

ASME B16.4-2021
(Revision of ASME B16.4-2016)

Gray Iron Threaded Fittings

Classes 125 and 250

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AN AMERICAN NATIONAL STANDARD



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Two Park Avenue • New York, NY • 10016 USA

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CONTENTS

Foreword	iv
Committee Roster	vi
Correspondence With the B16 Committee	vii
Summary of Changes	ix
List of Changes in Record Number Order	x
1 Scope	1
2 General	1
3 Pressure-Temperature Ratings	1
4 Size	2
5 Marking	2
6 Material	2
7 Dimensions and Tolerances	2
8 Threading	3
9 Ribs	3
10 Plugs, Bushings, and Locknuts	3
11 Face Bevel	3
12 Coatings	3
Mandatory Appendix	
I References	14
Nonmandatory Appendix	
A Quality System Program	15
Figures	
4.2-1 Identification of Reducing Fittings	2
8-1 Gaging of Chamfered Internal Threads	13
Tables	
3-1 Pressure-Temperature Ratings	2
7.1-1 Dimensions of Class 125 90-deg and 45-deg Elbows, Tees, and Crosses (Straight Sizes)	4
7.1-2 Dimensions of Class 125 90-deg Elbows and Crosses (Reducing Sizes)	5
7.1-3 Dimensions of Class 125 Tees (Reducing Sizes)	7
7.1-4 Dimensions of Class 125 Caps, Reducing Couplings, and Closed- and Open-Pattern Return Bends	10
7.1-5 Dimensions of Class 250 90-deg and 45-deg Elbows, Tees, and Crosses (Straight Sizes)	12
7.3-1 Inspection Tolerances	13

FOREWORD

In the spring of 1921, when the unification and extension of the flanged and threaded fittings standards in force in the United States seemed desirable, the American Engineering Standards Committee [subsequently the American Standards Association (ASA) and currently the American National Standards Institute (ANSI)] authorized the organization of a Sectional Committee on the Standardization of Pipe Flanges and Flanged Fittings. The following organizations served as joint sponsors: Heating, Piping, and Air Conditioning Contractors National Association (later the Mechanical Contractors Association of America), Manufacturers Standardization Society of the Valve and Fittings Industry, and the American Society of Mechanical Engineers.

At the second meeting of the Sectional Committee held in New York on December 16, 1921, a report was submitted by the Subcommittee on Threaded Fittings. The report indicated clearly that good progress was already being made toward the development of an American Standard for cast iron threaded fittings intended for services of 125-lb and 250-lb steam pressure. The review of the proposals of the manufacturer's Committee of Five was assigned to the Subcommittee on Threaded Fittings, and after a thorough study, it made its report to the Sectional Committee. The Standard was finally completed, approved, and published in December 1927 with the designation ASA B16d-1927.

To bring this Standard in line with the best current practice, a revision was begun in September 1936, providing for hydraulic service ratings, material specifications, tolerances on alignment, threading of fittings, and dimensions of some additional sizes, as well as dimensional tables covering reducing couplings, caps, and closed- and open-pattern return bends. The revision was approved in March 1941.

The Standard was reviewed in 1947 and was approved by the Sectional Committee. Following approval of the sponsor bodies, the Standard was presented for approval as an American Standard. It received that approval in December 1949 and was given the new designation ASA B16.4-1949.

A review was started in 1961 by Subcommittee 2. A draft involving only minor changes was approved by the Sectional Committee and sponsor bodies. Final ASA approval was granted on December 26, 1963.

As the changes in organization occurred and standards designation increased, Subcommittee 2 began a review in 1968. Minor changes included updating references and bringing the Standard into conformance with adopted policies of the B16 Committee. Final approval was granted by ANSI on January 20, 1971.

In 1975, Subcommittee B (formerly Subcommittee 2), in its regular five-year review of the document, recommended the addition of metric (SI) equivalents and updating of referenced standards. The revised edition received approval by ANSI on August 30, 1977.

In 1982, American National Standards Committee B16 became the ASME B16 Standards Committee, operating with the same scope under ASME procedures accredited by ANSI. A new revision of the Standard, including rationalization of metric equivalent dimensions and updating of referenced standards, was approved and published as ANSI/ASME B16.4-1985.

The 1992 edition of B16.4 omitted metric units, established U.S. customary units as the standard, and provided for electrodeposition as an alternative to hot dipping for zinc coating. Editorial revisions were made to clarify and correct the text. Following approval by the Standards Committee and ASME, ASME B16.4-1992 was approved as an American National Standard on December 2, 1992.

In the 1998 edition of ASME B16.4, the list of referenced standards was updated, a Quality System Program Annex added, an issued interpretation included, and several editorial revisions made. Following approval by the ASME B16 Subcommittee B and the ASME B16 Standards Committee, ANSI approved ASME B16.4-1998 as an American National Standard on November 20, 1998.

Work started during 1999 to revise the Standard to include metric units as the primary reference units while maintaining U.S. Customary units in either parenthetical or separate forms. Following approval by the Standards Committee and the ASME Board, ASME B16.4-2006 was approved as an American National Standard by ANSI on November 9, 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. The 2011 edition also established that materials manufactured to other editions of the referenced ASTM standards may 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 Pressure Technology Codes and Standards, ASME B16.4-2011 was approved by ANSI on August 9, 2011.

In the 2016 edition, section 7 was revised. Following approval by the ASME B16 Standards Committee, ASME B16.4-2016 was approved by ANSI on September 23, 2016.

In ASME B16.4-2021, the U.S. Customary tables in former Mandatory Appendix I have been merged with the SI tables in the main text. The tables and figures have been redesignated, former Mandatory Appendix I has been deleted, and former Mandatory Appendix II has been redesignated. Cross-references have been updated accordingly. Also, [Mandatory Appendix I](#) (former Mandatory Appendix II) has been updated. Following approval by the ASME B16 Standards Committee, ASME B16.4-2021 was approved by ANSI on November 12, 2021.

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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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J. R. Holstrom , Val-Matic Valve and Manufacturing Corp.	B. G. Fabian , <i>Contributing Member</i> , Pennsylvania Machine Works
D. H. Hunt, Jr. , Fastenal	A. G. Kireta, Jr. , <i>Contributing Member</i> , Copper Development Association, Inc.
G. A. Jolly , Samshin, Ltd.	
E. J. Lain , Exelon Nuclear	

SUBCOMMITTEE B — THREADED FITTINGS (EXCEPT STEEL), FLANGES, AND FLANGED FITTINGS

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J. R. Holstrom , <i>Vice Chair</i> , Val-Matic Valve and Manufacturing Corp.	R. Kelsey , NIBCO, Inc.
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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.

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ASME B16.4-2021

SUMMARY OF CHANGES

Following approval by the ASME B16 Standards Committee and ASME, and after public review, ASME B16.4-2021 was approved by the American National Standards Institute on November 12, 2021.

In ASME B16.4-2021, the U.S. Customary tables in former Mandatory Appendix I have been merged with the SI tables in the main text. The tables and figures have been redesignated, former Mandatory Appendix I has been deleted, and former Mandatory Appendix II has been redesignated. Cross-references have been updated accordingly. In addition, this edition includes the following change identified by a margin note, **(21)**. The Record Number listed below is explained in more detail in the “List of Changes in Record Number Order” following this Summary of Changes.

<i>Page</i>	<i>Location</i>	<i>Change (Record Number)</i>
14	Mandatory Appendix I	Former Mandatory Appendix II updated (21-620)

LIST OF CHANGES IN RECORD NUMBER ORDER

Record Number	Change
21-620	Updated references in Mandatory Appendix I (former Mandatory Appendix II).

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GRAY IRON THREADED FITTINGS

Classes 125 and 250

1 SCOPE

This Standard for gray iron threaded fittings, Classes 125 and 250, covers

- (a) pressure-temperature ratings
- (b) sizes and method of designating openings of reducing fittings
- (c) marking
- (d) material
- (e) dimensions and tolerances
- (f) threading
- (g) coatings

2 GENERAL

2.1 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 in the text the specific edition of each referenced standard and specification. Instead, the specific editions of the referenced standards and specifications are listed in [Mandatory Appendix I](#).

2.2 Quality Systems

Requirements relating to the product manufacturers' quality system programs are described in [Nonmandatory Appendix A](#).

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. In this Standard, 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 this Standard.

2.4 Service Conditions

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

2.5 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.

2.6 Denotation

2.6.1 Pressure Rating Designation. Class, followed by a dimensionless number, is the designation for pressure-temperature ratings as follows:

- (a) Class 125
- (b) Class 250

2.6.2 Size. NPS, followed by a dimensionless number, is the designation for nominal fitting size. NPS is related to the reference nominal diameter, DN, used in international standards. The relationship is, typically, as follows:

NPS	DN
1	25
1 $\frac{1}{4}$	32
1 $\frac{1}{2}$	40
2	50
2 $\frac{1}{2}$	65
3	80
3 $\frac{1}{2}$	...
4	100

GENERAL NOTE: For $NPS \geq 4$, the related $DN = 25 \times NPS$.

3 PRESSURE-TEMPERATURE RATINGS

(a) Pressure-temperature ratings for these fittings are shown in [Table 3-1](#).

(b) All ratings are independent of the contained fluid and are the maximum allowable working gage pressures at the tabulated temperatures. Intermediate ratings may be obtained by linear interpolation between the temperatures shown.

Table 3-1
Pressure-Temperature Ratings

Temperature, °C (°F)	Working Pressure, bar (psi)	
	Class 125	Class 250
-29 to 66 (-20 to 150)	12.1 (175)	27.6 (400)
100 (200)	11.1 (165)	25.0 (370)
125 (250)	10.2 (150)	23.1 (340)
150 (300)	9.8 (140)	21.2 (310)
175 (350)	8.7 (125) [Note (1)]	19.4 (300)
200 (400)	...	17.5 (250) [Note (2)]

NOTES:

- (1) Permissible for service temperature up to 178°C (353°F), reflecting the temperature of saturated steam at 8.6 bar (125 psi).
 (2) Permissible for service temperature up to 208°C (406°F), reflecting the temperature of saturated steam at 17.2 bar (250 psi).

(c) The temperatures shown for the corresponding pressure rating shall be the material temperature of the pressure-retaining structure. It may be assumed that the material temperature is the same as the fluid temperature. Use of a pressure rating at a material temperature other than that of the contained fluid is the responsibility of the user and subject to the requirements of any applicable code.

4 SIZE

4.1 Nominal Pipe Size

As applied in this Standard, the use of the phrase “nominal pipe size” or the designation NPS followed by a dimensionless number is for the purpose of identifying the end connection of fittings. The number is not necessarily the same as the fitting inside diameter.

4.2 Reducing Fittings

For reducing tees and crosses, the size of the largest run opening shall be given first, followed by the size of the opening at the opposite end of the run. Where the fitting is a tee, the size of the outlet is given last. Where the fitting is a cross, the largest side-outlet opening is the third dimension given, followed by the opposite opening. The straight-line sketches of Figure 4.2-1 illustrate how the reducing fittings are read.

5 MARKING

(a) Each Class 125 fitting shall be marked for identification with the manufacturer’s name or trademark.

(b) Each Class 250 fitting shall be marked for identification with

- (1) the manufacturer’s name or trademark
 (2) the numeral “250”

6 MATERIAL

Castings shall be produced to meet the requirements of ASTM A126, Class A, B, or C. The manufacturer shall be prepared to certify that the product has been so produced and that the chemical and physical properties thereof, as proved by test specimens, are equal to these requirements.

7 DIMENSIONS AND TOLERANCES

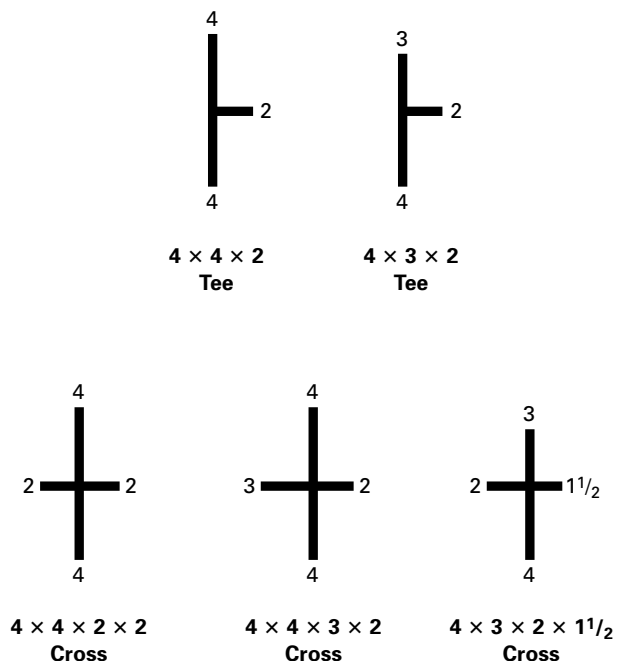
7.1 General

Center-to-end dimensions in millimeters are given for standard straight and reducing fittings in Tables 7.1-1 through 7.1-5. The sketches of fittings that accompany the tables are representative and for the purpose of illustration.

7.2 Reducing Fittings

7.2.1 The dimensions of reduced fittings shown in Tables 7.1-2 and 7.1-3 are for use only when making patterns for the specific reducing fitting in question and do not apply when a larger size pattern is reduced (i.e., “bushed”) to make the reduction or reductions in

Figure 4.2-1
Identification of Reducing Fittings



the fitting. Reducing pipe fitting patterns shall be designed to produce wall thicknesses, detail, and dimensions as required for the sizes involved.

7.2.2 The transition in wall thickness from one end size to another shall be in a manner that minimizes the addition of stress caused by sudden changes in direction or wall thickness.

7.2.3 Proof of design shall be verified by a hydrostatic pressure test made at ambient temperature in which pressure is applied continuously for no less than 1 min and at no less than 5 times the pressure rating of the largest size of end connection in the reducing fitting. Testing is considered successful only when no evidence of cracking, fracturing, or leakage is exhibited after holding for at least the minimum time at or above the required pressure.

7.3 Tolerances

The following tolerances shall be permitted:

(a) *Metal Thickness Tolerances.* At no point in the castings shall the metal thickness be less than 90% of the value given in Table 7.1-1, 7.1-4, or 7.1-5.

(b) *Center-to-End Tolerances.* Permitted tolerances on the center-to-end dimensions of the fittings are shown in Table 7.3-1. Tolerances for end-to-end dimensions and lengths of couplings and reducers shall be twice those given. The largest opening in a reducing fitting governs the tolerances to be applied to all openings. These tolerances do not apply to return bends and caps.

8 THREADING

(a) All fittings shall be threaded according to ASME B1.20.1, and the variations in threading shall be limited to one turn large or one turn small from the gaging notch on the plug when using working gages.

(b) The reference point for gaging internal fittings threads depends on the chamfer diameter. When the internal chamfer diameter exceeds the major diameter of the internal thread, the reference point is the last thread scratch on the chamfer cone. When the internal chamfer diameter does not exceed the major diameter of the internal thread, the reference point is the end of the fitting (see Figure 8-1).

(c) For the purpose of easier entrance in making a joint and for protection of the thread, all threads shall be countersunk a distance of not less than one-half the pitch of the thread at an angle of approximately 45 deg with the axis of the thread. Countersinking shall be concentric with the threads.

(d) The length of the threads specified in all tables shall be measured to include the countersink.

(e) The maximum allowable variation in the alignment of threads of all openings of threaded fittings shall be 5.0 mm/m (0.06 in./ft) (0.5% slope).

9 RIBS

(a) The addition of ribs or lugs is permitted on threaded fittings. Where ribs are used, it is recommended that their thickness be the same as specified for metal thickness of the fitting.

(b) Right-hand couplings shall have not more than two ribs.

(c) Right- and left-hand couplings shall have four or more ribs unless the left-hand opening is clearly marked, in which case the use of ribs is at the discretion of the manufacturer.

10 PLUGS, BUSHINGS, AND LOCKNUTS

For dimensions of plugs, bushings, and locknuts to be used in connection with Classes 125 and 250 gray iron threaded fittings, see ASME B16.14.

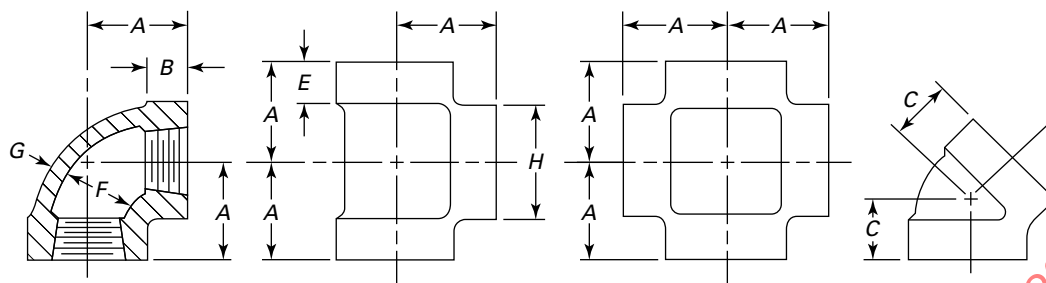
11 FACE BEVEL

A bevel not exceeding 5 deg is permitted on the faces of fitting openings. Center-to-end, end-to-end, and width-of-band dimensions may include or exclude the bevel.

12 COATINGS

When gray iron fittings are zinc coated, they shall be hot dipped in accordance with ASTM A153/A153M or have an electrodeposited zinc coating conforming to ASTM B633, Type I, Service Condition 4. Hot-dipped coatings shall have a minimum thickness of 0.0864 mm (0.0034 in.) and shall be applied before threading. Electrodeposited zinc shall have a minimum thickness of 0.025 mm (0.001 in.) and may be applied either before or after threading.

Table 7.1-1
Dimensions of Class 125 90-deg and 45-deg Elbows, Tees, and Crosses (Straight Sizes)

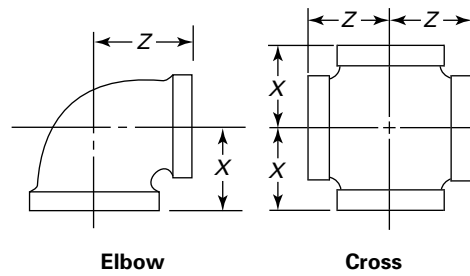


90-deg Elbow			Tee		Cross		45-deg Elbow	
NPS	Center-to-End Elbows, Tees, and Crosses, <i>A</i> [Note (1)]	Center-to-End, 45-deg Elbows, <i>C</i>	Minimum Length of Thread, <i>B</i>	Minimum Width of Band, <i>E</i>	Inside Diameter of Fitting, <i>F</i>		Metal Thickness, <i>G</i>	Minimum Outside Diameter of Band, <i>H</i>
					Min.	Max.		
1/4	20.5 (0.81)	18.5 (0.73)	8.0 (0.32)	9.0 (0.38)	13.7 (0.54)	14.8 (0.58)	3.0 (0.11)	24 (0.93)
3/8	24.0 (0.95)	20.5 (0.80)	9.0 (0.36)	11.0 (0.44)	17.1 (0.67)	18.3 (0.72)	3.0 (0.12)	28 (1.12)
1/2	28.5 (1.12)	22.5 (0.88)	11.0 (0.43)	12.5 (0.50)	21.3 (0.84)	22.8 (0.90)	3.5 (0.13)	34 (1.34)
3/4	33.5 (1.31)	25.0 (0.98)	12.5 (0.50)	14.0 (0.56)	26.7 (1.05)	28.1 (1.11)	4.0 (0.15)	41 (1.63)
1	38.0 (1.50)	28.5 (1.12)	14.5 (0.58)	15.5 (0.62)	33.4 (1.31)	35.2 (1.38)	4.5 (0.17)	50 (1.95)
1 1/4	44.5 (1.75)	33.0 (1.29)	17.0 (0.67)	17.5 (0.69)	42.2 (1.66)	43.9 (1.73)	4.5 (0.18)	61 (2.39)
1 1/2	49.5 (1.94)	36.5 (1.43)	18.0 (0.70)	19.0 (0.75)	48.3 (1.90)	50.0 (1.97)	5.0 (0.20)	68 (2.68)
2	57.0 (2.25)	42.5 (1.68)	19.0 (0.75)	21.5 (0.84)	60.3 (2.37)	62.1 (2.44)	5.5 (0.22)	83 (3.28)
2 1/2	68.5 (2.70)	49.5 (1.95)	23.5 (0.92)	24.0 (0.94)	73.0 (2.87)	75.6 (2.97)	6.0 (0.24)	98 (3.86)
3	78.0 (3.08)	55.0 (2.17)	25.0 (0.98)	25.5 (1.00)	88.9 (3.50)	91.4 (3.60)	6.5 (0.26)	117 (4.62)
3 1/2	87.0 (3.42)	60.5 (2.39)	26.0 (1.03)	27.0 (1.06)	101.6 (4.00)	104.1 (4.10)	7.0 (0.28)	132 (5.20)
4	96.5 (3.79)	66.5 (2.61)	27.5 (1.08)	28.5 (1.12)	114.4 (4.50)	116.8 (4.60)	8.0 (0.31)	147 (5.79)
5	114.5 (4.50)	77.5 (3.05)	30.0 (1.18)	30.0 (1.18)	141.3 (5.56)	143.8 (5.66)	9.5 (0.38)	179 (7.05)
6	130.5 (5.13)	88.0 (3.46)	31.5 (1.28)	31.5 (1.28)	168.3 (6.62)	170.8 (6.72)	11.0 (0.43)	210 (8.28)
8	166.5 (6.56)	108.5 (4.28)	37.5 (1.47)	37.5 (1.47)	219.2 (8.62)	221.7 (8.72)	14.0 (0.55)	270 (10.63)
10	205.0 (8.08)	131.0 (5.16)	42.5 (1.68)	42.5 (1.68)	273.1 (10.75)	275.6 (10.85)	17.5 (0.69)	333 (13.12)
12	241.5 (9.50)	151.5 (5.97)	48.0 (1.88)	48.0 (1.88)	323.8 (12.75)	326.4 (12.85)	20.5 (0.80)	393 (15.47)

GENERAL NOTE: Dimensions are in millimeters (inches).

NOTE: (1) Dimensions for reducing elbows and reducing crosses are given in Table 7.1-2 and reducing tees in Table 7.1-3.

Table 7.1-2
Dimensions of Class 125 90-deg Elbows and Crosses (Reducing Sizes)



Elbows			Crosses		
NPS	Center-to-End		NPS	Center-to-End	
	X	Z		X	Z
$\frac{1}{2} \times \frac{3}{8}$	26.5 (1.04)	26.0 (1.03)	$\frac{3}{4} \times \frac{3}{4} \times \frac{1}{2} \times \frac{1}{2}$	30.5 (1.20)	31.0 (1.22)
$\frac{3}{4} \times \frac{1}{2}$	30.5 (1.20)	31.0 (1.22)	$1 \times 1 \times \frac{3}{4} \times \frac{3}{4}$	35.0 (1.37)	37.0 (1.45)
$1 \times \frac{3}{4}$	35.0 (1.37)	37.0 (1.45)	$1\frac{1}{4} \times 1\frac{1}{4} \times 1 \times 1$	40.0 (1.58)	42.5 (1.67)
$1 \times \frac{1}{2}$	32.0 (1.26)	35.5 (1.36)	$1\frac{1}{4} \times 1\frac{1}{4} \times \frac{3}{4} \times \frac{3}{4}$	37.0 (1.45)	41.0 (1.62)
$1\frac{1}{4} \times 1$	40.0 (1.58)	42.5 (1.67)	$1\frac{1}{2} \times 1\frac{1}{2} \times 1\frac{1}{4} \times 1\frac{1}{4}$	46.0 (1.82)	48.0 (1.88)
$1\frac{1}{4} \times \frac{3}{4}$	36.0 (1.45)	41.0 (1.62)	$1\frac{1}{2} \times 1\frac{1}{2} \times 1 \times 1$	42.0 (1.65)	45.5 (1.80)
$1\frac{1}{4} \times \frac{1}{2}$	34.0 (1.34)	39.0 (1.53)	$1\frac{1}{2} \times 1\frac{1}{2} \times \frac{3}{4} \times \frac{3}{4}$	38.5 (1.52)	44.5 (1.75)
$1\frac{1}{2} \times 1\frac{1}{4}$	46.0 (1.82)	48.0 (1.88)	$2 \times 2 \times 1\frac{1}{2} \times 1\frac{1}{2}$	51.5 (2.02)	55.0 (2.16)
$1\frac{1}{2} \times 1$	42.0 (1.65)	45.5 (1.80)	$2 \times 2 \times 1\frac{1}{4} \times 1\frac{1}{4}$	48.5 (1.90)	53.5 (2.10)
$1\frac{1}{2} \times \frac{3}{4}$	38.5 (1.52)	44.5 (1.75)	$2 \times 2 \times 1 \times 1$	44.0 (1.73)	51.5 (2.02)
$1\frac{1}{2} \times \frac{1}{2}$	36.0 (1.41)	42.5 (1.66)	$2 \times 2 \times \frac{3}{4} \times \frac{3}{4}$	40.5 (1.60)	50.0 (1.97)
$2 \times 1\frac{1}{2}$	51.5 (2.02)	55.0 (2.16)	$2\frac{1}{2} \times 2\frac{1}{2} \times 2 \times 2$	60.5 (2.39)	56.0 (2.60)
$2 \times 1\frac{1}{4}$	48.5 (1.90)	53.5 (2.10)	$2\frac{1}{2} \times 2\frac{1}{2} \times 1\frac{1}{2} \times 1\frac{1}{2}$	55.0 (2.16)	64.0 (2.51)
2×1	44.0 (1.73)	51.5 (2.02)	$2\frac{1}{2} \times 2\frac{1}{2} \times 1\frac{1}{4} \times 1\frac{1}{4}$	52.0 (2.04)	62.0 (2.45)
$2 \times \frac{3}{4}$	40.5 (1.60)	50.0 (1.97)	$2\frac{1}{2} \times 2\frac{1}{2} \times 1 \times 1$	47.5 (1.87)	60.0 (2.37)
$2 \times \frac{1}{2}$	38.0 (1.49)	48.0 (1.88)	$3 \times 3 \times 2 \times 2$	65.5 (2.57)	73.5 (2.89)
$2\frac{1}{2} \times 2$	60.5 (2.39)	66.0 (2.60)	$3 \times 3 \times 1\frac{1}{2} \times 1\frac{1}{2}$	58.0 (2.29)	71.0 (2.80)
$2\frac{1}{2} \times 1\frac{1}{2}$	55.0 (2.16)	64.0 (2.51)	$3 \times 3 \times 1\frac{1}{4} \times 1\frac{1}{4}$	55.0 (2.17)	69.5 (2.74)
$2\frac{1}{2} \times 1\frac{1}{4}$	52.0 (2.04)	62.0 (2.45)	$3 \times 3 \times 1 \times 1$	51.0 (2.00)	67.5 (2.66)
$2\frac{1}{2} \times 1$	47.5 (1.87)	60.0 (2.37)	$3\frac{1}{2} \times 3\frac{1}{2} \times 2\frac{1}{2} \times 2\frac{1}{2}$	74.5 (2.93)	82.5 (3.24)
$3 \times 2\frac{1}{2}$	72.0 (2.83)	76.0 (2.99)	$3\frac{1}{2} \times 3\frac{1}{2} \times 2 \times 2$	66.5 (2.62)	80.0 (3.14)
3×2	64.0 (2.52)	73.5 (2.89)	$3\frac{1}{2} \times 3\frac{1}{2} \times 1\frac{1}{2} \times 1\frac{1}{2}$	60.5 (2.39)	77.5 (3.05)
$3 \times 1\frac{1}{2}$	58.0 (2.29)	71.0 (2.80)	$4 \times 4 \times 3 \times 3$	84.0 (3.30)	91.5 (3.60)
$3 \times 1\frac{1}{4}$	55.0 (2.17)	69.5 (2.74)	$4 \times 4 \times 2\frac{1}{2} \times 2\frac{1}{2}$	77.5 (3.05)	89.0 (3.51)
$3\frac{1}{2} \times 3$	81.0 (3.18)	84.5 (3.33)	$4 \times 4 \times 2 \times 2$	69.5 (2.74)	86.5 (3.41)
$4 \times 3\frac{1}{2}$	90.0 (3.54)	93.5 (3.69)	$4 \times 4 \times 1\frac{1}{2} \times 1\frac{1}{2}$	63.5 (2.51)	84.5 (3.32)
4×3	84.0 (3.30)	91.5 (3.60)	$5 \times 5 \times 4 \times 4$	101.5 (4.00)	112.0 (4.41)
$4 \times 2\frac{1}{2}$	77.5 (3.05)	89.0 (3.51)	$5 \times 5 \times 3 \times 3$	89.0 (3.51)	107.0 (4.22)
4×2	69.5 (2.74)	86.5 (3.41)	$5 \times 5 \times 2 \times 2$	75.0 (2.95)	102.5 (4.03)
5×4	101.5 (4.00)	112.0 (4.41)	$6 \times 6 \times 4 \times 4$	105.0 (4.13)	125.5 (4.94)
5×3	89.0 (3.51)	107.0 (4.22)	$6 \times 6 \times 3 \times 3$	92.5 (3.64)	120.5 (4.75)
$5 \times 2\frac{1}{2}$	83.0 (3.26)	105.0 (4.13)	$6 \times 6 \times 2\frac{1}{2} \times 2\frac{1}{2}$	86.0 (3.39)	118.5 (4.66)
6×5	117.5 (4.63)	128.0 (5.03)	$6 \times 6 \times 2 \times 2$	78.0 (3.08)	116.0 (4.56)
6×4	105.0 (4.13)	125.5 (4.94)	$8 \times 8 \times 6 \times 6$	141.0 (5.56)	162.0 (6.37)
6×3	92.5 (3.64)	120.5 (4.75)	$8 \times 8 \times 4 \times 4$	114.5 (4.50)	156.5 (6.17)
8×6	141.0 (5.56)	162.0 (6.37)			

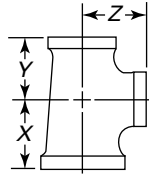
Table 7.1-2
Dimensions of Class 125 90-deg Elbows and Crosses (Reducing Sizes) (Cont'd)

GENERAL NOTES:

- (a) Dimensions are in millimeters (inches).
- (b) For dimensions not given, see [Table 7.1-1](#).

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Table 7.1-3
Dimensions of Class 125 Tees (Reducing Sizes)



NPS	Center-to-End			NPS	Center-to-End		
	X	Y	Z		X	Y	Z
$\frac{1}{2} \times \frac{1}{2} \times \frac{3}{8}$	26.5 (1.04)	26.5 (1.04)	26.0 (1.03)	$\frac{1}{2} \times \frac{1}{4} \times 1$	42.0 (1.65)	40.0 (1.58)	45.5 (1.80)
$\frac{1}{2} \times \frac{1}{2} \times \frac{1}{4}$	24.5 (0.97)	24.5 (0.97)	25.0 (0.98)	$\frac{1}{2} \times \frac{1}{4} \times \frac{3}{4}$	38.5 (1.52)	37.0 (1.45)	44.5 (1.75)
$\frac{3}{4} \times \frac{3}{4} \times \frac{1}{2}$	30.5 (1.20)	30.5 (1.20)	31.0 (1.22)	$\frac{1}{2} \times \frac{1}{4} \times \frac{1}{2}$	36.0 (1.41)	34.0 (1.34)	42.0 (1.66)
$\frac{3}{4} \times \frac{3}{4} \times \frac{3}{8}$	28.5 (1.12)	28.5 (1.12)	28.5 (1.13)	$\frac{1}{2} \times 1 \times \frac{1}{2}$	49.5 (1.94)	45.5 (1.80)	49.5 (1.94)
$\frac{3}{4} \times \frac{3}{4} \times \frac{1}{4}$	26.5 (1.05)	26.5 (1.05)	27.5 (1.08)	$\frac{1}{2} \times 1 \times \frac{1}{4}$	46.0 (1.82)	42.5 (1.67)	47.5 (1.88)
$\frac{3}{4} \times \frac{1}{2} \times \frac{3}{4}$	33.5 (1.31)	31.0 (1.22)	33.5 (1.31)	$\frac{1}{2} \times 1 \times 1$	42.0 (1.65)	38.0 (1.50)	45.5 (1.80)
$\frac{3}{4} \times \frac{1}{2} \times \frac{1}{2}$	30.5 (1.20)	28.5 (1.12)	31.0 (1.22)	$\frac{1}{2} \times \frac{3}{4} \times \frac{1}{2}$	49.5 (1.94)	44.5 (1.75)	49.5 (1.94)
$\frac{1}{2} \times \frac{1}{2} \times \frac{3}{4}$	31.0 (1.22)	31.0 (1.22)	30.5 (1.20)	$\frac{1}{2} \times \frac{3}{4} \times \frac{1}{4}$	46.0 (1.82)	41.0 (1.62)	48.0 (1.88)
$1 \times 1 \times \frac{3}{4}$	35.0 (1.37)	35.0 (1.37)	37.0 (1.45)	$\frac{1}{2} \times \frac{1}{2} \times \frac{1}{2}$	49.5 (1.94)	42.0 (1.66)	49.5 (1.94)
$1 \times 1 \times \frac{1}{2}$	32.0 (1.26)	32.0 (1.26)	35.5 (1.36)	$\frac{1}{4} \times \frac{1}{4} \times \frac{1}{2}$	48.0 (1.88)	48.0 (1.88)	46.0 (1.82)
$1 \times 1 \times \frac{3}{8}$	30.0 (1.18)	30.0 (1.18)	32.5 (1.27)	$\frac{1}{4} \times 1 \times \frac{1}{2}$	48.0 (1.88)	45.5 (1.80)	46.0 (1.82)
$1 \times \frac{3}{4} \times 1$	38.0 (1.50)	37.0 (1.45)	38.0 (1.50)	$1 \times 1 \times \frac{1}{2}$	45.5 (1.80)	45.5 (1.80)	42.0 (1.65)
$1 \times \frac{3}{4} \times \frac{3}{4}$	35.0 (1.37)	33.5 (1.31)	37.0 (1.45)	$2 \times 2 \times \frac{1}{2}$	51.5 (2.02)	51.5 (2.02)	55.0 (2.16)
$1 \times \frac{3}{4} \times \frac{1}{2}$	32.0 (1.26)	30.5 (1.20)	35.5 (1.36)	$2 \times 2 \times \frac{1}{4}$	48.5 (1.90)	48.5 (1.90)	53.5 (2.10)
$1 \times \frac{1}{2} \times 1$	38.0 (1.50)	35.5 (1.36)	38.0 (1.50)	$2 \times 2 \times 1$	44.0 (1.73)	44.0 (1.73)	51.5 (2.02)
$1 \times \frac{1}{2} \times \frac{3}{4}$	35.0 (1.37)	31.0 (1.22)	37.0 (1.45)	$2 \times 2 \times \frac{3}{4}$	40.5 (1.60)	40.5 (1.60)	50.0 (1.97)
$1 \times \frac{1}{2} \times \frac{1}{2}$	32.0 (1.26)	28.5 (1.12)	35.5 (1.36)	$2 \times 2 \times \frac{1}{2}$	38.0 (1.49)	38.0 (1.49)	48.0 (1.88)
$1 \times \frac{3}{8} \times 1$	38.0 (1.50)	32.5 (1.27)	38.0 (1.50)	$2 \times 1\frac{1}{2} \times 2$	57.0 (2.25)	55.0 (2.16)	57.0 (2.25)
$\frac{3}{4} \times \frac{3}{4} \times 1$	37.0 (1.45)	37.0 (1.45)	35.0 (1.37)	$2 \times 1\frac{1}{2} \times \frac{1}{2}$	51.5 (2.02)	49.5 (1.94)	55.0 (2.16)
$\frac{1}{4} \times \frac{1}{4} \times 1$	40.0 (1.58)	40.0 (1.58)	42.5 (1.67)	$2 \times 1\frac{1}{2} \times \frac{1}{4}$	48.5 (1.90)	46.0 (1.82)	53.5 (2.10)
$\frac{1}{4} \times \frac{1}{4} \times \frac{3}{4}$	37.0 (1.45)	37.0 (1.45)	41.0 (1.62)	$2 \times 1\frac{1}{2} \times 1$	44.0 (1.73)	42.0 (1.65)	51.5 (2.02)
$\frac{1}{4} \times \frac{1}{4} \times \frac{1}{2}$	34.0 (1.34)	34.0 (1.34)	39.0 (1.53)	$2 \times 1\frac{1}{2} \times \frac{3}{4}$	40.5 (1.60)	38.5 (1.52)	50.0 (1.97)
$\frac{1}{4} \times 1 \times \frac{1}{4}$	44.5 (1.75)	42.5 (1.67)	44.5 (1.75)	$2 \times 1\frac{1}{2} \times \frac{1}{2}$	38.0 (1.49)	36.0 (1.41)	48.0 (1.88)
$\frac{1}{4} \times 1 \times 1$	40.0 (1.58)	38.0 (1.50)	42.5 (1.67)	$2 \times 1\frac{1}{4} \times 2$	57.0 (2.25)	53.5 (2.10)	57.0 (2.25)
$\frac{1}{4} \times 1 \times \frac{3}{4}$	37.0 (1.45)	35.0 (1.37)	41.0 (1.62)	$2 \times 1\frac{1}{4} \times \frac{1}{2}$	51.5 (1.02)	48.0 (1.88)	55.0 (2.16)
$\frac{1}{4} \times 1 \times \frac{1}{2}$	34.0 (1.34)	32.0 (1.26)	39.0 (1.53)	$2 \times 1\frac{1}{4} \times \frac{1}{4}$	48.5 (1.90)	44.5 (1.75)	53.5 (2.10)
$\frac{1}{4} \times \frac{3}{4} \times \frac{1}{4}$	44.5 (1.75)	41.0 (1.62)	44.5 (1.75)	$2 \times 1\frac{1}{4} \times 1$	44.0 (1.73)	40.0 (1.58)	51.5 (2.02)
$\frac{1}{4} \times \frac{3}{4} \times 1$	40.0 (1.58)	37.0 (1.45)	42.5 (1.67)	$2 \times 1 \times 2$	57.0 (2.25)	51.5 (2.02)	57.0 (2.25)
$\frac{1}{4} \times \frac{3}{4} \times \frac{1}{2}$	37.0 (1.45)	33.5 (1.31)	41.0 (1.62)	$2 \times 1 \times \frac{1}{2}$	51.5 (2.02)	45.5 (1.80)	55.0 (2.16)
$\frac{1}{4} \times \frac{1}{2} \times \frac{1}{4}$	44.5 (1.75)	39.0 (1.53)	44.5 (1.75)	$2 \times 1 \times \frac{1}{4}$	48.5 (1.90)	42.5 (1.67)	53.5 (2.10)
$\frac{1}{4} \times \frac{1}{2} \times 1$	40.0 (1.58)	33.5 (1.36)	42.5 (1.67)	$2 \times \frac{3}{4} \times 2$	57.0 (2.25)	50.0 (1.97)	57.0 (2.25)
$1 \times 1 \times \frac{1}{4}$	42.5 (1.67)	42.5 (1.67)	40.0 (1.58)	$2 \times \frac{1}{2} \times 2$	57.0 (2.25)	48.0 (1.88)	57.0 (2.25)
$\frac{1}{2} \times \frac{1}{2} \times \frac{1}{4}$	46.0 (1.82)	46.0 (1.82)	48.0 (1.88)	$\frac{1}{2} \times 1 \times 2$	55.0 (2.16)	51.5 (2.02)	51.5 (2.02)
$\frac{1}{2} \times \frac{1}{2} \times 1$	42.0 (1.65)	42.0 (1.65)	45.5 (1.80)	$\frac{1}{4} \times \frac{1}{4} \times 2$	53.5 (2.10)	53.5 (2.10)	48.5 (1.90)
$\frac{1}{2} \times \frac{1}{2} \times \frac{3}{4}$	38.5 (1.52)	38.5 (1.52)	44.5 (1.75)	$\frac{1}{2} \times \frac{1}{2} \times 2$	55.0 (2.16)	55.0 (2.16)	51.5 (2.02)
$\frac{1}{2} \times \frac{1}{2} \times \frac{1}{2}$	36.0 (1.41)	36.0 (1.41)	42.0 (1.66)	$\frac{1}{2} \times \frac{1}{4} \times 2$	55.0 (2.16)	53.5 (2.10)	51.5 (2.02)
$\frac{1}{2} \times \frac{1}{4} \times \frac{1}{2}$	49.5 (1.94)	47.5 (1.88)	49.5 (1.94)	$2\frac{1}{2} \times 2\frac{1}{2} \times 2$	60.5 (2.39)	60.5 (2.39)	66.0 (2.60)
$\frac{1}{2} \times \frac{1}{4} \times \frac{1}{4}$	46.0 (1.82)	44.5 (1.75)	48.0 (1.88)	$2\frac{1}{2} \times 2\frac{1}{2} \times \frac{1}{2}$	55.0 (2.16)	55.0 (2.16)	64.0 (2.51)

Table 7.1-3
Dimensions of Class 125 Tees (Reducing Sizes) (Cont'd)

NPS	Center-to-End			NPS	Center-to-End		
	X	Y	Z		X	Y	Z
$2\frac{1}{2} \times 2\frac{1}{2} \times 1\frac{1}{4}$	52.0 (2.04)	52.0 (2.04)	62.0 (2.45)	$3 \times \frac{3}{4} \times 3$	78.0 (3.08)	66.5 (2.61)	78.0 (3.08)
$2\frac{1}{2} \times 2\frac{1}{2} \times 1$	47.5 (1.87)	47.5 (1.87)	60.0 (2.37)	$2\frac{1}{2} \times 2\frac{1}{2} \times 3$	76.0 (2.99)	76.0 (2.99)	72.0 (2.83)
$2\frac{1}{2} \times 2\frac{1}{2} \times \frac{3}{4}$	44.0 (1.74)	44.0 (1.74)	60.0 (2.32)	$2\frac{1}{2} \times 2 \times 3$	76.0 (2.99)	73.5 (2.89)	72.0 (2.83)
$2\frac{1}{2} \times 2\frac{1}{2} \times \frac{1}{2}$	41.5 (1.63)	41.5 (1.63)	56.5 (2.23)	$2 \times 2 \times 3$	73.5 (2.89)	73.5 (2.89)	64.0 (2.52)
$2\frac{1}{2} \times 2 \times 2\frac{1}{2}$	68.5 (2.70)	66.0 (2.60)	68.5 (2.70)	$3\frac{1}{2} \times 3\frac{1}{2} \times 3$	81.0 (3.18)	81.0 (3.18)	84.5 (3.33)
$2\frac{1}{2} \times 2 \times 2$	60.5 (2.39)	57.0 (2.25)	66.0 (2.60)	$3\frac{1}{2} \times 3\frac{1}{2} \times 2\frac{1}{2}$	74.5 (2.93)	74.5 (2.93)	82.5 (3.24)
$2\frac{1}{2} \times 2 \times 1\frac{1}{2}$	55.0 (2.16)	51.5 (2.02)	64.0 (2.51)	$3\frac{1}{2} \times 3\frac{1}{2} \times 2$	66.5 (2.62)	66.5 (2.62)	80.0 (3.14)
$2\frac{1}{2} \times 2 \times 1\frac{1}{4}$	52.0 (2.04)	48.5 (1.90)	62.0 (2.45)	$3\frac{1}{2} \times 3\frac{1}{2} \times 1\frac{1}{2}$	60.5 (2.39)	60.5 (2.39)	77.5 (3.05)
$2\frac{1}{2} \times 2 \times 1$	47.5 (1.87)	44.0 (1.73)	60.0 (2.37)	$3\frac{1}{2} \times 3\frac{1}{2} \times 1\frac{1}{4}$	56.5 (2.27)	56.5 (2.27)	76.0 (2.99)
$2\frac{1}{2} \times 2 \times \frac{3}{4}$	44.5 (1.74)	40.5 (1.60)	59.0 (2.32)	$3\frac{1}{2} \times 3\frac{1}{2} \times 1$	53.5 (2.10)	53.5 (2.10)	74.0 (2.91)
$2\frac{1}{2} \times 2 \times \frac{1}{2}$	41.5 (1.63)	38.0 (1.49)	56.5 (2.23)	$3\frac{1}{2} \times 3 \times 3$	81.0 (3.18)	78.0 (3.08)	84.5 (3.33)
$2\frac{1}{2} \times 1\frac{1}{2} \times 2\frac{1}{2}$	68.5 (2.70)	64.0 (2.51)	68.5 (2.70)	$3\frac{1}{2} \times 3 \times 2\frac{1}{2}$	74.5 (2.93)	72.0 (2.83)	82.5 (3.24)
$2\frac{1}{2} \times 1\frac{1}{2} \times 2$	60.5 (2.39)	55.0 (2.16)	66.0 (2.60)	$3\frac{1}{2} \times 3 \times 2$	66.5 (2.62)	64.0 (2.52)	80.0 (3.14)
$2\frac{1}{2} \times 1\frac{1}{2} \times 1\frac{1}{2}$	55.0 (2.16)	49.5 (1.94)	64.0 (2.51)	$3\frac{1}{2} \times 3 \times 1\frac{1}{2}$	60.5 (2.39)	58.0 (2.29)	77.5 (3.05)
$2\frac{1}{2} \times 1\frac{1}{4} \times 2\frac{1}{2}$	68.5 (2.70)	62.0 (2.45)	68.5 (2.70)	$3\frac{1}{2} \times 2\frac{1}{2} \times 3\frac{1}{2}$	87.0 (3.42)	82.5 (3.24)	87.0 (3.42)
$2\frac{1}{2} \times 1\frac{1}{4} \times 2$	60.5 (2.39)	53.5 (2.10)	66.0 (2.60)	$3\frac{1}{2} \times 2\frac{1}{2} \times 3$	81.0 (3.18)	76.0 (2.99)	84.5 (3.33)
$2\frac{1}{2} \times 1 \times 2\frac{1}{2}$	68.5 (2.70)	60.5 (2.37)	68.5 (2.70)	$3\frac{1}{2} \times 2\frac{1}{2} \times 2\frac{1}{2}$	74.5 (2.93)	68.5 (2.70)	82.5 (3.24)
$2\frac{1}{2} \times 1 \times 2$	60.5 (2.39)	51.5 (2.02)	66.0 (2.60)	$3\frac{1}{2} \times 2 \times 3\frac{1}{2}$	87.0 (3.42)	80.0 (3.14)	87.0 (3.42)
$2\frac{1}{2} \times \frac{3}{4} \times 2\frac{1}{2}$	68.5 (2.70)	59.0 (2.32)	68.5 (2.70)	$3\frac{1}{2} \times 1\frac{1}{2} \times 3\frac{1}{2}$	87.0 (3.42)	77.5 (3.05)	87.0 (3.42)
$2\frac{1}{2} \times \frac{1}{2} \times 2\frac{1}{2}$	68.5 (2.70)	56.5 (2.23)	68.5 (2.70)	$3\frac{1}{2} \times 1\frac{1}{4} \times 3\frac{1}{2}$	87.0 (3.42)	76.0 (2.99)	87.0 (3.42)
$2 \times 2 \times 2\frac{1}{2}$	66.0 (2.60)	66.0 (2.60)	60.5 (2.39)	$3\frac{1}{2} \times 1 \times 3\frac{1}{2}$	87.0 (3.42)	74.0 (2.91)	87.0 (3.42)
$2 \times 1\frac{1}{2} \times 2\frac{1}{2}$	66.0 (2.60)	64.0 (2.51)	60.5 (2.39)	$3 \times 3 \times 3\frac{1}{2}$	84.5 (3.33)	84.5 (3.33)	81.0 (3.18)
$2 \times 1\frac{1}{4} \times 2\frac{1}{2}$	66.0 (2.60)	62.0 (2.45)	60.5 (2.39)	$4 \times 4 \times 3\frac{1}{2}$	90.0 (3.54)	90.0 (3.54)	93.5 (3.69)
$1\frac{1}{2} \times 1\frac{1}{2} \times 2\frac{1}{2}$	64.0 (2.51)	64.0 (2.51)	55.0 (2.16)	$4 \times 4 \times 3$	84.0 (3.30)	84.0 (3.30)	91.5 (3.60)
$3 \times 3 \times 2\frac{1}{2}$	72.0 (2.83)	72.0 (2.83)	76.0 (2.99)	$4 \times 4 \times 2\frac{1}{2}$	77.5 (3.05)	77.5 (3.05)	89.0 (3.51)
$3 \times 3 \times 2$	64.0 (2.52)	64.0 (2.52)	73.5 (2.89)	$4 \times 4 \times 2$	69.5 (2.74)	69.5 (2.74)	86.5 (3.41)
$3 \times 3 \times 1\frac{1}{2}$	58.0 (2.29)	58.0 (2.29)	71.0 (2.80)	$4 \times 4 \times 1\frac{1}{2}$	64.0 (2.51)	64.0 (2.51)	84.5 (3.32)
$3 \times 3 \times 1\frac{1}{4}$	55.0 (2.17)	55.0 (2.17)	69.5 (2.74)	$4 \times 4 \times 1\frac{1}{4}$	60.5 (2.39)	60.5 (2.39)	83.0 (3.26)
$3 \times 3 \times 1$	51.0 (2.00)	51.0 (2.00)	67.5 (2.66)	$4 \times 4 \times 1$	56.5 (2.22)	56.5 (2.22)	81.0 (3.18)
$3 \times 3 \times \frac{3}{4}$	47.5 (1.87)	47.5 (1.87)	66.5 (2.61)	$4 \times 4 \times \frac{3}{4}$	53.0 (2.09)	53.0 (2.09)	79.5 (3.13)
$3 \times 3 \times \frac{1}{2}$	44.5 (1.76)	44.5 (1.76)	64.0 (2.52)	$4 \times 3\frac{1}{2} \times 4$	96.5 (3.79)	93.5 (3.69)	96.5 (3.79)
$3 \times 2\frac{1}{2} \times 3$	78.5 (3.08)	76.0 (2.99)	78.0 (3.08)	$4 \times 3\frac{1}{2} \times 3\frac{1}{2}$	90.0 (3.54)	87.0 (3.42)	93.5 (3.69)
$3 \times 2\frac{1}{2} \times 2\frac{1}{2}$	72.0 (2.83)	68.5 (2.70)	76.0 (2.99)	$4 \times 3\frac{1}{2} \times 3$	84.0 (3.30)	81.0 (3.18)	91.5 (3.60)
$3 \times 2\frac{1}{2} \times 2$	64.0 (2.52)	60.5 (2.39)	73.5 (2.89)	$4 \times 3\frac{1}{2} \times 2\frac{1}{2}$	77.5 (3.05)	77.5 (2.93)	89.0 (3.51)
$3 \times 2\frac{1}{2} \times 1\frac{1}{2}$	58.0 (2.29)	55.0 (2.16)	71.0 (2.80)	$4 \times 3\frac{1}{2} \times 2$	69.5 (2.74)	66.5 (2.62)	86.5 (3.41)
$3 \times 2\frac{1}{2} \times 1\frac{1}{4}$	55.0 (2.17)	52.0 (2.04)	69.5 (2.74)	$4 \times 3\frac{1}{2} \times 1\frac{1}{2}$	64.0 (2.51)	60.5 (2.39)	84.5 (3.32)
$3 \times 2\frac{1}{2} \times 1$	51.0 (2.00)	47.5 (1.87)	67.5 (2.66)	$4 \times 3\frac{1}{2} \times 1\frac{1}{4}$	60.5 (2.39)	57.5 (2.27)	83.0 (3.26)
$3 \times 2 \times 3$	78.0 (3.08)	73.5 (2.89)	78.0 (3.08)	$4 \times 3 \times 4$	96.5 (3.79)	91.5 (3.60)	96.5 (3.79)
$3 \times 2 \times 2\frac{1}{2}$	72.0 (2.83)	66.0 (2.60)	76.0 (2.99)	$4 \times 3 \times 3$	84.0 (3.30)	78.0 (3.08)	91.5 (3.60)
$3 \times 2 \times 2$	64.0 (2.52)	57.0 (2.25)	73.5 (2.89)	$4 \times 3 \times 2\frac{1}{2}$	77.5 (3.05)	72.0 (2.83)	89.0 (3.51)
$3 \times 2 \times 1\frac{1}{2}$	58.0 (2.29)	51.5 (2.02)	71.0 (2.80)	$4 \times 3 \times 2$	69.5 (2.74)	64.0 (2.52)	86.5 (3.41)
$3 \times 1\frac{1}{2} \times 3$	78.0 (3.08)	71.0 (2.80)	78.0 (3.08)	$4 \times 2\frac{1}{2} \times 4$	96.5 (3.79)	89.2 (3.51)	96.5 (3.79)
$3 \times 1\frac{1}{4} \times 3$	78.0 (3.08)	69.5 (2.74)	78.0 (3.08)	$4 \times 2\frac{1}{2} \times 3$	84.0 (3.30)	76.0 (2.99)	91.5 (3.60)
$3 \times 1 \times 3$	78.0 (3.08)	67.5 (2.66)	78.0 (3.08)	$4 \times 2\frac{1}{2} \times 2\frac{1}{2}$	77.5 (3.05)	68.5 (2.70)	89.0 (3.51)

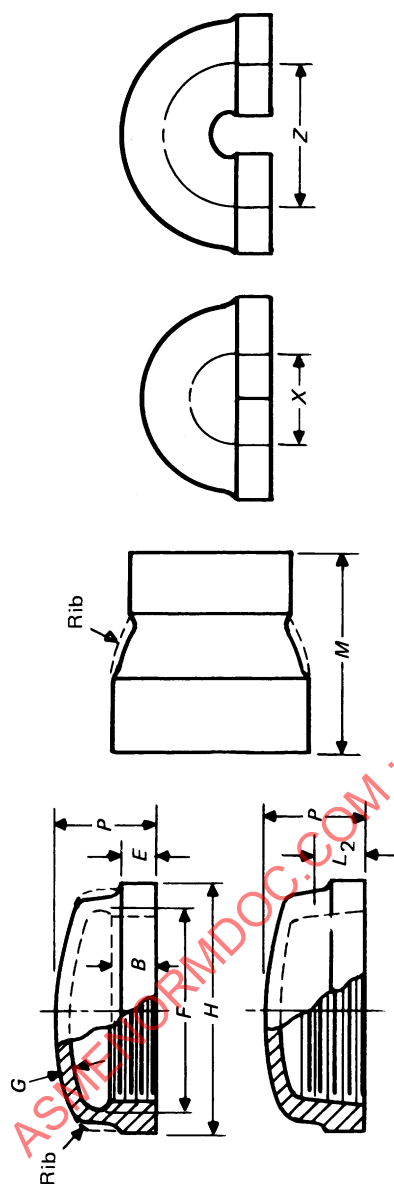
Table 7.1-3
Dimensions of Class 125 Tees (Reducing Sizes) (Cont'd)

NPS	Center-to-End			NPS	Center-to-End		
	X	Y	Z		X	Y	Z
4 × 2 × 4	96.5 (3.79)	86.5 (3.41)	96.5 (3.79)	6 × 6 × 3	92.5 (3.64)	92.5 (3.64)	120.5 (4.75)
4 × 2 × 3	84.0 (3.30)	73.5 (2.89)	91.5 (3.60)	6 × 6 × 2½	86.0 (3.39)	86.0 (3.39)	118.5 (4.66)
4 × 2 × 2	69.5 (2.74)	57.0 (2.25)	86.5 (3.41)	6 × 6 × 2	78.0 (3.08)	78.0 (3.08)	116.0 (4.56)
4 × 1½ × 4	96.5 (3.79)	84.5 (3.32)	96.5 (3.79)	6 × 6 × 1½	72.5 (2.85)	72.5 (2.85)	113.5 (4.47)
4 × 1¼ × 4	96.5 (3.79)	83.0 (3.26)	96.5 (3.79)	6 × 6 × 1¼	69.5 (2.73)	69.5 (2.73)	112.0 (4.41)
4 × 1 × 4	96.5 (3.79)	81.0 (3.18)	96.5 (3.79)	6 × 6 × 1	65.0 (2.56)	65.0 (2.56)	110.0 (4.33)
3½ × 3½ × 4	93.5 (3.69)	93.5 (3.69)	90.0 (3.54)	6 × 5 × 6	130.5 (5.13)	128.0 (5.03)	130.5 (5.13)
3 × 3 × 4	91.5 (3.60)	91.5 (3.60)	84.0 (3.30)	6 × 5 × 5	117.5 (4.63)	114.5 (4.50)	128.0 (5.03)
2½ × 2½ × 4	89.0 (3.51)	89.0 (3.51)	77.5 (3.05)	6 × 5 × 4	105.0 (4.13)	101.5 (4.00)	125.5 (4.94)
2 × 2 × 4	86.5 (3.41)	86.5 (3.41)	69.5 (2.74)	6 × 5 × 3	92.5 (3.64)	89.0 (3.51)	120.5 (4.75)
5 × 5 × 4	101.5 (4.00)	101.5 (4.00)	112.0 (4.41)	6 × 5 × 2½	86.0 (3.39)	83.0 (3.26)	118.5 (4.66)
5 × 5 × 3½	95.5 (3.75)	95.5 (3.75)	109.5 (4.31)	6 × 5 × 2	78.0 (3.08)	75.0 (2.95)	116.0 (4.56)
5 × 5 × 3	89.0 (3.51)	89.0 (3.51)	107.0 (4.22)	6 × 4 × 6	130.5 (5.13)	125.5 (4.94)	130.5 (5.13)
5 × 5 × 2½	83.0 (3.26)	83.0 (3.26)	105.0 (4.13)	6 × 4 × 5	117.5 (4.63)	112.0 (4.41)	128.0 (5.03)
5 × 5 × 2	75.0 (2.95)	75.0 (2.95)	102.5 (4.03)	6 × 4 × 4	105.0 (4.13)	96.5 (3.79)	125.5 (4.94)
5 × 5 × 1½	69.0 (2.72)	69.0 (2.72)	100.0 (3.94)	6 × 3 × 6	130.5 (5.13)	120.5 (4.75)	130.5 (5.13)
5 × 5 × 1¼	66.0 (2.60)	66.0 (2.60)	98.5 (3.88)	6 × 3 × 3	92.5 (3.64)	78.0 (3.08)	120.5 (4.75)
5 × 5 × 1	61.5 (2.43)	61.5 (2.43)	96.5 (3.80)	6 × 2½ × 6	130.5 (5.13)	118.5 (4.66)	130.5 (5.13)
5 × 4 × 5	114.5 (4.50)	112.0 (4.41)	114.5 (4.50)	6 × 2 × 6	130.5 (5.13)	116.0 (4.56)	130.5 (5.13)
5 × 4 × 4	101.5 (4.00)	96.5 (3.79)	112.0 (4.41)	5 × 5 × 6	128.0 (5.03)	128.0 (5.03)	117.5 (4.63)
5 × 4 × 3½	95.5 (3.75)	90.0 (3.54)	109.5 (4.31)	5 × 3 × 6	128.0 (5.03)	120.5 (4.75)	117.5 (4.63)
5 × 4 × 3	89.0 (3.51)	84.0 (3.30)	107.0 (4.22)	4 × 4 × 6	125.5 (4.94)	125.5 (4.94)	105.0 (4.13)
5 × 4 × 2½	83.0 (3.26)	77.5 (3.05)	105.0 (4.13)	8 × 8 × 6	141.0 (5.56)	141.0 (5.56)	162.0 (6.37)
5 × 4 × 2	75.0 (2.95)	69.5 (2.74)	102.5 (4.03)	8 × 8 × 5	128.0 (5.03)	128.0 (5.03)	159.5 (6.27)
5 × 4 × 1½	69.0 (2.72)	64.0 (2.51)	100.0 (3.94)	8 × 8 × 4	114.5 (4.50)	114.5 (4.50)	156.5 (6.17)
5 × 3 × 5	114.5 (4.50)	107.0 (4.22)	114.5 (4.50)	8 × 8 × 3	101.5 (4.00)	101.5 (4.00)	154.0 (6.07)
5 × 3 × 4	101.5 (4.00)	91.5 (3.60)	112.0 (4.41)	8 × 8 × 2½	93.5 (3.69)	93.5 (3.69)	152.5 (6.01)
5 × 3 × 3	89.0 (3.51)	78.0 (3.08)	107.0 (4.22)	8 × 8 × 2	87.5 (3.44)	87.5 (3.44)	148.5 (5.84)
5 × 2½ × 5	114.5 (4.50)	105.0 (4.13)	114.5 (4.50)	8 × 6 × 8	166.5 (6.56)	162.0 (6.37)	166.5 (6.56)
5 × 2 × 5	114.5 (4.50)	102.5 (4.03)	114.5 (4.50)	8 × 6 × 6	141.0 (5.56)	130.5 (5.13)	162.0 (6.37)
4 × 4 × 5	112.0 (4.41)	112.0 (4.41)	101.5 (4.00)	8 × 4 × 8	166.5 (6.56)	156.5 (6.17)	166.5 (6.56)
6 × 6 × 5	117.5 (4.63)	117.5 (4.63)	128.0 (5.03)	6 × 6 × 8	162.0 (6.37)	162.0 (6.37)	141.0 (5.56)
6 × 6 × 4	105.0 (4.13)	105.0 (4.13)	125.5 (4.94)				

GENERAL NOTES:

- (a) Dimensions are in millimeters (inches).
 (b) For dimensions not given, see [Table 7.1-1](#).

Table 7.1-4
Dimensions of Class 125 Caps, Reducing Couplings, and Closed- and Open-Pattern Return Bends



Minimum Length of Thread [Note (1)]		Minimum Width of Band, E		Inside Diameter of Fitting, F [Note (1)]		Metal Thickness, G		Minimum Outside Diameter of Band, H		Length of Reducing Concentric Couplings, M [Note (2)]		Minimum Height, P [Note (1)]		Center-to-Center	
NPS	B	L ₂			Min.	Max.								Closed, X	Open, Z
1/2	11.0 (0.43)	...	12.5 (0.50)	21.3 (0.84)	22.8 (0.90)	22.8 (0.90)	3.5 (0.13)	34 (1.34)	35 (1.38)	...	...	...	...	32.0 (1.25)	44.5 (1.75)
3/4	12.5 (0.50)	...	14.0 (0.56)	26.7 (1.05)	28.1 (1.11)	28.1 (1.11)	4.0 (0.15)	41 (1.63)	38 (1.50)	...	...	...	...	38.0 (1.50)	48.0 (1.88)
1	14.5 (0.58)	...	16.0 (0.62)	33.4 (1.31)	35.2 (1.38)	35.2 (1.38)	4.5 (0.17)	50 (1.95)	43 (1.70)	...	...	...	...	44.5 (1.75)	63.5 (2.50)
1 1/4	17.0 (0.67)	...	17.5 (0.69)	42.4 (1.66)	43.9 (1.73)	43.9 (1.73)	4.5 (0.18)	61 (2.39)	54 (2.13)	...	...	...	...	52.0 (2.25)	76.0 (3.00)
1 1/2	18.0 (0.70)	...	19.0 (0.75)	48.3 (1.90)	50.0 (1.97)	50.0 (1.97)	5.0 (0.20)	68 (2.68)	57 (2.25)	...	...	...	...	63.5 (2.50)	89.0 (3.50)
2	19.0 (0.75)	...	21.5 (0.84)	60.3 (2.37)	62.1 (2.44)	62.1 (2.44)	5.0 (0.22)	83 (3.28)	59 (2.32)	...	...	...	...	82.5 (3.25)	114.5 (4.50)
2 1/2	23.5 (0.92)	29.0 (1.14)	30.0 (0.94)	73.0 (2.87)	75.6 (2.97)	75.6 (2.97)	6.0 (0.24)	98 (3.86)	67 (2.63)	...	...	...	...	95.5 (3.75)	139.5 (5.50)
3	25.0 (0.98)	30.5 (1.20)	25.5 (1.00)	88.9 (3.50)	91.4 (3.60)	91.4 (3.60)	6.5 (0.26)	117 (4.62)	73 (2.88)	...	...	...	...	114.5 (4.50)	165.0 (6.50)
3 1/2	26.0 (1.03)	32.0 (1.25)	27.0 (1.06)	101.6 (4.00)	104.1 (4.10)	104.1 (4.10)	7.0 (0.28)	132 (5.20)	80 (3.13)	...	...	...	...	...	...
4	27.5 (1.08)	33.0 (1.30)	28.5 (1.12)	114.4 (4.50)	116.8 (4.60)	116.8 (4.60)	8.0 (0.31)	147 (5.79)	86 (3.38)	...	...	...	...	152.5 (6.00)	190.5 (7.50)
5	30.0 (1.18)	36.0 (1.41)	30.0 (1.18)	141.3 (5.56)	143.8 (5.66)	143.8 (5.66)	9.5 (0.38)	179 (7.05)	91 (3.57)	...	...	...	...	...	...
6	32.5 (1.28)	38.5 (1.51)	32.5 (1.28)	168.3 (6.62)	170.8 (6.72)	170.8 (6.72)	11.0 (0.43)	210 (8.28)	97 (3.81)	...	...	...	...	...	...
8	37.5 (1.47)	43.5 (1.71)	37.5 (1.47)	219.2 (8.62)	221.7 (8.72)	221.7 (8.72)	14.0 (0.55)	270 (10.63)	133 (5.25)	...	...	...	...	...	...
10	42.5 (1.68)	49.0 (1.92)	42.5 (1.68)	273.1 (10.75)	275.6 (10.85)	275.6 (10.85)	17.5 (0.69)	333 (13.12)	...	...	...	...	...	...	...
12	48.0 (1.88)	54.0 (2.12)	48.0 (1.88)	323.8 (12.75)	326.4 (12.85)	326.4 (12.85)	20.5 (0.80)	393 (15.47)	...	...	...	...	...	...	...

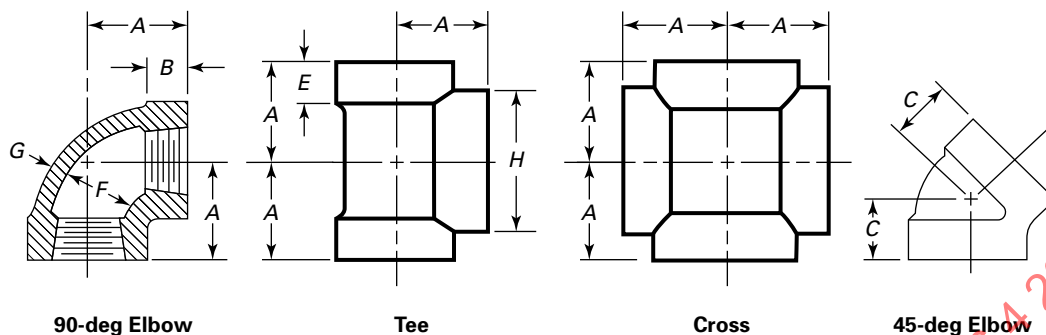
GENERAL NOTES:

- (a) Dimensions are in millimeters (inches).
 (b) Caps may be made flat or with a radius as shown in the illustrations.

Table 7.1-4
Dimensions of Class 125 Caps, Reducing Couplings, and Closed- and Open-Pattern Return Bends (Cont'd)

NOTES:
(1) Caps may be made without recess. Caps so made shall be of such height, P , that the length of perfect thread shall be not less than B , and the length of useful thread (B plus threads with fully formed roots and flat crests) shall be not less than L (effective length of external thread) required by ASME B1.20.1.
(2) Dimension M for all reduction of reducing couplings (concentric only) shall be the same as shown for the largest opening. Dimension M for eccentric couplings is not standard and such information should be obtained from the manufacturer.

Table 7.1-5
Dimensions of Class 250 90-deg and 45-deg Elbows, Tees, and Crosses (Straight Sizes)



NPS	Center-to-End Elbows, Tees, and Crosses, <i>A</i>	Center-to-End, 45-deg Elbows, <i>C</i>	Minimum Length of Thread, <i>B</i>	Minimum Width of Band, <i>E</i>	Inside Diameter of Fitting, <i>F</i>		Metal Thickness, <i>G</i>	Minimum Outside Diameter of Band, <i>H</i>
					Min.	Max.		
1/4	24.0 (0.94)	20.5 (0.81)	11.0 (0.43)	12.5 (0.49)	13.7 (0.54)	14.8 (0.58)	4.5 (0.18)	30 (1.17)
3/8	27.0 (1.06)	22.5 (0.88)	12.0 (0.47)	14.0 (0.55)	17.1 (0.67)	18.3 (0.72)	4.5 (0.18)	36 (1.36)
1/2	32.0 (1.25)	25.5 (1.00)	14.5 (0.57)	15.0 (0.60)	21.3 (0.84)	22.8 (0.90)	5.0 (0.20)	40 (1.59)
3/4	36.5 (1.44)	28.5 (1.13)	16.5 (0.64)	17.5 (0.68)	26.7 (1.05)	28.1 (1.11)	6.0 (0.23)	48 (1.88)
1	41.5 (1.63)	33.5 (1.31)	19.0 (0.75)	19.5 (0.76)	33.4 (1.31)	35.2 (1.38)	7.0 (0.28)	57 (2.24)
1 1/4	49.5 (1.94)	38.0 (1.50)	21.5 (0.84)	22.5 (0.88)	42.2 (1.66)	43.9 (1.73)	8.5 (0.33)	69 (2.73)
1 1/2	54.0 (2.13)	43.0 (1.69)	22.0 (0.87)	24.5 (0.97)	48.3 (1.90)	50.0 (1.97)	9.0 (0.35)	78 (3.07)
2	63.5 (2.50)	51.0 (2.00)	25.5 (1.00)	28.5 (1.12)	60.3 (2.37)	62.1 (2.44)	10.0 (0.39)	95 (3.74)
2 1/2	74.5 (2.94)	57.0 (2.25)	29.5 (1.17)	33.0 (1.30)	73.0 (2.87)	75.6 (2.97)	11.0 (0.43)	117 (4.60)
3	86.0 (3.38)	63.5 (2.50)	31.0 (1.23)	35.5 (1.40)	88.9 (3.50)	91.4 (3.60)	12.0 (0.48)	136 (5.36)
3 1/2	95.5 (3.75)	67.0 (2.63)	32.5 (1.28)	38.0 (1.49)	101.6 (4.00)	104.1 (4.10)	13.0 (0.52)	152 (5.98)
4	105.0 (4.13)	71.5 (2.81)	34.0 (1.33)	40.0 (1.57)	114.4 (4.50)	116.8 (4.60)	14.0 (0.56)	168 (6.61)
5	124.0 (4.88)	81.0 (3.19)	36.5 (1.43)	44.0 (1.74)	141.3 (5.56)	143.8 (5.66)	17.0 (0.66)	201 (7.92)
6	143.0 (5.63)	89.0 (3.50)	39.0 (1.53)	48.5 (1.91)	168.3 (6.62)	170.8 (6.72)	19.0 (0.74)	235 (9.24)
8	178.0 (7.00)	109.5 (4.31)	43.5 (1.72)	57.0 (2.24)	219.2 (8.62)	221.7 (8.72)	23.0 (0.90)	298 (11.73)
10	219.0 (8.63)	132.9 (5.19)	49.0 (1.93)	65.5 (2.58)	273.1 (10.75)	275.6 (10.85)	27.5 (1.08)	365 (14.37)
12	254.0 (10.00)	152.5 (6.00)	54.0 (2.13)	74.0 (2.91)	323.8 (12.75)	326.4 (12.85)	31.5 (1.24)	428 (16.84)

GENERAL NOTES:

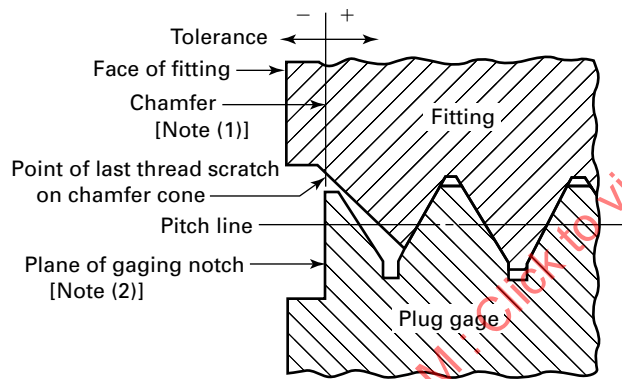
(a) Dimensions are in millimeters (inches).

(b) The Class 250 standard for threaded fittings covers only the straight sizes of 90-deg and 45-deg elbows, tees, and crosses.

Table 7.3-1
Inspection Tolerances

NPS	Tolerance, mm (in.)
$\frac{1}{4}$	$\pm 1.0 (\pm 0.04)$
$\frac{3}{8}$	$\pm 1.3 (\pm 0.05)$
$\frac{1}{2}, \frac{3}{4}$	$\pm 1.5 (\pm 0.06)$
1, $1\frac{1}{4}$	$\pm 1.8 (\pm 0.07)$
$1\frac{1}{2}, 2$	$\pm 2.0 (\pm 0.08)$
$2\frac{1}{2}, 3, 3\frac{1}{2}$	$\pm 2.5 (\pm 0.10)$
4, 5	$\pm 3.0 (\pm 0.12)$
6	$\pm 3.6 (\pm 0.14)$
8	$\pm 4.1 (\pm 0.16)$
10	$\pm 4.8 (\pm 0.19)$
12	$\pm 5.3 (\pm 0.21)$

Figure 8-1
Gaging of Chamfered Internal Threads



GENERAL NOTE: Enlarged view showing chamfered internal thread of basic size with chamfer exceeding the major diameter.

NOTES:

- (1) The chamfer illustrated is at a 45-deg angle and is approximately $\frac{3}{8}$ pitch in depth. However, these details are not requirements and are given only for information on the illustration shown.
- (2) Plane of gaging notch should intersect crest of thread on gage.