ASME B16.12-2009

[Revision of ASME B16.12-1998 (R2006)]

Cast Iron Threaded Drainage Fittings

AN AMERICAN NATIONAL STANDARD

The American Society of Mechanical Engineers

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Date of Issuance: August 14, 2009

The next edition of this Standard is scheduled for publication in 2014. There will be no addenda issued to this edition.

ASME issues written replies to inquiries concerning interpretations of technical aspects of this Standard. Interpretations are published on the ASME Web site under the Committee Pages at http://cstools.asme.org as they are issued.

The American Society of Mechanical Engineers
Three Park Avenue, New York, NY 10016-5990

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FOREWORD

Screw joint drainage fittings were developed in about 1880 by the Durham House Drainage Company of New York and are often referred to as Durham fittings. At that time, soil pipes and drains in New York had been required to be of plumber's cast iron soil pipe, whereas Chicago's soil pipes were required to be of lead or plumber's cast iron pipe.

To form a continuous passageway with no pockets or obstructions where foreign matter could collect and gradually accumulate, it was necessary to design a special type of screw fitting. Inside diameters of the fittings are about the nominal size of standard weight wrought steel pipe (Schedule 40). The thread chamber is designed so that when the pipe is tightly screwed into the fitting, its end nearly abuts the shoulder of the fitting, thereby making a practically continuous passage. The threading of these fittings required special care, and the threads on the pipe were cut to suit the threads in the fitting.

With the passage of time, manufacturers' practices began to diverge in regard to center-to-end dimensions and other features. The Manufacturers Standardization Society of the Valve and Fittings Industry (MSS) studied the situation, developed a standard practice for these fittings, and published MSS SP-8, Cast Iron Drainage Fittings, in 1929. Subsequently, for better coordination with other screwed fitting standards under the jurisdiction of the B16 Sectional Committee of the American Standards Association (ASA), the subject was assigned to Subcommittee 2 of B16.

Many drafts of the proposed standard were developed, and printer's proofs were distributed to industry for criticism and comment in May 1940. A revised proposal dated July 1941 was submitted to the members of the Sectional Committee for letter ballot vote. Following its approval by that body, it was submitted to the sponsors and to ASA with recommendations for approval as an American Standard. This was granted in February 1942, with the designation ASA B16.12-1942.

The MSS Ferrous Screw Fittings Committee made a thorough study of the 1942 Standard and recommended that several changes be made to bring the data in line with current production and usage of this type of fitting. To comply with the recommendations, Subcommittee 2 of the B16 Sectional Committee revised portions of the text and illustrations and added dimensional tables for Tucker connections, roof connections, and Tucker Y-branches, as well as dimensions for P-traps, bath traps, and running traps.

A draft, dated September 1952, was presented to the Sectional Committee for letter ballot vote. After the committee and other sponsor organizations approved the draft, it was presented to ASA, and approval of ASA B16.12-1953 was granted on September 11, 1953.

Subcommittee 2 reviewed the document from 1963 to 1964. The Sectional Committee approved several minor changes in format and wording, changing the title to Cast Iron Threaded Drainage Fittings. ASA B16.12-1965 was approved on November 12, 1965.

In 1970, further review was initiated by Subcommittee 2, now an American National Standards Institute (ANSI) Committee, and ANSI B16.12-1971 was granted approval on November 1, 1971.

The Standard was updated, and metric (SI) dimensions were added in ANSI B16.12-1977, approved on February 4, 1977.

In 1982, American Standards Committee B16 was reorganized as the ASME B16 Standards Committee under procedures accredited by ANSI. Also in 1982, Subcommittee B (formerly 2) updated reference standards, and the revision was approved on July 20, 1983 as ANSI B16.12-1983.

In the 1991 edition of ASME B16.12, reference standards were updated, and the metric dimensions were deleted. The edition was approved by ASME and by ANSI on January 4, 1991.

In the 1998 edition of ASME B16.12, reference standards were updated, a quality system program annex was added, and several editorial revisions were made. Following approval by ASME B16 Subcommittee B and the B16 Main Committee, ANSI approved this 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.

In this edition, metric dimensions have become the primary units and inch dimensions are incorporated into this Standard as secondary units and shown in parentheses. The added inch dimensions constitute an independent but equal standard to the metric units.

Following approval by the Standards Committee and the ASME Board, this revision to the 1998 edition of this Standard was approved as an American National Standard by ANSI on April 6, 2009, and designated as ASME B16.12-2009.

ASME B16 COMMITTEE
Standardization of Valves, Flanges, Fittings, Gaskets, and Valve Actuators

(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, and attending Committee meetings. Correspondence should be addressed to:

Secretary, B16 Standards Committee
The American Society of Mechanical Engineers
Three Park Avenue
New York, NY 10016-5990

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.

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.

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.
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. 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 this format may be rewritten in the appropriate format by the Committee prior to being answered, which may inadvertently change the intent of the original request.

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, which are open to the public. Persons wishing to attend any meeting should contact the Secretary of the B16 Standards Committee.

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CAST IRON THREADED DRAINAGE FITTINGS

1 SCOPE AND GENERAL

1.1 Scope

This Standard for cast iron threaded drainage fittings covers

(a) sizes and method of designating openings in reducing fittings
(b) marking
(c) material
(d) dimensions and tolerances
(e) threading
(f) ribs
(g) coatings
(h) face bevel

1.2 Applicability

This Standard covers fittings intended for use in gravity drainage systems subject only to the gravity head of waste liquids at temperatures from ambient to approximately 100°C (212°F). The use of this Standard for pressurized waste handling systems is the responsibility of the user and is subject to the requirements of any applicable code.

1.3 Quality Systems

Requirements relating to the product manufacturers' Quality System Programs are described in Nonmandatory Appendix A.

1.4 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 referenced standard and specification in the text, when referenced. Instead, the specific editions of the referenced standards and specifications are listed in Mandatory Appendix I.

2 SIZE

2.1 Nominal Pipe Size

The size of the fittings scheduled in Tables 1 and 2 is identified by the corresponding nominal pipe size. For reducing tees, Y-branches, or crosses, the largest run opening shall be given first. The straight-line sketches (Fig. 1) illustrate how the reducing fittings are read.

2.2 Denotation

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
1¼	32
1½	40
2	50
2½	65
3	80
3½	. . .
4	100

GENERAL NOTE: For NPS ≥ 4, the related DN ≥ 25 × (NPS).

Table 1 Inspection Limits for Diameter and Width of Band

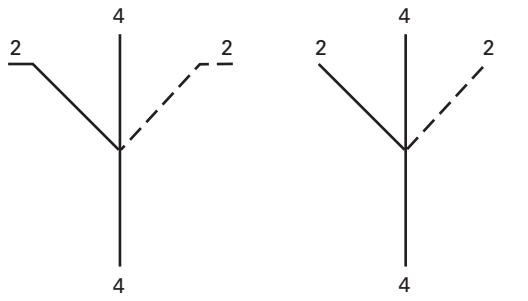
NPS	Diameter and Width of Band, Minus, mm
1¼	1.0
1½	1.0
2	1.0
2½	1.3
3	1.3
4	1.6
5	1.6
6	1.8
8	2.3

Table 2 Inspection Limits for Center-to-End Dimensions

NPS	Center-to-End, Plus or Minus, mm
1¼	1.8
1½	2.0
2	2.0
2½	2.5
3	2.5
4	3.0
5	3.0
6	3.6
8	4.1

GENERAL NOTE: The above limits apply to all fittings covered by this Standard. Inspection limits for end-to-end dimensions shall be double the limits for center-to-end dimensions. The largest opening in the fitting governs the tolerance to be applied to all openings.

Fig. 1 Identification of Reducing Fittings



4 × 2 Single and Double Short 90-deg Y-Branch Long 90-deg Y-Branch

4 × 2 Single and Double 45-deg Y-Branch

3 MARKING

Each fitting shall be marked with the manufacturer's name or trademark in accordance with the requirements of MSS Standard Practice No. SP-25.

4 MATERIALS

4.1 Castings

The dimensions prescribed in this Standard (Tables 3 through 13) are based on gray iron castings of high quality produced under regular control of chemical and physical properties by a recognized process. The manufacturer shall be prepared to certify that the product has been so produced and that its chemical and physical properties, as proved by test specimens, are equal to the requirements specified in ASTM A 126, Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings.

4.2 Optional Material

Drainage fittings are regularly made of cast iron. At the option of the manufacturer, drainage fittings may be furnished of malleable iron complying with the minimum physical requirements of ASTM A 197, Specification for Cupola Malleable Iron.

5 DIMENSIONS AND TOLERANCES

5.1 Dimensions

Dimensions in SI (metric) units are given in Tables 3 through 13 for various types of fittings. Those dimensions are the standard. Corresponding U.S. Customary values are given in Tables II-3 through II-13 in Mandatory Appendix II. Some dimensions of steel pipe from ASME B36.10M are listed for convenience in Nonmandatory Appendix B in inches only. Tolerances applicable to dimensions of fittings are specified in paras. 5.2 through 5.6.

5.2 Metal Thickness

At no point in the castings shall the metal thickness be less than 90% of the values listed in Table 3.

5.3 Thread Chamber

The length of thread and total length of thread chamber to shoulder shall not vary from the dimensions shown in the tables by more than plus or minus the equivalent of the pitch of one thread.

5.4 Outside Diameter and Width of Band

The minus tolerances given in Table 1 are permitted on inspection to apply to the diameter of the band and the width of the band.

5.5 Inside Diameter of Fitting

The inside diameter shall not vary from dimensions shown by more than the following:

(a) for sizes $1\frac{1}{2} \le$ NPS ≤ 4, inclusive ±0.8 mm (0.03 in.)

(b) for sizes $5 \le$ NPS ≤ 8, inclusive ±1.6 mm (0.06 in.)

5.6 Center-to-End

The center-to-end dimensions shall not vary from the given dimensions by more than the values given in Table 2.

5.7 Shoulder

These fittings are provided with shoulders so that when used with Standard Wall Pipe (ASME B36.10M), the end of the pipe practically meets the shoulder as the joint is made up, thereby forming a smooth passageway.

6 THREADING

(a) All fittings (except roof connections) shall be threaded with American National Standard Taper Pipe Threads (ASME B1.20.1), and the variations in threading shall be limited to one turn small and no turn large. Threaded openings without shoulder, however, shall be limited to one turn large and one turn small from the gaging notch on the plug when using working gages. Roof connections may have taper threads as above or American National Standard Straight Pipe Threads, Free Fitting Mechanical Joint NPSM (ASME B1.20.1).

(b) When gaging internal threads, the notch shall be flush with the bottom of the chamfer, which shall be considered as being the intersection of the chamfer cone and the pitch cone of the thread. This depth is approximately equal to one-half thread from the face of the fitting.

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

(d) The length of thread specified in this Standard 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 mm/m (0.06 in./ft).

(f) All fittings having openings of 90 deg nominal angle shall be tapped with a pitch of 21 mm/m (0.25 in./ft), with the pitch in the direction shown in Fig. 2.

7 RIBS

The addition of ribs or lugs shall be allowed on any drainage fittings.

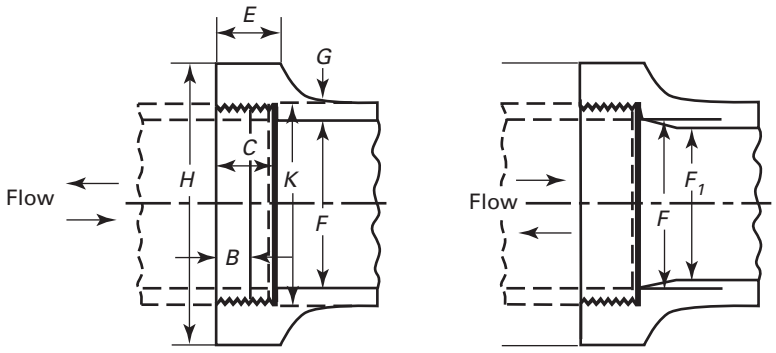
8 COATINGS

Fittings may be furnished uncoated or may be coated with a bituminous composition or zinc coated by the hot dipped process. The coatings shall be applied prior to threading.

9 FACE BEVEL

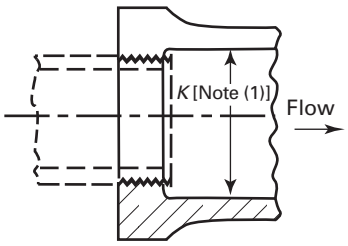
A bevel not exceeding 5 deg is permitted on the faces of fitting openings. Center-to-end, end-to-end, and width-of-band dimensions may include or exclude the bevel.

Table 3 Wall Thickness and Threaded End Dimensions

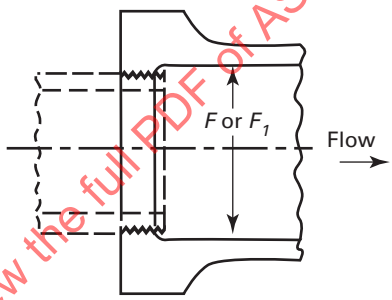


Type 1

Type 2



Type 3 [Note (2)]



Type 4 (Bushed) [Note (2)]

NPS	Length of Threads, *B*	Total Length of Thread Chamber to Shoulder, *C*	Width of Band, *E*	Inside Diameter of Fitting		Nominal Metal Thickness, *G*	Outside Diameter of Band, *H*	Recess Diameter, *K*	
				F	F_1			Max.	Min.
1¼	10.7	18.0	18.0	35.1	31.8	4.7	60.7	43.9	42.2
1½	10.7	18.4	18.3	40.9	38.1	5.1	68.1	50.0	48.3
2	11.1	19.2	19.3	52.6	50.8	5.6	83.3	62.2	60.5
2½	17.3	28.9	29.0	62.7	63.5	6.1	98.0	75.7	73.2
3	19.5	30.5	30.5	78.0	76.2	6.6	117.3	91.4	88.9
4	21.4	33.0	33.0	102.4	101.6	7.9	147.1	116.8	114.3
5	23.8	35.7	35.8	128.3	127.0	9.7	179.1	143.8	141.2
6	24.3	38.4	38.4	154.2	152.4	10.9	210.3	170.9	168.4
8	27.0	43.5	43.4	202.7	203.2	14.0	270.0	221.7	219.2

GENERAL NOTES:

(a) Dimensions are in millimeters.

(b) For tolerances, see section 5.

(c) Type 2 fittings having diameters *F* and F_1 shall be tapered as shown.

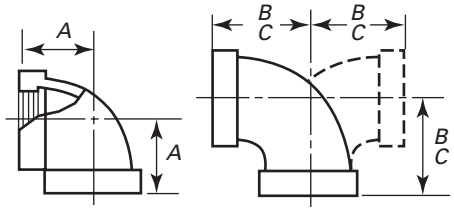
(d) The shoulder and groove, Types 1 and 2, are required on outlet connections. They are also required on inlet connections that are the same size as the outlet connections. Inlet connections that are smaller than the outlet connections may be made as shown in Type 3 or Type 4, at the manufacturer's option.

NOTES:

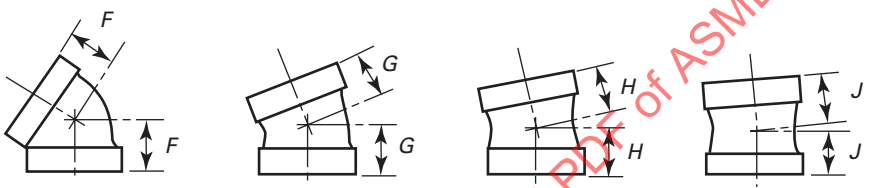
(1) Values for *K* correspond to reduced size inlet.

(2) The openings for Types 3 and 4 are reduced size inlet.

Table 4 Center-to-End Dimensions of Elbows



90-deg Short Elbow | 90-deg Long Elbow 90-deg Extra Long Elbow and Three-Way Elbow | 45-deg Short Elbow | 45-deg Long Elbow



60-deg Elbow | $22\frac{1}{2}$-deg Elbow | $11\frac{1}{4}$-deg Elbow | $5\frac{5}{8}$-deg Elbow

NPS	90-deg Elbow			45-deg Elbow		60-deg Elbow, *F*	$22\frac{1}{2}$-deg Elbow, *G*	$11\frac{1}{4}$-deg Elbow, *H*	$5\frac{5}{8}$-deg Elbow, *J*
	Short, *A* [Note (1)]	Long and Three-Way Elbow, *B* [Note (2)]	Extra Long, *C*	Short, *D* [Note (1)]	Long, *E*				
$1\frac{1}{4}$	44.5	57.2	76.2	33.3	44.5	39.6	28.7	26.9	30.2
$1\frac{1}{2}$	49.3	63.5	88.9	36.6	47.8	44.5	31.8	31.8	33.3
2	57.2	77.7	101.6	42.9	57.2	52.3	36.6	35.1	38.1
$2\frac{1}{2}$	68.3	93.7	114.3	49.3	66.8	63.5	44.5	41.4	41.4
3	77.7	108.0	133.4	55.6	74.7	73.2	50.8	46.0	44.5
4	96.8	131.8	158.8	66.8	88.9	85.9	58.7	50.8	47.8
5	114.3	155.7	. . .	77.7	104.9	98.6	66.8	57.2	50.8
6	130.3	181.1	. . .	87.4	124.0	108.0	74.7	60.5	57.2
8	166.6	228.6	. . .	108.0	. . .	. . .	. . .	. . .	. . .

GENERAL NOTES:

(a) Dimensions are in millimeters.

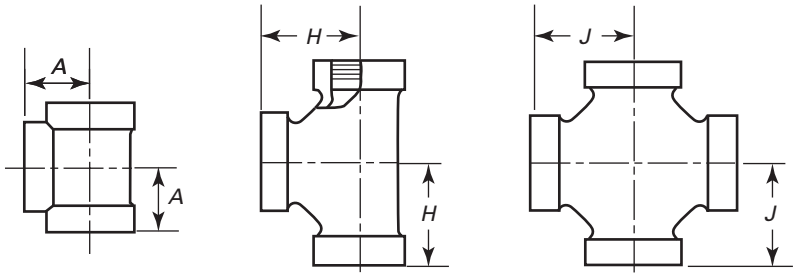
(b) For tolerances, see Table 2.

NOTES:

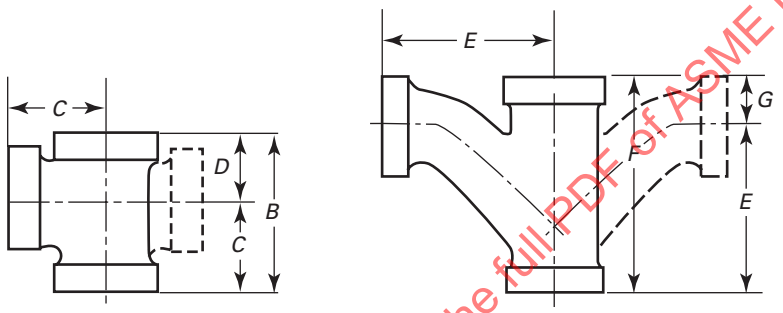
(1) Same dimensions as adopted for Class 125 Cast Iron Threaded Fittings (ASME B16.4).

(2) Three-way elbows have the same dimensions as 90-deg long radius elbows.

Table 5 Dimensions of Tees, Crosses, and Y-Branches



Tee | Basin Tee | Basin Cross



90-deg Short Y-Branch | 90-deg Long Y-Branch

NPS	Center-to-End of Tee, *A* [Note (1)]	90-deg Short Y-Branch [Note (2)] End-to-End, *B*	90-deg Short Y-Branch [Note (2)] Center-to-End, *C*	90-deg Short Y-Branch [Note (2)] Center-to-End, *D*	90-deg Long Y-Branch [Note (2)] Center-to-End, *E*	90-deg Long Y-Branch [Note (2)] End-to-End, *F*	90-deg Long Y-Branch [Note (2)] Center-to-End, *G*	Center-to-End of Basin Tee, *H*	Center-to-End of Basin Cross, *J*
1¼	44.5	95.3	57.2	38.1	92.2	120.7	28.7	58.7	58.7
1½	49.3	108.0	63.5	44.5	104.9	136.7	31.8	68.3	68.3
2	57.2	131.8	77.7	54.1	133.4	177.8	44.5	88.9	88.9
2½	68.6	160.3	93.7	66.8	158.8	209.6	50.8	108.0	. . .
3	78.2	184.2	108.0	76.2	190.5	251.0	60.5	. . .	. . .
4	96.3	222.3	131.8	90.4	251.0	330.2	79.5	. . .	. . .
5	114.3	261.9	155.7	106.4	311.2	400.1	88.9	. . .	. . .
6	130.3	303.3	181.1	122.2	371.6	476.3	104.9	. . .	. . .
8	166.6	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .

GENERAL NOTES:

(a) Dimensions are in millimeters.

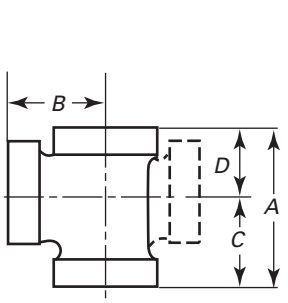
(b) For tolerances, see Table 2.

NOTES:

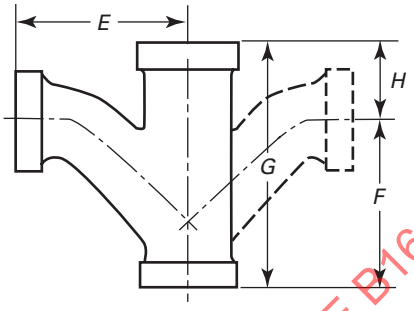
(1) Same dimensions as adopted for Class 125 Cast Iron Threaded Fittings (ASME B16.4).

(2) Double Y-branches have the same dimensions as single Y-branches.

Table 6 Dimensions of Y-Branches (Reducing Sizes)



90-deg Short Y-Branch Reducing

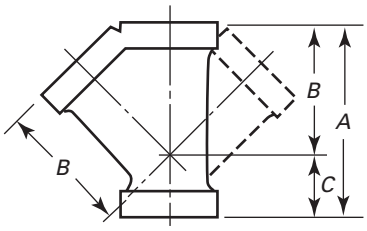


90-deg Long Y-Branch Reducing

NPS	90-deg Short Y-Branch End-to-End, *A*	90-deg Short Y-Branch Center-to-End, *B*	90-deg Short Y-Branch Center-to-End, *C*	90-deg Short Y-Branch Center-to-End, *D*	90-deg Long Y-Branch End-to-End, *G*	90-deg Long Y-Branch Center-to-End, *E*	90-deg Long Y-Branch Center-to-End, *F*	90-deg Long Y-Branch Center-to-End, *H*
1½ × 1¼	98.6	63.5	60.5	38.1	130.3	98.6	100.1	30.2
2 × 1½	117.6	74.7	68.3	49.3	146.1	111.3	112.8	33.3
2½ × 1½	124.0	77.7	71.4	52.3	146.1	115.8	112.8	33.3
2½ × 2	139.7	84.1	82.6	57.2	187.5	146.1	146.1	41.4
3 × 1½	128.5	84.1	74.7	54.1	150.9	127.0	117.6	33.3
3 × 2	144.5	92.2	84.1	60.5	192.0	153.9	150.9	41.4
4 × 1½	133.4	96.8	76.2	57.2	153.9	138.2	120.7	33.3
4 × 2	147.6	103.1	85.9	62.0	195.3	168.4	153.9	41.4
4 × 2½	168.4	112.8	96.8	71.4	219.2	179.3	168.4	50.8
4 × 3	187.5	120.7	109.5	77.7	254.0	204.7	193.8	60.5
5 × 1½	141.2	111.3	81.0	60.5	160.3	152.4	125.5	35.1
5 × 2	155.7	117.6	90.4	65.0	196.9	181.1	155.7	41.4
5 × 3	196.9	133.4	114.3	82.5	260.4	219.2	200.2	60.5
5 × 4	231.9	144.5	136.7	95.3	330.2	265.2	257.3	73.2
6 × 2	158.8	130.3	92.2	66.8	201.7	196.9	160.3	41.4
6 × 3	200.2	146.1	115.8	84.1	263.7	231.9	204.7	58.7
6 × 4	235.0	157.2	138.2	96.8	331.7	279.4	258.8	73.2
6 × 5	268.2	168.4	158.8	109.5	407.9	325.4	318.0	88.9

GENERAL NOTES:
(a) Dimensions are in millimeters.
(b) For tolerances, see Table 2.
(c) Double Y-branches have the same dimensions as single Y-branches.

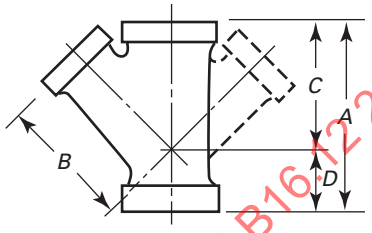
Table 7 Dimensions of 45-deg Y-Branches



NPS	End-to-End, *A*	Center-to-End, *B*	Center-to-End, *C*
1¼	127.0	82.6	44.5
1½	139.7	92.2	47.8
2	165.1	111.3	54.1
2½	200.2	136.7	63.5
3	228.6	157.2	71.4
4	276.4	195.3	81.0
5	328.7	233.4	95.3
6	378.0	273.1	104.9
8	477.8	344.4	133.4

GENERAL NOTES:
(a) Dimensions are in millimeters.
(b) For tolerances, see Table 2.
(c) Double Y-branches have the same dimensions as single Y-branches.

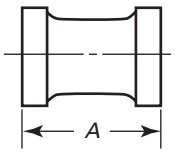
Table 8 Dimensions of 45-deg Y-Branches (Reducing Sizes)



NPS	End-to-End, *A*	Center-to-End, *B*	Center-to-End, *C*	Center-to-End, *D*
1½ × 1¼	133.4	87.4	88.9	44.5
2 × 1½	149.4	104.9	103.1	46.0
2½ × 1½	163.6	117.6	115.8	47.8
2½ × 2	179.3	130.3	125.5	54.1
3 × 1½	168.4	128.5	125.5	42.9
3 × 2	187.5	136.7	134.9	52.3
3 × 2½	203.2	147.6	144.5	58.7
4 × 1½	182.6	153.9	146.1	36.6
4 × 2	195.3	160.3	152.4	42.9
4 × 3	235.0	182.6	174.8	60.5
5 × 2	209.6	182.6	174.8	35.1
5 × 3	249.2	200.2	193.8	55.6
5 × 4	289.1	215.9	214.4	74.7
6 × 2	214.4	204.7	192.0	22.4
6 × 3	254.0	222.3	211.1	42.9
6 × 4	301.8	238.3	230.1	71.4
6 × 5	330.8	254.0	249.2	81.0
8 × 4	290.6	279.4	265.2	25.4
8 × 6	379.5	314.5	301.8	77.7

GENERAL NOTES:
(a) Dimensions are in millimeters.
(b) For tolerances, see Table 2.
(c) Double Y-branches have the same dimensions as single Y-branches.

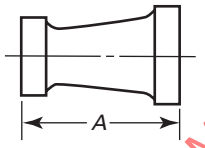
Table 9 Dimensions of Couplings



NPS	End-to-End, *A*
1¼	76.2
1½	85.9
2	95.3
2½	101.6
3	108.0
4	114.3
5	120.7
6	127.0
8	142.7

GENERAL NOTES:
(a) Dimensions are in millimeters.
(b) For tolerances, see Table 2.

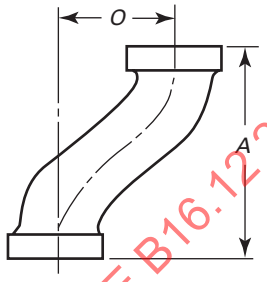
Table 10 Dimensions of Increasers



NPS	End-to-End, *A*
1½ × 2	228.6
2 × 2½	228.6
2 × 3	228.6
2½ × 3	228.6
2 × 4	228.6
3 × 4	228.6
2 × 5	228.6
3 × 5	228.6
4 × 5	228.6
4 × 6	228.6
5 × 6	228.6
4 × 8	228.6
5 × 8	228.6
6 × 8	228.6

GENERAL NOTES:
(a) Dimensions are in millimeters.
(b) For tolerances, see Table 2.

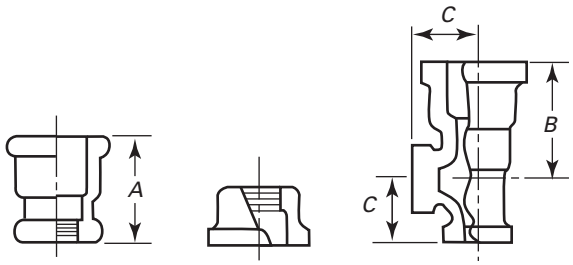
Table 11 Dimensions of Offsets



NPS	Offset, *O*	End-to-End, *A*
2	101.6	190.5
2	152.4	241.3
2	203.2	292.1
2	254.0	342.9
3	101.6	222.3
3	152.4	273.1
3	203.2	323.9
3	254.0	374.7
4	101.6	247.7
4	152.4	298.5
4	203.2	349.3
4	254.0	400.1
4	304.8	250.9
5	152.4	320.8
5	203.2	371.6
5	254.0	422.4
5	304.8	473.2
6	152.4	346.2
6	203.2	397.0
6	254.0	447.8
6	304.8	498.6

GENERAL NOTES:
(a) Dimensions are in millimeters.
(b) For tolerances, see Table 2.

Table 12 Dimensions of Tucker Connections, Roof Connections, and Tucker Y-Branches



Tucker Connection | Roof Connection | Tucker Y-Branch

NPS	Length, *A*	Center-to-Tucker End, *B*	Center-to-Threaded End, *C*
1¼	95.3	100.1	57.2
1½	101.6	108.0	63.5
2 [Note (1)]	114.3	119.1	77.7
3	120.7	136.7	108.0
4 [Note (2)]	177.8	. . .	. . .
5 [Note (2)]	177.8	. . .	. . .
6 [Note (2)]	177.8	. . .	. . .

GENERAL NOTES:

(a) Dimensions are in millimeters.

(b) For tolerances, see Table 2.

(c) The hubs on Tucker connections, roof connections, and Tucker Y-branches are designed to be used with wrought iron and steel pipe of the nominal pipe size.

(d) For pitch of Tucker Y-branch, see Fig. 2 and para. 6(f).

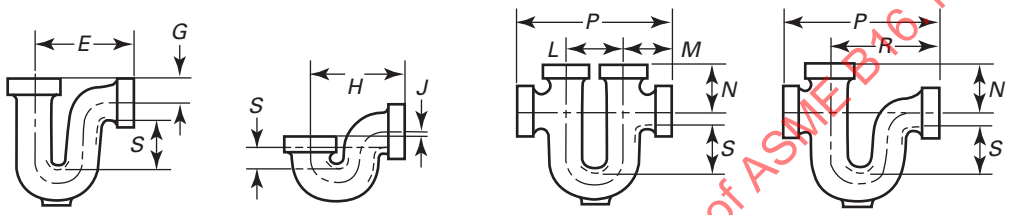
(e) Roof connections are not made to standard dimensions, except for the thread, which may be either straight or tapered [see para. 6(a)].

NOTES:

(1) The size 2 Tucker connection may be made of malleable iron, having a diameter to fit within a nominal 100 mm building wall.

(2) These sizes are provided with loose rings to slip into hubs over wrought pipe. Other sizes may be provided with loose rings at the option of the manufacturer.

Table 13 Dimensions of P-Traps, Bath P-Traps, and Running Traps

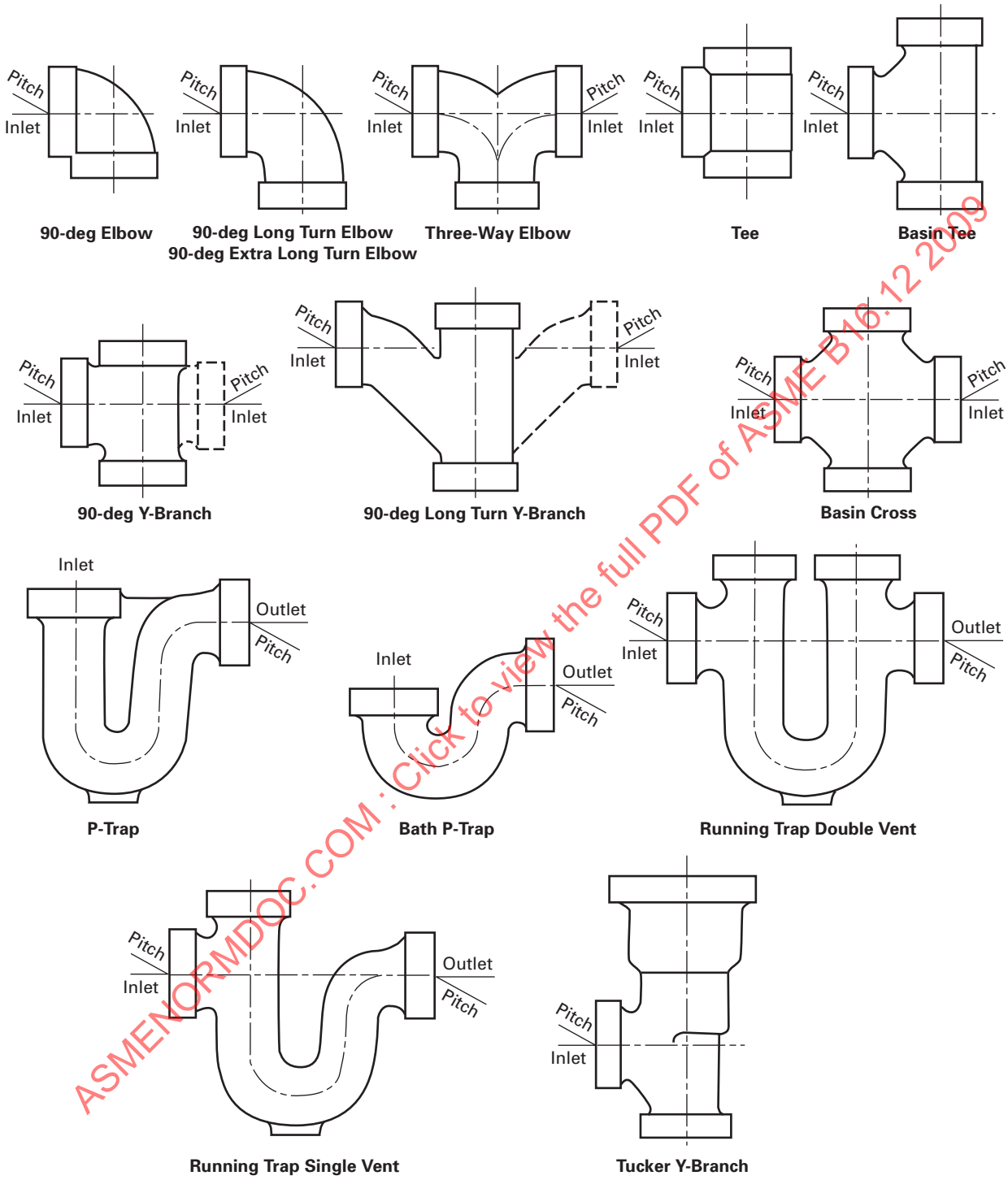


P-Trap | Bath P-Trap | Running Trap Double Vent | Running Trap Single Vent

NPS	P-Traps		Bath P-Traps		Running Traps					Minimum Water Seal,	Cleanout,
	E	*G*	*H*	*J*	*P*	*L*	*M*	*N*	*R*	*S*	NPS
1¼	100.1	19.1	. . .	. . .	196.9	79.5	58.7	50.8	138.2	50.8	¾
1½	111.3	22.4	114.3	6.4	212.9	85.9	63.5	57.2	149.4	50.8	1
2	134.9	22.4	134.9	0	257.3	101.6	77.7	65.0	179.3	50.8	1
3	181.1	30.2	. . .	. . .	349.3	136.7	106.4	88.9	242.8	63.5	1¼
4	235.0	38.1	. . .	. . .	438.2	177.8	130.3	106.4	308.1	63.5	2

GENERAL NOTES:
(a) Dimensions are in millimeters.
(b) For tolerances, see Table 2.
(c) For pitch of traps, see Fig. 2.

Fig. 2 Types of Fittings Tapped to Provide 21 mm/m (0.25 in./ft) Pitch



GENERAL NOTE: Inlets of all drainage fittings have openings of 90-deg nominal angle; outlets of P-traps and bath P-traps, and both inlets and outlets of running traps are tapped, pitched 21 mm/m (0.25 in./ft) with the pitch in the direction shown (exaggerated for illustration). The faces of bands of pitched openings may be perpendicular to the pitch line. Similar types of reducing fittings are tapped and pitched likewise.

MANDATORY APPENDIX I
REFERENCES

The following is a list of publications referenced in this Standard.

ASME B1.20.1-1983 (R1992), Pipe Threads, General Purpose (Inch)[1]

ASME B16.4-1998, Gray Iron Threaded Fittings[1]

ASME B36.10M-1996, Welded and Seamless Wrought Steel Pipe[1]

Publisher: The American Society of Mechanical Engineers (ASME), Three Park Avenue, New York, NY 10016-5990; Order Department: 22 Law Drive, P.O. Box 2300, Fairfield, NJ 07007-2300 (www.asme.org)

ASTM A 126-95, Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings

ASTM A 197-87 (R1992), Specification for Cupola Malleable Iron

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

ISO 9000: 2005, Quality Management Systems — Fundamentals and Vocabulary

ISO 9001: 2000, Quality Management Systems — Requirements

ISO 9004: 2000, Quality Management Systems — Guidelines for Performance Improvements

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

MSS SP-25-1998, Standard Marking System for Valves, Fittings, Flanges, and Unions

Publisher: Manufacturers Standardization Society of the Valve and Fittings Industry, 127 Park Street, NE, Vienna, VA 22180 (www.mss-hq.org)

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

MANDATORY APPENDIX II
DIMENSIONS OF FITTINGS IN U.S. CUSTOMARY UNITS

Table II-1 Inspection Limits for Diameter and Width of Band

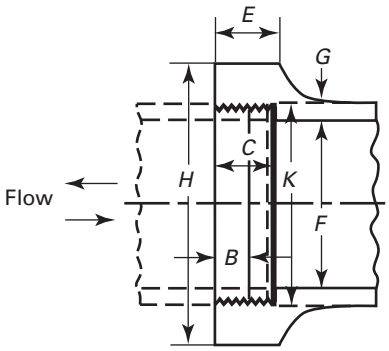
NPS	Diameter and Width of Band, Minus, in.
1¼	0.04
1½	0.04
2	0.04
2½	0.05
3	0.05
4	0.06
5	0.06
6	0.07
8	0.09

Table II-2 Inspection Limits for Center-to-End Dimensions

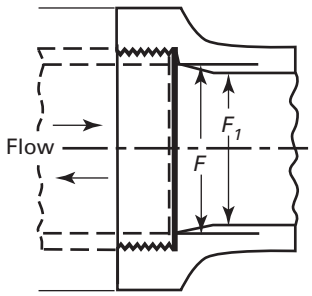
NPS	Center-to-End, Plus or Minus, in.
1¼	0.07
1½	0.08
2	0.08
2½	0.10
3	0.10
4	0.12
5	0.12
6	0.14
8	0.16

GENERAL NOTE: The above limits apply to all fittings covered by this Standard. Inspection limits for end-to-end dimensions shall be double the limits for center-to-center dimensions. The largest opening in the fitting governs the tolerance to be applied to all openings.

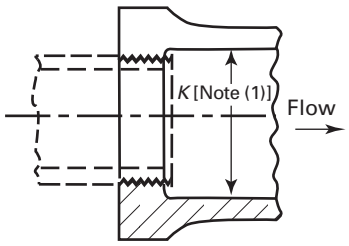
Table II-3 Wall Thickness and Threaded End Dimensions



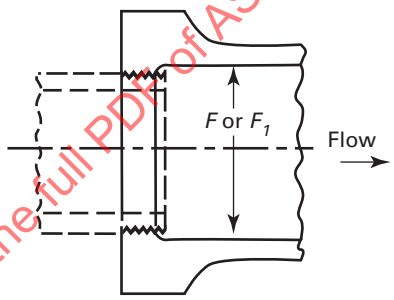
Type 1



Type 2



Type 3 [Note (2)]



Type 4 (Bushed) [Note (2)]

NPS	Length of Threads, *B*	Total Length of Thread Chamber to Shoulder, *C*	Width of Band, *E*	Inside Diameter of Fitting		Nominal Metal Thickness, *G*	Outside Diameter of Band, *H*	Recess Diameter, *K*	
				F	F_1			Max.	Min.
$1\frac{1}{4}$	0.42	0.71	0.71	1.38	1.25	0.18	2.39	1.73	1.66
$1\frac{1}{2}$	0.42	0.72	0.72	1.61	1.5	0.20	2.68	1.97	1.90
2	0.44	0.76	0.76	2.07	2.00	0.22	3.28	2.44	2.37
$2\frac{1}{2}$	0.68	1.14	1.14	2.47	2.50	0.24	3.86	2.97	2.87
3	0.77	1.20	1.20	3.07	3.00	0.26	4.62	3.60	3.50
4	0.84	1.30	1.30	4.03	4.00	0.31	5.79	4.60	4.50
5	0.94	1.41	1.41	5.05	5.00	0.38	7.05	5.66	5.56
6	0.96	1.51	1.51	6.06	6.00	0.43	8.28	6.72	6.62
8	1.06	1.71	1.71	7.98	8.00	0.55	10.63	8.72	8.62

GENERAL NOTES:

(a) Dimensions are in inches.

(b) For tolerances, see section 5.

(c) Type 2 fittings having diameters *F* and F_1 shall be tapered as shown.

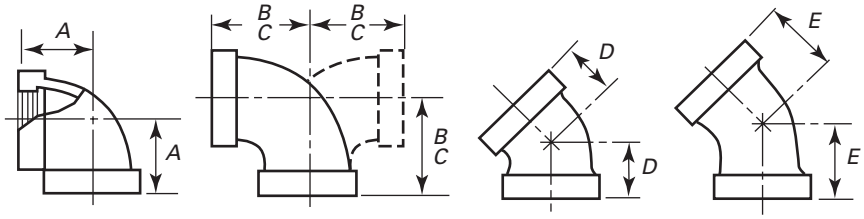
(d) The shoulder and groove, Types 1 and 2, are required on outlet connections. They are also required on inlet connections that are the same size as the outlet connections. Inlet connections that are smaller than the outlet connections may be made as shown in Type 3 or Type 4, at the manufacturer's option.

NOTES:

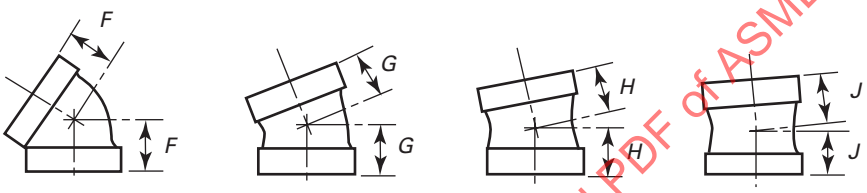
(1) Values for *K* correspond to reduced size inlet.

(2) The openings for Types 3 and 4 are reduced size inlet.

Table II-4 Center-to-End Dimensions of Elbows



90-deg Short Elbow | 90-deg Long Elbow, 90-deg Extra Long Elbow and Three-Way Elbow | 45-deg Short Elbow | 45-deg Long Elbow



60-deg Elbow | $22^1/_2$-deg Elbow | $11^1/_4$-deg Elbow | $5^5/_8$-deg Elbow

NPS	90-deg Elbow			45-deg Elbow		60-deg Elbow, *F*	$22^1/_2$-deg Elbow, *G*	$11^1/_4$-deg Elbow, *H*	$5^5/_8$-deg Elbow, *J*
	Short, *A* [Note (1)]	Long and Three-Way Elbow, *B* [Note (2)]	Extra Long, *C*	Short, *D* [Note (1)]	Long, *E*				
$1^1/_4$	1.75	2.25	3.00	1.31	1.75	1.56	1.13	1.06	1.19
$1^1/_2$	1.94	2.50	3.50	1.44	1.88	1.75	1.25	1.25	1.31
2	2.25	3.06	4.00	1.69	2.25	2.06	1.44	1.38	1.50
$2^1/_2$	2.69	3.69	4.50	1.94	2.63	2.50	1.75	1.63	1.63
3	3.06	4.25	5.25	2.19	2.94	2.88	2.00	1.81	1.75
4	3.81	5.19	6.25	2.63	3.50	3.38	2.31	2.00	1.88
5	4.50	6.13	. . .	3.06	4.13	3.88	2.63	2.25	2.00
6	5.13	7.13	. . .	3.44	4.88	4.25	2.94	2.38	2.25
8	6.56	9.00	. . .	4.25	. . .	. . .	. . .	. . .	. . .

GENERAL NOTES:

(a) Dimensions are in inches.

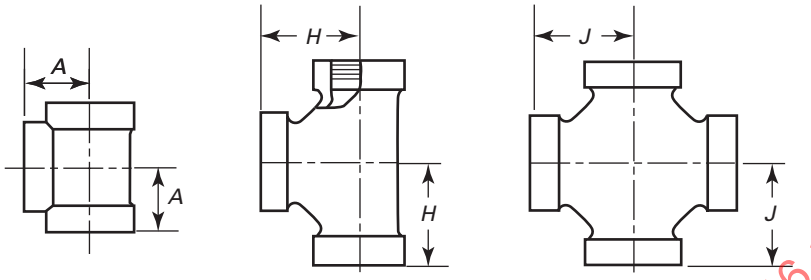
(b) For tolerances, see Table II-2.

NOTES:

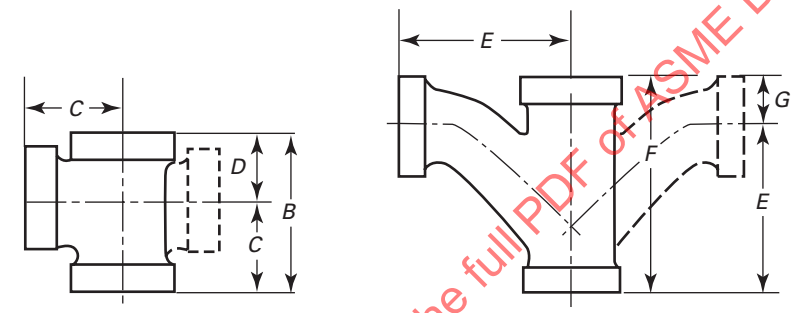
(1) Same dimensions as adopted for Class 125 Cast Iron Threaded Fittings (ASME B16.4).

(2) Three-way elbows have the same dimensions as 90-deg long radius elbows.

Table II-5 Dimensions of Tees, Crosses, and Y-Branches



Tee | Basin Tee | Basin Cross



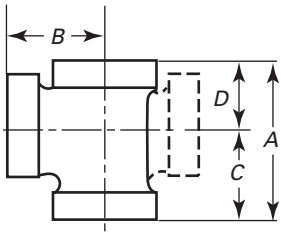
90-deg Short Y-Branch | 90-deg Long Y-Branch

NPS	Center-to-End of Tee, *A* [Note (1)]	90-deg Short Y-Branch [Note (2)] End-to-End, *B*	90-deg Short Y-Branch [Note (2)] Center-to-End, *C*	90-deg Short Y-Branch [Note (2)] Center-to-End, *D*	90-deg Long Y-Branch [Note (2)] Center-to-End, *E*	90-deg Long Y-Branch [Note (2)] End-to-End, *F*	90-deg Long Y-Branch [Note (2)] Center-to-End, *G*	Center-to-End of Basin Tee, *H*	Center-to-End of Basin Cross, *J*
1¼	1.75	3.75	2.25	1.50	3.63	4.75	1.13	2.31	2.31
1½	1.94	4.25	2.50	1.75	4.13	5.38	1.25	2.69	2.69
2	2.25	5.19	3.06	2.13	5.25	7.00	1.75	3.50	3.50
2½	2.70	6.31	3.69	2.63	6.25	8.25	2.00	4.25	. . .
3	3.08	7.25	4.25	3.00	7.50	9.88	2.38	. . .	. . .
4	3.79	8.75	5.19	3.56	9.88	13.00	3.13	. . .	. . .
5	4.50	10.31	6.13	4.19	12.25	15.75	3.50	. . .	. . .
6	5.13	11.94	7.13	4.81	14.63	18.75	4.13	. . .	. . .
8	6.56	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .

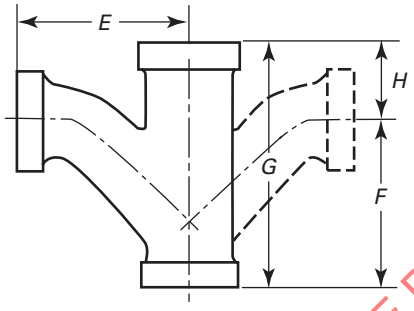
GENERAL NOTES:
(a) Dimensions are in inches.
(b) For tolerances, see Table II-2.

NOTES:
(1) Same dimensions as adopted for Class 125 Cast Iron Threaded Fittings (ASME B16.4).
(2) Double Y-branches have the same dimensions as single Y-branches.

Table II-6 Dimensions of Y-Branches (Reducing Sizes)



90-deg Short Y-Branch Reducing



90-deg Long Y-Branch Reducing

NPS	90-deg Short Y-Branch End-to-End, *A*	90-deg Short Y-Branch Center-to-End, *B*	90-deg Short Y-Branch Center-to-End, *C*	90-deg Short Y-Branch Center-to-End, *D*	90-deg Long Y-Branch End-to-End, *G*	90-deg Long Y-Branch Center-to-End, *E*	90-deg Long Y-Branch Center-to-End, *F*	90-deg Long Y-Branch Center-to-End, *H*
1½ × 1¼	3.88	2.50	2.38	1.50	5.13	3.88	3.94	1.19
2 × 1½	4.63	2.94	2.69	1.94	5.75	4.38	4.44	1.31
2½ × 1½	4.88	3.06	2.81	2.06	5.75	4.56	4.44	1.31
2½ × 2	5.50	3.31	3.25	2.25	7.38	5.75	5.75	1.63
3 × 1½	5.06	3.31	2.94	2.13	5.94	5.00	4.63	1.31
3 × 2	5.69	3.63	3.31	2.38	7.56	6.06	5.94	1.63
4 × 1½	5.25	3.81	3.00	2.25	6.06	5.44	4.75	1.31
4 × 2	5.81	4.06	3.38	2.44	7.69	6.63	6.06	1.63
4 × 2½	6.63	4.44	3.81	2.81	8.63	7.06	6.63	2.00
4 × 3	7.38	4.75	4.31	3.06	10.00	8.06	7.63	2.38
5 × 1½	5.56	4.38	3.19	2.38	6.31	6.00	4.94	1.38
5 × 2	6.13	4.63	3.56	2.56	7.75	7.13	6.13	1.63
5 × 3	7.75	5.25	4.50	3.25	10.25	8.63	7.88	2.38
5 × 4	9.13	5.69	5.38	3.75	13.00	10.44	10.13	2.88
6 × 2	6.25	5.13	3.63	2.63	7.94	7.75	6.31	1.63
6 × 3	7.88	5.75	4.56	3.31	10.38	9.13	8.06	2.31
6 × 4	9.25	6.19	5.44	3.81	13.06	11.00	10.19	2.88
6 × 5	10.56	6.63	6.25	4.31	16.06	12.81	12.56	3.50

GENERAL NOTES:
(a) Dimensions are in inches.
(b) For tolerances, see Table II-2.
(c) Double Y-branches have the same dimensions as single Y-branches.