)

GENERAL NOTES (Cont'd):

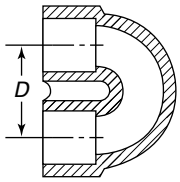
(b) For dimensions of threaded ends, see ASME B16.15, Class 125. For sizes not listed in ASME B16.15, Class 125, refer to ASME B16.3, Class 150. For configuration of threaded ends, see section 10. For dimensions of solder joint ends, see Table 8.2-2.

NOTES:

(1) Hi-ear fittings are designed for use with $^{9}/_{16}$ in. (14 mm) maximum width strap.

(2) For size designation of fitting, see section 4.

Table 8.2-12 Dimensions of Return Bends (Straight Sizes)



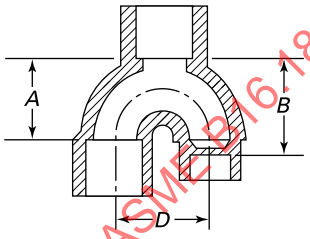
Return Bend
C × C

Standard Water Tube Size [Note (1)]	Center-to-Center, *D*, in. (mm)
½	1.00 (25.5)
¾	1.31 (33.5)
1	1.88 (47.5)
1¼	2.00 (51.0)
1½	2.50 (63.5)
2	3.00 (76.0)
3	4.00 (101.5)
4	5.00 (127.0)

GENERAL NOTE: For dimensions not given in this Table, see Table 8.2-2.

NOTE: (1) For size designation of fitting, see section 4.

Table 8.2-13 Dimensions of Supply and Return Tees



Supply and Return Tee
C × C × C

Standard Water Tube Size [Note (1)]	Laying Lengths		Center-to-Center, *D*, in. (mm)
	A, in. (mm)	*B*, in. (mm)	
½	0.81 (20.5)	0.81 (20.5)	1.00 (25.5)
¾	1.09 (28.0)	1.09 (28.0)	1.31 (33.5)
¾ × ¾ × ½	1.09 (28.0)	1.09 (28.0)	1.31 (33.5)
¾ × ½ × ½	1.09 (28.0)	1.28 (32.5)	1.31 (33.5)

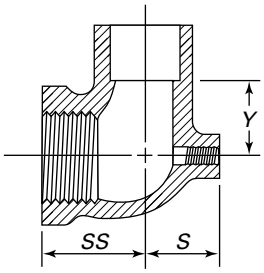
GENERAL NOTES:

(a) For dimensions not given in this Table, see Table 8.2-2.

(b) For inspection tolerances, see section 8 and Table 8.2-1.

NOTE: (1) For size designation of fittings, see section 4.

Table 8.2-14 Dimensions of Baseboard Tees (F × F × C)



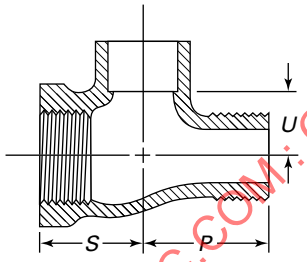
Baseboard Tee
F × F × C

Standard Water Tube Size [Note (1)]	Laying Lengths		
	SS, in. (mm)	*S*, in. (mm)	*Y*, in. (mm)
½ × ⅛ × 1	1.12 (28.5)	0.81 (20.5)	0.56 (14.5)
½ × ⅛ × ¾	0.94 (24.0)	0.69 (17.5)	0.56 (14.5)
¾ × ⅛ × 1	1.19 (30.0)	0.81 (20.5)	0.69 (17.5)
¾ × ⅛ × ¾	1.00 (25.5)	0.69 (17.5)	0.69 (17.5)
1¼ × ⅛ × 1¼	1.84 (47.0)	0.94 (24.0)	0.88 (22.0)

GENERAL NOTES:
(a) For dimensions not given in this Table, see Table 8.2-2.
(b) For inspection tolerances, see section 8 and Table 8.2-1.

NOTE: (1) For size designation of fittings, see section 4.

Table 8.2-15 Dimensions of Tees



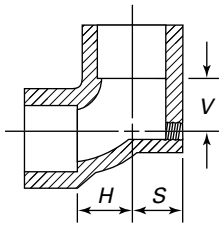
Tee
F × M × C

Standard Water Tube Size [Note (1)]	Laying Lengths		
	U, in. (mm)	*P*, in. (mm)	*S*, in. (mm)
½ × ¾ × ½	0.69 (17.5)	1.22 (31.0)	0.97 (24.5)
¾	0.69 (17.5)	1.34 (34.0)	1.00 (25.5)
¾ × ¾ × ½	0.69 (17.5)	1.22 (31.0)	0.97 (24.5)

GENERAL NOTES:
(a) For dimensions not given in this Table, see Table 8.2-2.
(b) For inspection tolerances, see section 8 and Table 8.2-1.

NOTE: (1) For size designation of fittings, see section 4.

Table 8.2-16 Dimensions of Baseboard Tees (C × F × C)



Baseboard Tee
C × F × C

Standard Water Tube Size [Note (1)]	Laying Lengths		
	H, in. (mm)	*S*, in. (mm)	*V*, in. (mm)
⅜ × ⅛ × ⅜	0.59 (15.0)	0.97 (24.5)	0.59 (15.0)
½ × ⅛ × 1	0.75 (19.0)	0.81 (20.5)	0.44 (11.0)
½ × ⅛ × ¾	0.56 (14.5)	0.69 (17.5)	0.44 (11.0)
½ × ⅛ × ½	0.44 (11.0)	0.56 (14.5)	0.44 (11.0)
¾ × ⅛ × 1¼	0.81 (20.5)	0.94 (24.0)	0.56 (14.5)
¾ × ⅛ × 1	0.75 (19.0)	0.81 (20.5)	0.62 (16.0)
¾ × ⅛ × ¾	0.56 (11.0)	0.69 (17.5)	0.56 (11.0)
1 × ⅛ × 1	0.72 (18.0)	0.75 (19.0)	0.72 (15.0)
1¼ × ⅛ × 1¼	0.88 (22.0)	0.94 (24.0)	0.88 (22.0)

GENERAL NOTES:
(a) For dimensions not given in this Table, see Table 8.2-2.
(b) For inspection tolerances, see section 8 and Table 8.2-1.

NOTE: (1) For size designation of fittings, see section 4.