

**ASME B16.23-2021**  
(Revision of ASME B16.23-2016)

# **Cast Copper Alloy Solder Joint Drainage Fittings: DWV**

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Mechanical Engineers**

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Mechanical Engineers**

Two Park Avenue • New York, NY • 10016 USA

Date of Issuance: March 18, 2022

The next edition of this Standard is scheduled for publication in 2026.

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# FOREWORD

Standardization work on solder joint fittings began in 1936 in Subcommittee 11 of Sectional Committee A40, Minimum Requirements for Plumbing and Standardization of Plumbing Equipment, organized within the American Standards Association (ASA). It resulted in the publication, in January 1941, of ASA A40.3-1941. That standard covered only supply (pressure) fittings.

In 1949, responsibility for solder joint fittings was transferred to newly formed Subcommittee 9 of Sectional Committee B16 on Standardization of Pipe Flanges and Fittings. The next revision of A40.3 appeared as ASA B16.18-1950, Cast-Brass Solder-Joint Fittings. During its development, however, the need for separate standards for wrought copper and wrought bronze supply fittings and for solder joint drainage fittings was recognized.

Work on the wrought fitting standard was undertaken by a joint committee of the Copper and Brass Research Association and the Manufacturers' Standardization Society of the Valve and Fittings Industry (MSS). That work, properly reviewed and approved, was published as ASA B16.22-1951.

Concurrently, in June 1949, at the request of Subcommittee 9, a task group organized by MSS began work on a standard for cast brass solder joint drainage fittings. Representatives of all U.S. and Canadian manufacturers were invited to participate. The Report of the Coordinating Committee for a National Plumbing Code was taken into account; special research on wall thickness and depth of solder joint was conducted; and coordination with other standards was sought, to avoid inconsistency. After working through nine drafts to reach consensus, the group submitted an April 1952 draft to Subcommittee 9. After committee, sponsor, and ASA approval, the standard was approved as ASA B16.23-1953, Cast Brass Solder Joint Drainage Fittings, on January 30, 1953.

Work soon began on a revision, to include additional sizes, reducing sizes, and additional types of fittings. A March 1955 draft was approved by the B16 Committee, sponsors, and ASA, and published as ASA B16.23-1955. Starting in 1958, responding to requests for further revision and expansion, the MSS task group developed a 1959 draft that was approved by Subcommittee 9, the B16 Committee, sponsors, and ASA, and was published as ASA B16.23-1960.

In 1967 and 1968, a complete revision was undertaken, including engineering studies to verify that a user request for shorter soldering cups was justified. The resulting draft, after approval by Subcommittee 9, USA Standards Committee B16, sponsors, and the (then-called) USA Standards Institute, was published as USAS B16.23-1969. An addenda, dated 1973, lengthened the cups on the three smallest sizes to overcome assembly problems.

The subcommittee, now Subcommittee I, began a new revision in 1974, resulting in the inclusion of the 1973 addenda, addition of metric equivalents, and change of "bronze" to "copper alloy." The draft, finally approved by the (again renamed) American National Standards Institute (ANSI), was published as ANSI B16.23-1976.

In 1982, a new edition updating dimensional tables and metric equivalents was developed. Following approval at all levels, the revision was published as ANSI B16.23-1984.

Also in 1982, American National Standards Committee B16 became the ASME B16 Standards Committee, operating with the same scope, under ASME procedures accredited by ANSI. Subsequently, Subcommittee I merged with Subcommittee J, which had a related scope.

The 1992 edition removed metric units, establishing U.S. Customary units as the standard. Clarifications and updating changes were made to improve the text. The 2002 edition of B16.23 added SI units of measure in the main body of text and moved U.S. Customary units to Mandatory Appendix I. A Nonmandatory Appendix for Quality System Programs was added, plus editorial changes were made to improve text. Following approval by the Standards Committee and ASME, approval as an American National Standard was given on February 6, 2002, with the designation, ASME B16.23-2002.

In the 2011 edition, references to ASME standards were revised to no longer list specific edition years. Following approval by the Standards Committee and the ASME Board on PTCS, the revision to the 2002 edition was approved as an American National Standard by ANSI on September 23, 2011, with the new designation ASME B16.23-2011.

In the 2016 edition, provisions have been made to update verbiage and readings. Following approval by the ASME B16 Standards Committee, ASME B16.23-2016 was approved as an American National Standard by ANSI on October 21, 2016.

In ASME B16.23-2021, 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 the subsequent Mandatory Appendix has been redesignated and updated. Cross-references have been updated accordingly. Following approval by the ASME B16 Standards Committee, ASME B16.23-2021 was approved by ANSI on November 12, 2021.

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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](mailto: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.

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**Attending Committee Meetings.** The B16 Standards Committee regularly holds meetings and/or telephone conferences that are open to the public. Persons wishing to attend any meeting and/or telephone conference should contact the Secretary of the B16 Standards Committee.

# ASME B16.23-2021

## SUMMARY OF CHANGES

Following approval by the ASME B16 Standards Committee and ASME, and after public review, ASME B16.23-2021 was approved by the American National Standards Institute on November 12, 2021.

In ASME B16.23-2021, 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 the subsequent Mandatory Appendix has been redesignated. Cross-references have been updated accordingly. In addition, this edition includes the following changes 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</i>
1	2.1	Editorially revised
35	Table 6-51	Title editorially revised
40	Mandatory Appendix I	Updated (20-2576)

# LIST OF CHANGES IN RECORD NUMBER ORDER

<u>Record Number</u>	<u>Change</u>
20-2576	Updated references in Mandatory Appendix I (former Mandatory Appendix II).

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# CAST COPPER ALLOY SOLDER JOINT DRAINAGE FITTINGS: DWV

## 1 SCOPE

This Standard establishes specifications for cast copper alloy solder joint drainage fittings, designed for use in drain, waste, and vent (DWV) systems. These fittings are designed for use with seamless copper tube conforming to ASTM B306, Copper Drainage Tube (DWV), as well as fittings intended to be assembled with soldering materials conforming to ASTM B32, or tapered pipe thread conforming to ASME B1.20.1.

This Standard is allied with ASME B16.29, Wrought Copper and Wrought Copper Alloy Solder Joint Drainage Fittings — DWV.

It provides requirements for fitting ends suitable for soldering. This Standard covers

- (a) description
- (b) pitch (slope)
- (c) abbreviations for end connections
- (d) sizes and methods for designing openings for reducing fittings
- (e) marking
- (f) material
- (g) dimensions and tolerances

## 2 GENERAL

### (21) 2.1 Relevant Units

This Standard states values in both SI (Metric) and U.S. Customary units. These systems of units are to be regarded separately as standard. 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 the Standard.

### 2.2 References

Standards and specifications adopted by reference in this Standard are shown in [Mandatory Appendix I](#), which is part of this Standard. It is not considered practical to identify the specific edition of each standard and specification in the individual references. Instead, the specific edition reference is identified in [Mandatory Appendix I](#).

## 2.3 Quality Systems

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

## 3 DESCRIPTION

(a) These fittings are designed for drainage and vent systems using the solder joint method of connection. The fitting cups (C), are provided with stops so that the ends of the tube, when assembled, meet the stops, thereby forming essentially smooth passageways.

(b) The sketches and designs of fittings are illustrative only. The dimensions specified herein shall govern in all cases.

## 4 PITCH (SLOPE)

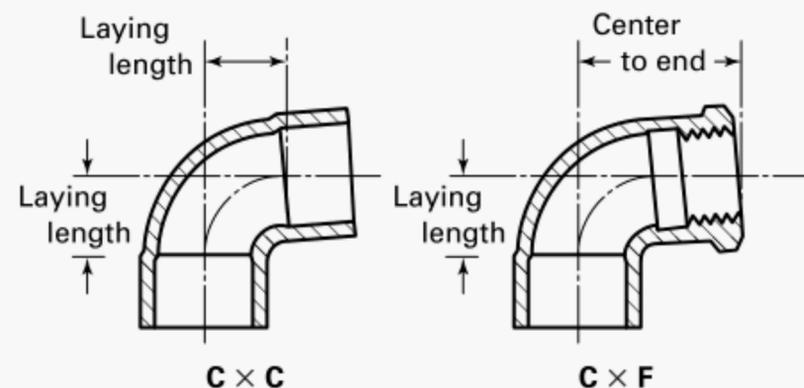
All nominal 90-deg fittings shall be pitched to result in a slope of 21 mm/m (0.25 in./ft) (2.1%) of length of horizontal tube with reference to a horizontal plane (see [Figure 4-1](#)).

## 5 ABBREVIATIONS

The following symbols are used to designate the type of fitting end:

- C = solder-joint fitting end made to receive copper tube diameter (female)
- F = internal ANSI Standard taper pipe thread (female) NPT

**Figure 4-1**  
**Typical Laying Lengths of DWV 90-deg Elbows**



FTG = solder-joint fitting end made to copper tube diameter (male)

M = external ANSI Standard taper pipe thread (male) NPT

NPSM = standard straight mechanical pipe thread

SJ = end of fitting made to receive O.D. tube size

## 6 SIZE

(a) The size of the fittings scheduled in Tables 6-1 through 6-56 corresponds to the drainage tube size shown in ASTM B306. The size of the threaded ends (except slip joints) corresponds to the nominal pipe size.

(b) Fittings are designated by the size of the openings in the sequence illustrated in Figure 6-1.

## 7 MARKING

(a) Each fitting shall be marked permanently and legibly with the manufacturer's name or trademark and with "DWV" (to indicate Drain Waste Vent).

(b) Vent fittings shall be permanently marked "VENT ONLY" (See Tables 6-43 and 6-44) and show the manufacturer's name or trademark in accordance with MSS SP-25.

## 8 MATERIAL

Castings shall be copper alloy produced to meet

(a) the requirements of ASTM B62 Alloy C83600; or

(b) the chemical and tensile requirements of ASTM B584 Alloy 83800 or 84400, and in all other respects comply with the requirements of ASTM B62.

## 9 METAL THICKNESS

Dimensional variations will occur in the casting process. Pattern equipment shall be designed to produce the metal thickness given for fittings in Table 6-2.

Any final fitting metal wall thickness less than 90% of the thickness given in the table is unacceptable.

## 10 INSPECTION TOLERANCE

### 10.1 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.

### 10.2 Linear Dimensions

DWV fittings covered by this Standard shall conform to the laying lengths specified in Tables 6-4 through 6-56. An inspection tolerance, as shown in Table 6-1, shall be allowed on center-to-shoulder, center-to-threaded end, and shoulder-to-threaded end dimensions on all fittings having internal solder (cup) ends; and on center-to-solder end, solder end-to-shoulder, and solder end-to-threaded dimensions on all fittings having external solder (fitting) ends. The largest opening in the fitting governs the tolerance to be applied to all openings.

The inspection tolerance for laying length dimensions *A*, *B*, and *C* (in Table 6-4) shall be double those shown above, except the minus tolerance applied to couplings; dimension *A* shall not result in a dimension less than 2.3 mm (0.09 in.).

### 10.3 Ovality

Maximum ovality shall not exceed 1% of the maximum diameters shown in Table 6-2. The average of the maximum and minimum diameters shall be within the dimensions shown in the table.

### 10.4 Alignment

The maximum allowable variations in the regular alignment of all openings shall be 5 mm/m (0.06 in./ft).

### 10.5 Gaging of Solder Joint Ends

(a) *Standard Gaging Method of Solder Joint Ends.* The standard method of gaging the diameter tolerances for male and female ends shall be by the use of plain plug and ring gages designed to hold the product within the limits established in Table 6-2.

(b) *Optional Gaging Method of Solder Joint Ends.* For gaging the diameter tolerance of male and female ends, the manufacturer may use direct reading instruments instead of ring and plug gages as specified in (a). When gaging the diameters of male and female ends, using direct reading instruments, refer to para. 10.3.

## 11 THREADED ENDS

### 11.1 General

Threaded ends shall conform to the dimensional requirements contained within Table 6-3. Fitting threads shall be right-hand, conforming to ASME B1.20.1. They shall be taper threads (NPT) except for slip joint ends, which shall have straight pipe threads (NPSM).

### 11.2 Thread Dimensions

All internal threads shall be countersunk a distance not less than one-half the pitch of the thread at an angle of approximately 45 deg with the axis of the thread.

All external threads shall be chamfered at an angle of 30 deg to 45 deg from the axis. This facilitates joint assembly and thread protection. Countersinking and chamfering shall be concentric to the threads. The length of threads specified in all tables shall be measured to include the countersink or chamfer.

**11.3 Threading Tolerances**

Tapered pipe threads (NPT) shall be checked by use of working plug or ring gages either standard or limit types. Gages shall be threaded hand tight. The reference point for gaging internal taper threads, the plug gage, shall be screwed hand tight into the fitting. Internal product threads depend upon the chamfer diameter. When the internal chamfer diameter exceeds the major diameter of the internal thread, the reference point shall be the last thread scratch on the chamfer cone. Otherwise, when the internal chamfer diameter does not exceed the major diameter of the internal thread, the reference point shall be the end of the fitting. On the external thread it shall be flush with the end of the fitting.

Tolerance for an internal threaded end having an internal shoulder shall be from one turn large to one turn small. Tolerance for an internal threaded end without shoulder and for an external threaded end shall be from one-half turn small to one and one-half turn large.

Straight pipe threads (NPSM) shall be checked by use of the standard GO and NO GO plug and ring gages.

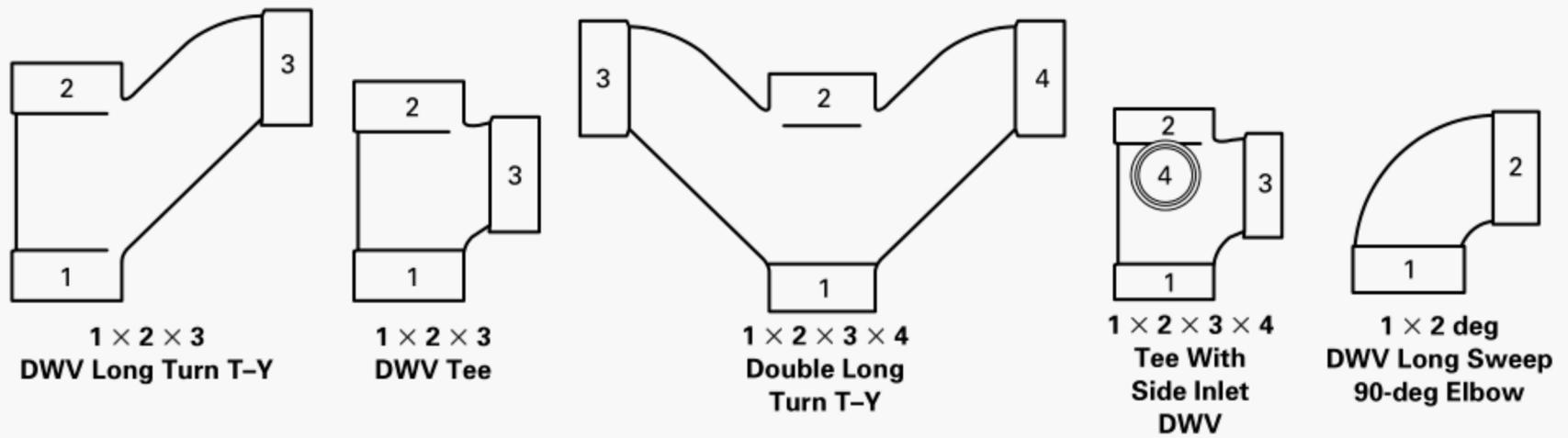
**12 CONFIGURATION OF THREADED ENDS**

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

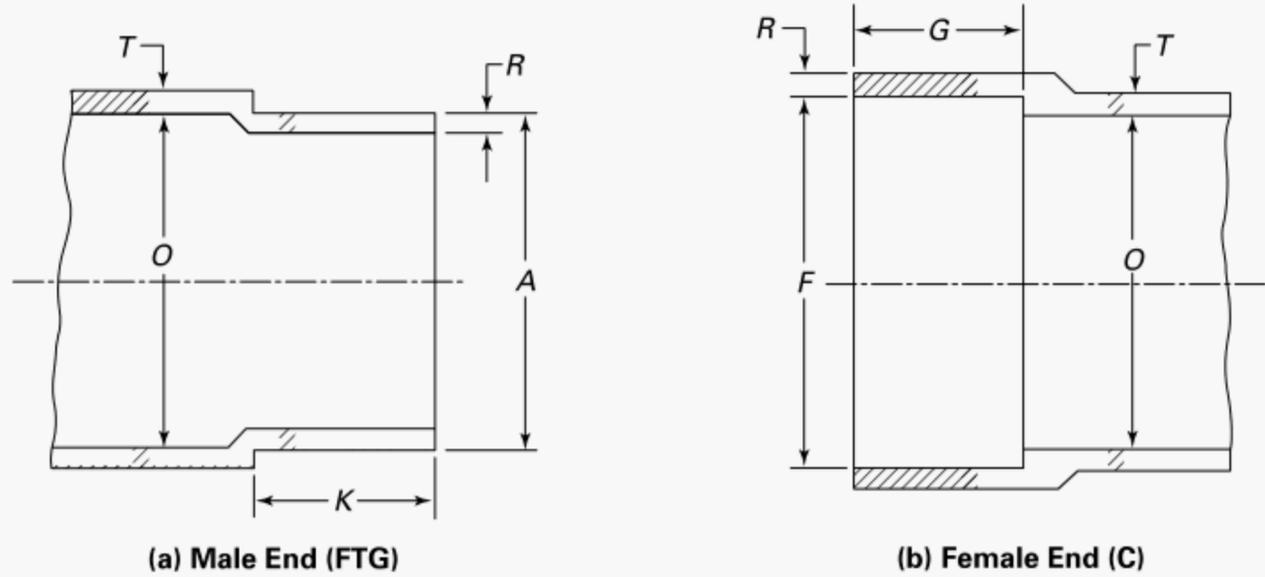
**Table 6-1  
Inspection Tolerance Table**

Nominal Size	± mm (in.)
1 <sup>1</sup> / <sub>4</sub> , 1 <sup>1</sup> / <sub>2</sub> , and 2	2.0 (0.08)
3	2.8 (0.11)
4 and 5	3.2 (0.12)
6 and 8	4.0 (0.16)

**Figure 6-1  
Size Sequence of Fittings**



**Table 6-2  
Dimensions of Solder Joint Ends — DWV**



Nominal Size [Note (1)]	Male End			Female End			Metal Thickness, [Note (4)]		Minimum Inside Diameter of Fitting, <i>O</i>
	Outside Diameter <i>A</i> , [Note (2)]		Minimum Length, <i>K</i> , [Note (3)]	Inside Diameter <i>F</i> , [Note (2)]		Minimum Depth, <i>G</i>	Body, <i>T</i>	Joint, <i>R</i>	
	Min.	Max.		Min.	Max.				
1¼	34.85 (1.372)	34.98 (1.377)	14.2 (0.56)	35.00 (1.378)	35.10 (1.382)	12.7 (0.50)	2.5 (0.10)	1.8 (0.07)	32.8 (1.29)
1½	41.17 (1.621)	41.33 (1.627)	15.7 (0.62)	41.35 (1.628)	41.48 (1.633)	14.2 (0.56)	2.5 (0.10)	2.0 (0.08)	38.9 (1.53)
2	53.87 (2.121)	54.03 (2.127)	17.5 (0.69)	54.05 (2.128)	54.18 (2.133)	15.7 (0.62)	2.5 (0.10)	2.3 (0.09)	51.1 (2.01)
3	79.27 (3.121)	79.43 (3.127)	20.6 (0.81)	79.45 (3.128)	79.58 (3.133)	19.1 (0.75)	3.0 (0.12)	2.5 (0.10)	75.7 (2.98)
4	104.67 (4.121)	104.83 (4.127)	26.9 (1.06)	104.85 (4.128)	104.98 (4.133)	25.4 (1.00)	3.0 (0.12)	3.0 (0.12)	99.8 (3.93)
5	130.07 (5.121)	130.23 (5.127)	33.3 (1.31)	130.25 (5.128)	130.38 (5.133)	31.8 (1.25)	4.8 (0.19)	4.8 (0.19)	124.7 (4.91)
6	155.47 (6.121)	155.63 (6.127)	41.1 (1.62)	155.65 (6.128)	155.78 (6.133)	38.1 (1.50)	4.8 (0.19)	4.8 (0.19)	149.4 (5.88)
8	206.22 (8.119)	206.43 (8.127)	53.8 (2.12)	206.45 (8.128)	206.58 (8.133)	50.8 (2.00)	5.6 (0.22)	5.6 (0.22)	197.6 (7.78)

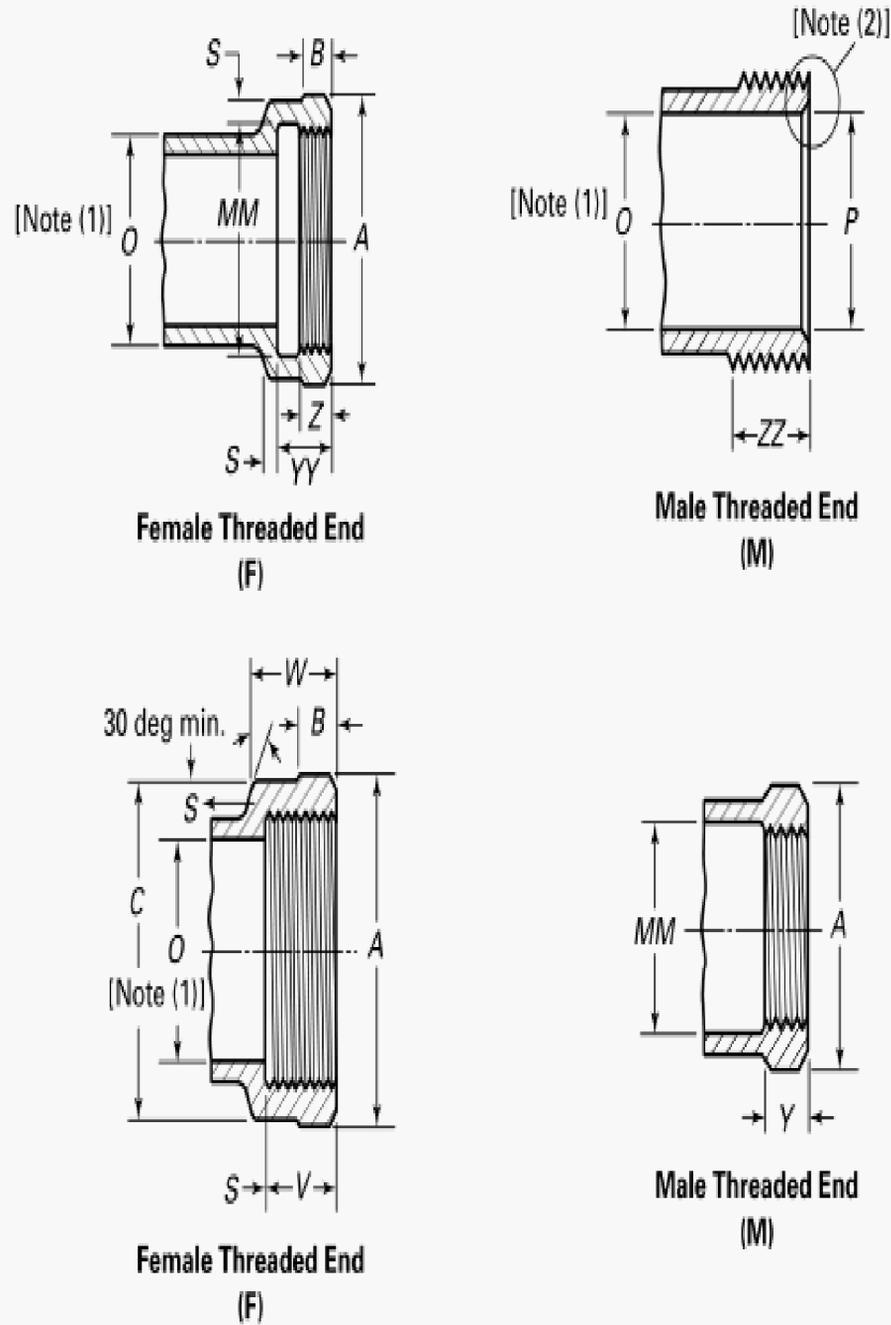
GENERAL NOTES:

- (a) Dimensions are in millimeters (inches).
- (b) The sketches and designs of fittings are illustrative only. The dimensions herein shall govern in all cases.

NOTES:

- (1) For size designation of fitting, see section 6.
- (2) For ovality, see para. 10.3.
- (3) *K* dimensions of 11.2 mm (0.44 in.), 12.7 mm (0.50 in.), and 14.2 mm (0.56 in.) and *G* dimensions of 9.7 mm (0.38 in.), 11.2 mm (0.44 in.), and 12.7 mm (0.50 in.), respectively, for 1¼-in., 1½-in., and 2-in. sizes are sound and acceptable from an engineering standpoint. However, the cup depths specified in Table 6-2 are to provide greater facility in making installations.
- (4) For metal thickness tolerance, see section 9.

**Table 6-3**  
**Dimensions of Threaded Ends — DWV**



5

ASME B16.23-2021

Nominal Thread Size [Note (3)]	Minimum Dia. of Band or Across Flats of Polygon, <i>A</i>	Minimum Band Length, <i>B</i>	Minimum Dia. of Body Over Thread, <i>C</i>	Minimum Dia. of Recess, <i>MM</i> [Note (4)]	Minimum Depth of Full Thread, <i>V</i>	Minimum, <i>W</i>	Minimum Length of Thread, <i>Y</i>	Minimum End To Shoulder, <i>YY</i> ±1.5 (±0.06), [Note (4)]	Minimum Thread End Wall, <i>S</i> [Note (5)]	Maximum Thread End Bore, <i>P</i> [Note (4)]	Minimum Length of Effective Thread, <i>ZZ</i>
1¼	48.5 (1.91)	7.9 (0.31)	48.3 (1.90)	42.2 (1.66)	18.0 (0.71)	25.4 (1.00)	10.7 (0.42)	17.8 (0.70)	3.05 (0.120)	33.27 (1.31)	18.034 (0.71)
1½	55.1 (2.17)	8.6 (0.34)	55.1 (2.17)	48.5 (1.91)	18.3 (0.72)	25.4 (1.00)	10.7 (0.42)	18.3 (0.72)	3.30 (0.130)	39.37 (1.55)	18.3 (0.72)
2	68.3 (2.69)	10.4 (0.41)	68.1 (2.68)	60.5 (2.38)	19.3 (0.76)	26.2 (1.03)	11.2 (0.44)	19.1 (0.75)	3.81 (0.150)	51.56 (2.03)	19.3 (0.76)
3	98.6 (3.88)	14.0 (0.55)	98.6 (3.88)	88.9 (3.50)	30.5 (1.20)	37.1 (1.46)	19.6 (0.77)	30.5 (1.20)	4.83 (0.190)	77.47 (3.05)	30.5 (1.20)
4	125.5 (4.94)	16.8 (0.66)	125.5 (4.94)	114.3 (4.50)	33.0 (1.30)	38.9 (1.53)	21.3 (0.84)	33.0 (1.30)	5.59 (0.220)	102.87 (4.05)	33.0 (1.30)
5	155.4 (6.12)	19.8 (0.78)	155.4 (6.12)	141.2 (5.56)	35.8 (1.41)	42.2 (1.65)	23.9 (0.94)	35.8 (1.41)	7.11 (0.280)	126.49 (4.98)	35.8 (1.41)
6	185.4 (7.30)	22.4 (0.88)	185.4 (7.30)	168.1 (6.62)	38.4 (1.51)	42.7 (1.68)	24.4 (0.96)	38.1 (1.50)	8.64 (0.340)	153.16 (6.03)	38.4 (1.51)
8	238.3 (9.38)	28.4 (1.12)	238.0 (9.37)	218.9 (8.62)	43.4 (1.71)	44.5 (1.75)	26.9 (1.06)	43.2 (1.70)	9.53 (0.375)	201.93 (7.95)	43.4 (1.71)

**Table 6-3**  
**Dimensions of Threaded Ends — DWV (Cont'd)**

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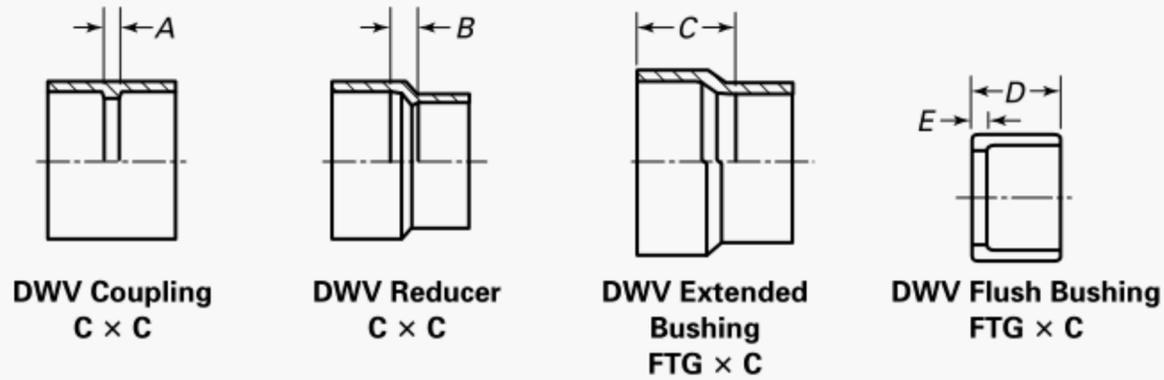
GENERAL NOTES:

- (a) Dimensions are in millimeters (inches).
- (b) For threads of threaded ends, see [section 11](#).

NOTES:

- (1) For inside diameter of fitting, see [Table 6-2](#).
- (2) 1¼ in., 1½ in., and 2 in. male threaded ends may have inside chamfer for slip nut connections.
- (3) Thread size is per American National Standard Pipe Threads, General Purpose (Inch), ASME B1.20.1.
- (4) Dimensions computed using formula  $E_1 - h - 2T$ .
  - $E_1$  = thread pitch diameter from ASME B1.20.1
  - $h$  = height of thread from ASME B1.20.1
  - $T$  = metal thickness from [Table 6-2](#)
- (5) For initial thickness tolerance, see [section 9](#).

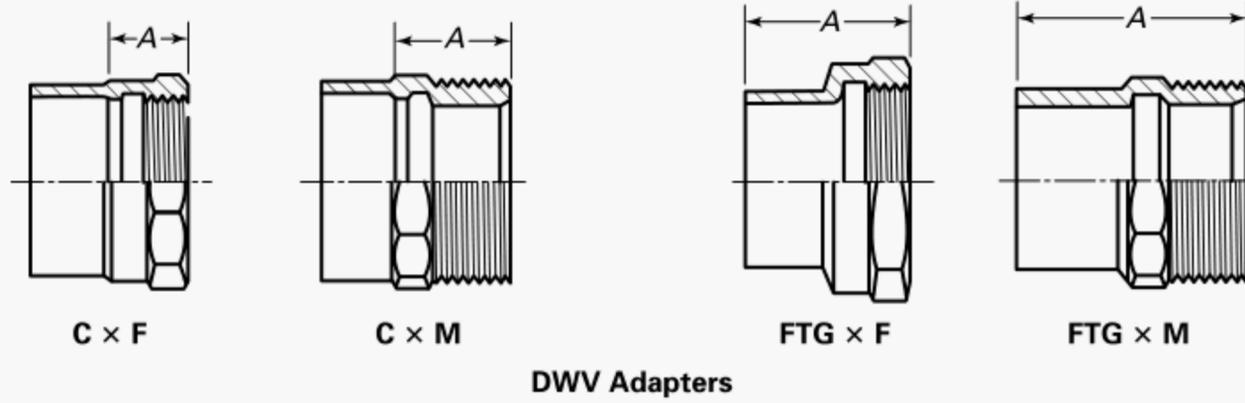
**Table 6-4**  
**Dimensions of DWV Couplings, Reducers, Extended Bushings, and Flush Bushings**



Nominal Size	Coupling, <i>A</i>	Reducer, <i>B</i>	Extended Bushing, <i>C</i>	Flush Bushing	
				<i>D</i>	<i>E</i>
1¼	3.0 (0.12)	...	...	...	...
1½	3.0 (0.12)	...	...	...	...
1½ x 1¼	...	6.4 (0.25)	19.1 (0.75)	15.7 (0.62)	3.0 (0.12)
2	3.0 (0.12)	...	...	...	...
2 x 1½	...	9.7 (0.38)	23.1 (0.91)	17.5 (0.69)	3.3 (0.13)
2 x 1¼	...	11.2 (0.44)	23.9 (0.94)	17.5 (0.69)	4.8 (0.19)
3	4.8 (0.19)	...	...	...	...
3 x 2	...	19.1 (0.75)	35.1 (1.38)	20.6 (0.81)	4.8 (0.19)
3 x 1½	...	23.9 (0.94)	33.3 (1.31)	20.6 (0.81)	6.4 (0.25)
3 x 1¼	...	23.9 (0.94)	33.3 (1.31)	...	...
4	4.8 (0.19)	...	...	...	...
4 x 3	...	8.6 (0.34)	41.1 (1.62)	26.9 (1.06)	7.9 (0.31)
4 x 2	...	12.7 (0.50)	44.5 (1.75)	...	...
4 x 1½	...	38.1 (1.50)	...	...	...
5	6.4 (0.25)	...	...	...	...
5 x 4	...	14.2 (0.56)	39.6 (1.56)	...	...
5 x 3	...	22.4 (0.88)	47.8 (1.88)	...	...
6	6.4 (0.25)	...	...	...	...
6 x 5	...	13.5 (0.53)	74.7 (2.94)	...	...
8	9.7 (0.38)	...	...	...	...
8 x 6	...	35.1 (1.38)	...	...	...

GENERAL NOTE: Dimensions are in millimeters (inches).

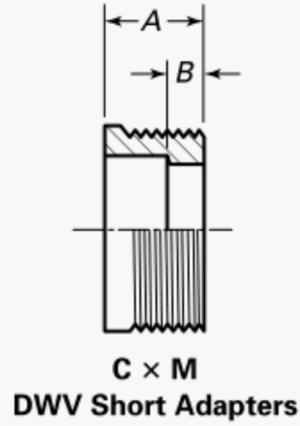
**Table 6-5  
Dimensions of DWV Adapters**



Nominal Size	C x F, A	C x M, A	FTG x F, A	FTG x M, A
1¼	20.6 (0.81)	23.9 (0.94)	37.3 (1.47)	49.3 (1.94)
1¼ x 2	23.9 (0.94)	33.3 (1.31)	...	...
1¼ x 1½	20.6 (0.81)	28.4 (1.12)	...	...
1½	20.6 (0.81)	23.9 (0.94)	38.9 (1.53)	52.3 (2.06)
1½ x 2	22.4 (0.88)	31.8 (1.25)	...	...
1½ x 1¼	20.6 (0.81)	26.9 (1.06)	...	...
2	22.4 (0.88)	23.9 (0.94)	41.4 (1.63)	60.5 (2.38)
2 x 3	47.8 (1.88)	...	...	...
2 x 1½	22.4 (0.88)	26.9 (1.06)	...	...
2 x 1¼	22.4 (0.88)	26.9 (1.06)	...	...
3	38.1 (1.50)	39.6 (1.56)	60.5 (2.38)	76.2 (3.00)
3 x 4	57.2 (2.25)	...	...	...
3 x 2	39.6 (1.56)	36.6 (1.44)	...	...
4	42.2 (1.66)	41.1 (1.62)	71.4 (2.81)	91.9 (3.62)
4 x 3	42.9 (1.69)	...	...	...
5	49.3 (1.94)	44.5 (1.75)	...	...
6	55.6 (2.19)	50.8 (2.00)	96.8 (3.81)	...
8	66.5 (2.62)	85.9 (3.38)	111.3 (4.38)	...

GENERAL NOTE: Dimensions are in millimeters (inches).

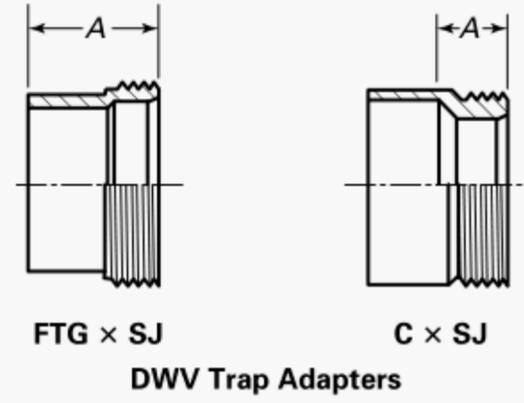
**Table 6-6**  
**Dimensions of DWV Short Adapters**



Nominal Size	C × M	
	A	B
1¼	25.4 (1.00)	12.7 (0.50)
1½	25.4 (1.00)	11.2 (0.44)
1¼ × 1½	25.4 (1.00)	12.7 (0.50)
2	28.4 (1.12)	12.7 (0.50)
1½ × 2	30.2 (1.19)	15.7 (0.62)

GENERAL NOTE: Dimensions are in millimeters (inches).

**Table 6-7**  
**Dimensions of DWV Trap Adapters**



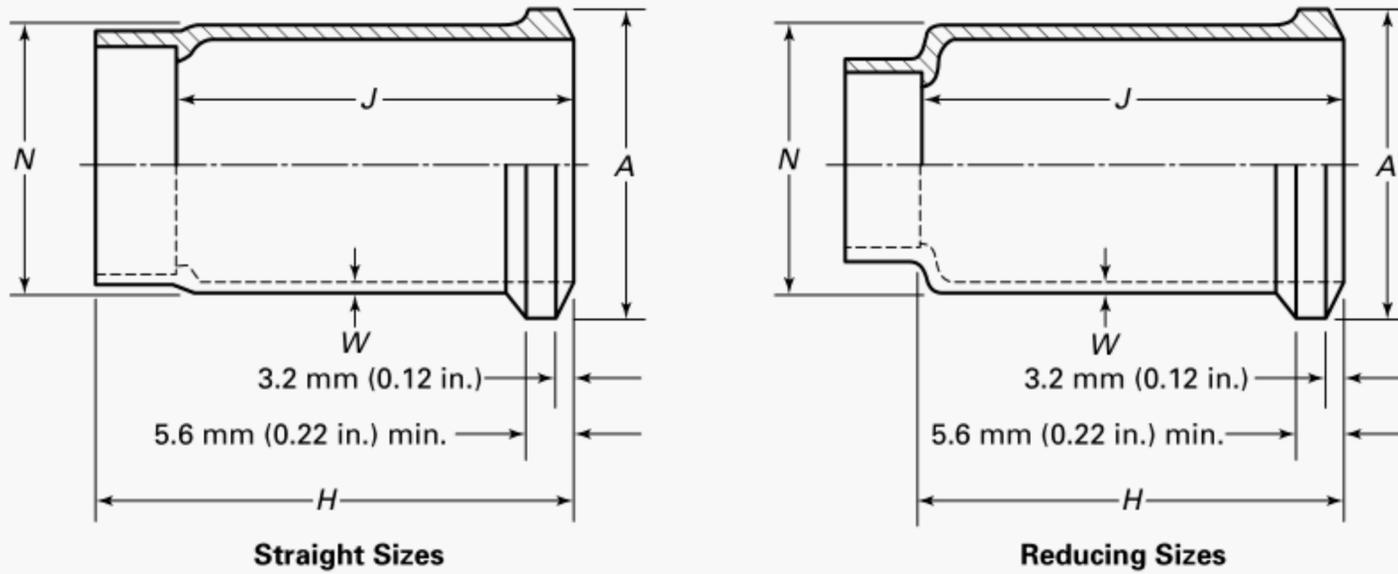
Nominal Size	FTG × SJ, A	C × SJ, A
1¼	30.2 (1.19)	15.7 (0.62)
1½	31.8 (1.25)	17.5 (0.69)
1½ × 1¼	...	17.5 (0.69)
2	...	17.5 (0.69)
2 × 1½	...	17.5 (0.69)

GENERAL NOTES:

(a) Dimensions are in millimeters (inches).

(b) For dimensions of slip joint ends, see [Table 6-49](#).

**Table 6-8**  
**Dimensions of C to Soil Pipe Adapter for Joining to Extra Heavy Soil Pipe**



**DWV Soil Pipe Adapter — C × Spigot**

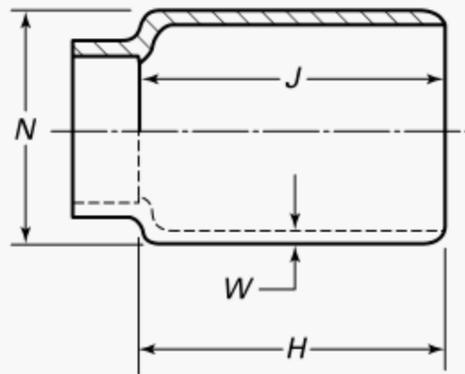
Nominal Size Soil Pipe, C × Spigot [Note (1)]	Diameter of Bead, A		Body Wall, W	Body Outside Diameter, $N \pm 2.286 (\pm 0.09)$ [Note (2)]	Body Length, $H \pm 1.524 (\pm 0.06)$ [Note (3)]	Laying Length, J
	Min.	Max.				
2 × 2	69.9 (2.75)	68.3 (2.69)	2.5 (0.10)	60.5 (2.38)	63.5 (2.50)	63.5 (2.50)
1 × 2	69.9 (2.75)	68.3 (2.69)	2.5 (0.10)	60.5 (2.38)	82.6 (3.25)	58.7 (2.31)
1½ × 2	69.9 (2.75)	68.3 (2.69)	2.5 (0.10)	60.5 (2.38)	82.6 (3.25)	58.7 (2.31)
1¼ × 2	69.9 (2.75)	68.3 (2.69)	2.5 (0.10)	60.5 (2.38)	82.6 (3.25)	84.1 (3.31)
3 × 3	98.6 (3.88)	96.8 (3.81)	3.0 (0.12)	88.9 (3.50)	69.9 (2.75)	69.9 (2.75)
2 × 3	98.6 (3.88)	96.8 (3.81)	3.0 (0.12)	88.9 (3.50)	88.9 (3.50)	90.4 (3.56)
1½ × 3	98.6 (3.88)	96.8 (3.81)	3.0 (0.12)	88.9 (3.50)	88.9 (3.50)	90.4 (3.56)
4 × 4	124.0 (4.88)	122.2 (4.81)	3.0 (0.12)	114.3 (4.50)	76.2 (3.00)	76.2 (3.00)
3 × 4	124.0 (4.88)	122.2 (4.81)	3.0 (0.12)	114.3 (4.50)	95.3 (3.75)	96.8 (3.81)
2 × 4	124.0 (4.88)	122.2 (4.81)	3.0 (0.12)	114.3 (4.50)	95.3 (3.75)	98.6 (3.88)
1½ × 4	124.0 (4.88)	122.2 (4.81)	3.0 (0.12)	114.3 (4.50)	95.3 (3.75)	98.6 (3.88)
5 × 5	149.4 (5.88)	147.6 (5.81)	4.8 (0.19)	139.7 (5.50)	76.2 (3.00)	76.2 (3.00)
6 × 6	174.8 (6.88)	173.0 (6.81)	5.6 (0.22)	165.1 (6.50)	76.2 (3.00)	76.2 (3.00)

GENERAL NOTE: Dimensions are in millimeters (inches).

NOTES:

- (1) Dimensions given are for extra heavy weight soil pipe. Refer to ASTM A74. For service weight, A and N may be reduced as shown in ASTM A74, Table 6-2. Service weight adapters should be marked "SW" or "SERVICE WEIGHT."
- (2) N is taken from outside diameter of XH soil pipe.
- (3) H body lengths are based on "telescoping lengths of XH soil pipe hubs."

**Table 6-9**  
**Dimensions of C to Soil Pipe Adapter — Plain End for**  
**Joining to Extra Heavy Soil Pipe**



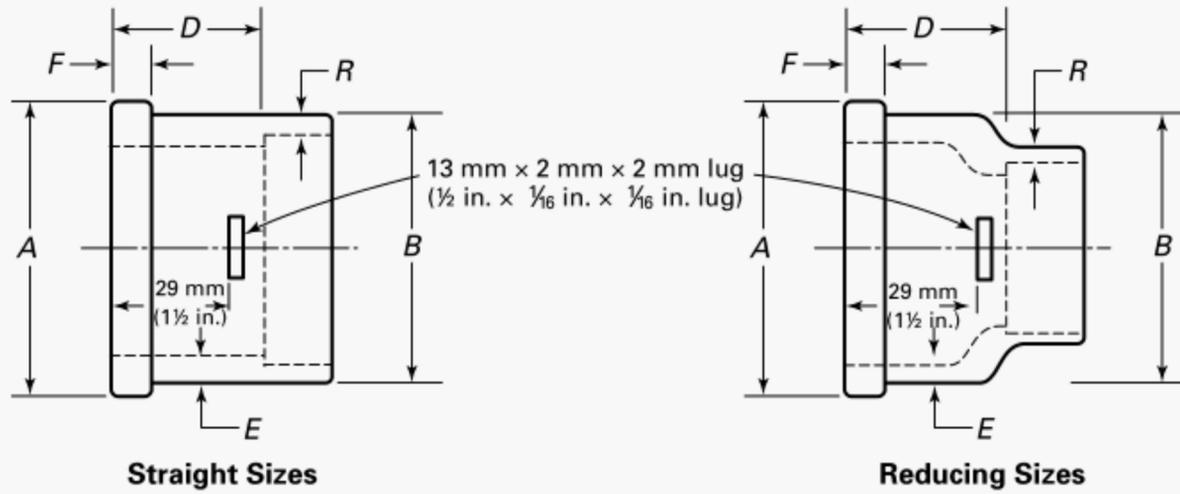
**C × Soil Pipe**  
**DWV Soil Pipe Adapters — Plain End**  
**[Note (1)]**

Nominal Size	Body Length, $H$ $\pm 1.524$ ( $\pm 0.06$ )	Body Outside Diameter, $N$ $\pm 2.286$ ( $\pm 0.09$ )	Body Wall, $W$	Laying Length, $J$
2 × 2	63.5 (2.50)	60.5 (2.38)	2.5 (0.10)	63.5 (2.50)
1 $\frac{1}{4}$ × 2	63.5 (2.50)	60.5 (2.38)	2.5 (0.10)	65.0 (2.56)
1 $\frac{1}{2}$ × 2	63.5 (2.50)	60.5 (2.38)	2.5 (0.10)	65.0 (2.56)
3 × 3	69.9 (2.75)	88.9 (3.50)	3.0 (0.12)	69.9 (2.75)
2 × 3	69.9 (2.75)	88.9 (3.50)	3.0 (0.12)	71.4 (2.81)
3 × 4	76.2 (3.00)	114.3 (4.50)	3.0 (0.12)	77.7 (3.06)

GENERAL NOTE: Dimensions are in millimeters (inches).

NOTE: (1) For use with elastomer gasket.

**Table 6-10**  
**Dimensions of C × No-Hub Soil Pipe Adapter**



**DWV Soil Pipe Adapter — C × No-Hub**  
**[Note (1)]**

Nominal Size C × No-Hub	Diameter of Bead, A ±1.524 (±0.06)	Outside Diameter of Body, B ±1.524 (±0.06)	Laying Length, D	Metal Thickness [Note (2)]		Minimum Width Bead, F +3.302 (+0.13) -0.0 (-0.00)
				Body, E	Joint, R	
2	60.5 (2.38)	58.7 (2.31)	31.0 (1.22)	2.54 (0.100)	2.29 (0.090)	6.4 (0.25)
1½ × 2	60.5 (2.38)	58.7 (2.31)	31.8 (1.25)	2.54 (0.100)	1.98 (0.078)	6.4 (0.25)
1¼ × 2	60.5 (2.38)	58.7 (2.31)	32.5 (1.28)	2.54 (0.100)	1.83 (0.072)	6.4 (0.25)
3	86.6 (3.41)	84.8 (3.34)	31.0 (1.22)	3.05 (0.120)	2.62 (0.103)	6.4 (0.25)
2 × 3	86.6 (3.41)	84.8 (3.34)	31.8 (1.25)	3.05 (0.120)	2.29 (0.090)	6.4 (0.25)
1½ × 3	86.6 (3.41)	84.8 (3.34)	32.5 (1.28)	3.05 (0.120)	1.98 (0.078)	6.4 (0.25)
4	112.8 (4.44)	111.3 (4.38)	31.0 (1.22)	3.05 (0.120)	3.05 (0.120)	7.9 (0.31)
3 × 4	112.8 (4.44)	111.3 (4.38)	31.8 (1.25)	3.05 (0.120)	2.62 (0.103)	7.9 (0.31)

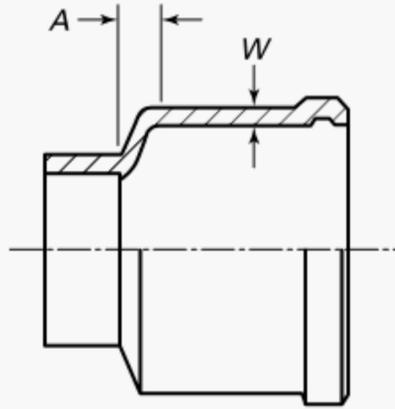
GENERAL NOTE: Dimensions are in millimeters (inches).

NOTES:

(1) For use with stainless steel clamp and elastomer gasket.

(2) For metal thickness tolerance, see [section 9](#).

**Table 6-11**  
**Dimensions of C × Hub Soil Pipe Adapter**



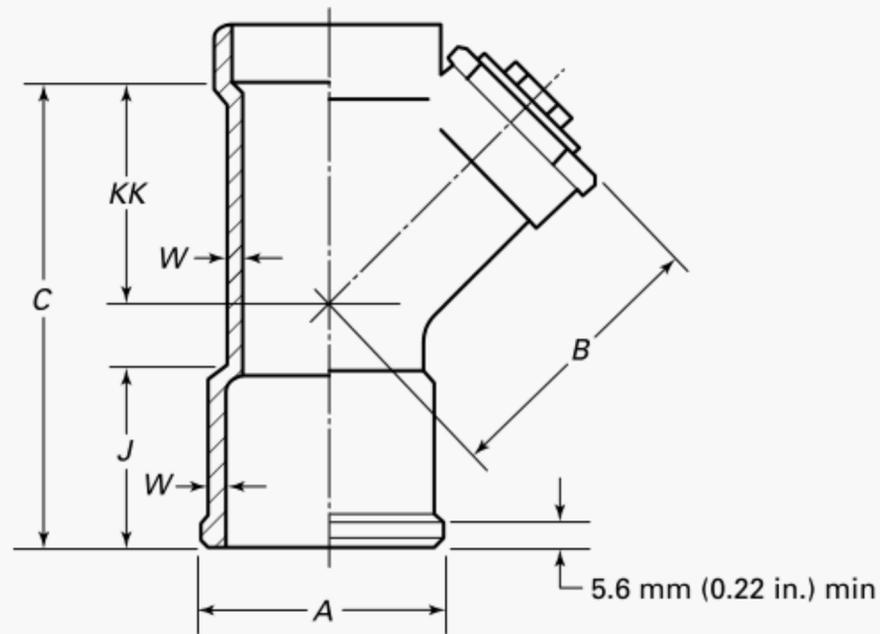
**DWV Soil Pipe Adapter**  
**C × Hub**

Nominal Size	A	W
3	9.7 (0.38)	3.0 (0.12)
3 × 4	11.2 (0.44)	3.0 (0.12)
4	4.8 (0.19)	3.0 (0.12)

GENERAL NOTES:

- (a) Dimensions are in millimeters (inches).
- (b) For hub dimensions, see ASTM A74.

**Table 6-12**  
**Dimensions of DWV 45-deg Y With Cleanout — Soil Pipe (Spigot) × C × Cleanout**

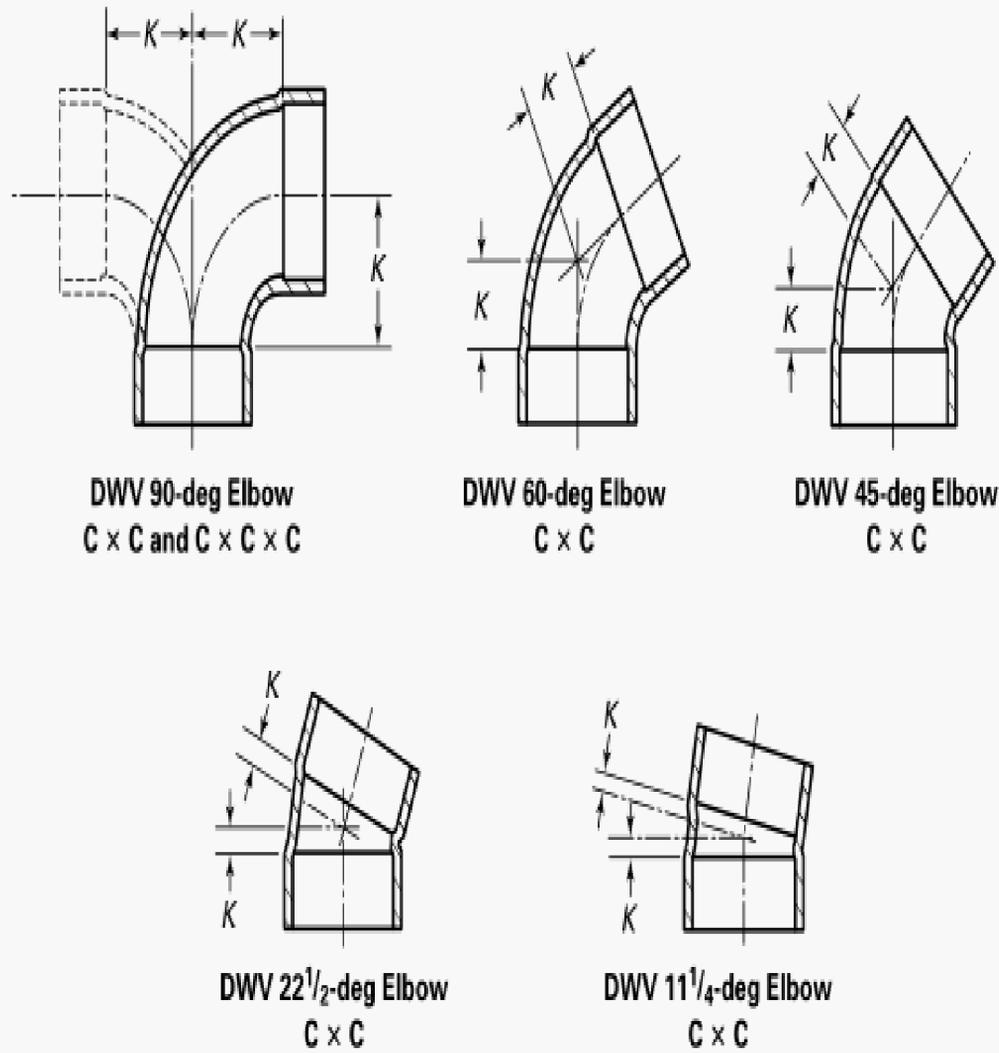


**DWV 45-deg Y With Cleanout**

Nominal Size	A		Maximum, B	C	J	KK	W
	Max.	Min.					
4 × 3 × 3	122.7 (4.83)	122.2 (4.81)	130.0 (5.12)	215.9 (8.50)	76.2 (3.00)	104.6 (4.12)	3.0 (0.12)

GENERAL NOTE: Dimensions are in millimeters (inches).

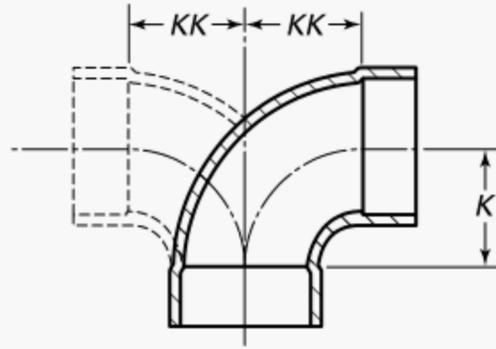
**Table 6-13**  
**Dimensions of DWV Elbows and Double Elbows — C × C**



Angle	Dimension	Nominal Size							
		1¼	1½	2	3	4	5	6	8
DWV 90-deg elbow, C × C and C × C × C	<i>K</i>	30.2 (1.19)	36.6 (1.44)	49.3 (1.94)	74.7 (2.94)	98.6 (3.88)	124.0 (4.88)	147.6 (5.81)	198.4 (7.81)
DWV 60-deg elbow, C × C	<i>K</i>	17.5 (0.69)	20.6 (0.81)	28.4 (1.12)	42.9 (1.69)	57.2 (2.25)	73.2 (2.88)	88.9 (3.50)	117.3 (4.62)
DWV 45-deg elbow, C × C	<i>K</i>	12.7 (0.50)	14.2 (0.56)	20.6 (0.81)	30.2 (1.19)	41.1 (1.62)	52.3 (2.06)	63.5 (2.50)	84.1 (3.31)
DWV 22½-deg elbow, C × C	<i>K</i>	4.8 (0.19)	6.4 (0.25)	9.7 (0.38)	14.2 (0.56)	19.1 (0.75)	23.9 (0.94)	28.4 (1.12)	38.1 (1.50)
DWV 11¼-deg elbow, C × C	<i>K</i>	3.0 (0.12)	3.0 (0.12)	4.8 (0.19)	6.4 (0.25)	7.9 (0.31)	10.4 (0.41)	12.7 (0.50)	16.8 (0.66)

GENERAL NOTE: Dimensions are in millimeters (inches).

**Table 6-14**  
**Dimensions of Reducing DWV Single and Double Elbows — C × C**

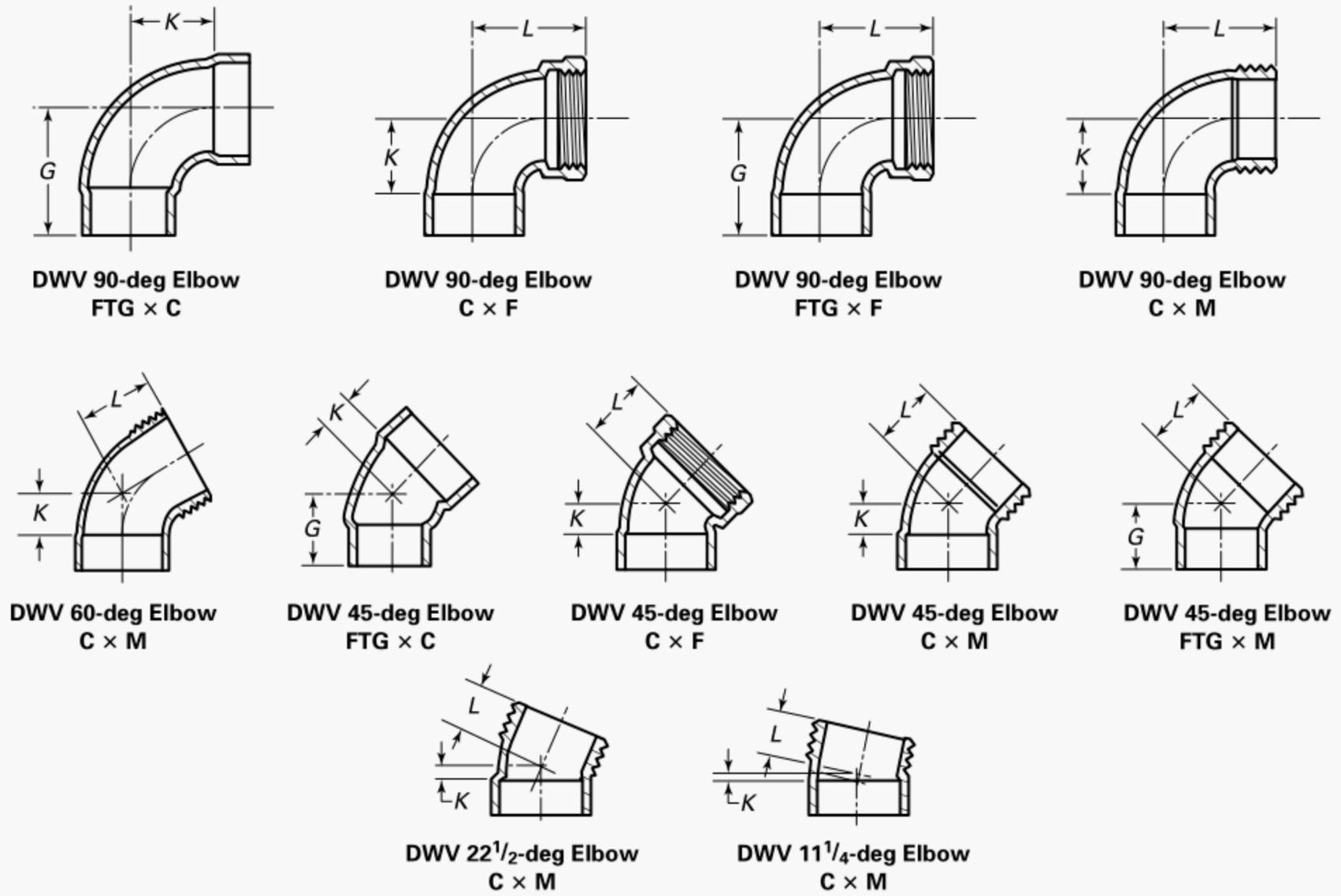


**DWV 90-deg Elbow, C × C**  
**DWV Double Elbow, C × C × C**

Angle	Dimension	Nominal Size C × C or C × C × C			
		1½ × 1¼	2 × 1½	2 × 1¼	4 × 3
DWV 90-deg reducing elbow, C × C	K	30.2 (1.19)	36.6 (1.44)	30.2 (1.19)	71.4 (2.81)
	KK	33.3 (1.31)	42.9 (1.69)	39.6 (1.56)	76.2 (3.00)

GENERAL NOTE: Dimensions are in millimeters (inches).

**Table 6-15  
Dimensions of DWV Elbows**



Angle	Dimensions	Nominal Size				
		1¼	1½	2	3	4
DWV 90-deg elbow, FTG × C	K	30.2 (1.19)	36.6 (1.44)	49.3 (1.94)	74.7 (2.94)	98.6 (3.88)
	G	44.5 (1.75)	53.8 (2.12)	68.3 (2.69)	95.3 (3.75)	124.0 (4.88)
DWV 90-deg elbow, C × F	K	30.2 (1.19)	36.6 (1.44)	49.3 (1.94)	74.7 (2.94)	98.6 (3.88)
	L	47.8 (1.88)	53.8 (2.12)	68.3 (2.69)	100.1 (3.94)	125.5 (4.94)
DWV 90-deg elbow, FTG × F	G	44.5 (1.75)	52.3 (2.06)	68.3 (2.69)	95.3 (3.75)	122.2 (4.81)
	L	47.8 (1.88)	53.8 (2.12)	68.3 (2.69)	100.1 (3.94)	127.0 (5.00)
DWV 90-deg elbow, C × M	K	30.2 (1.19)	36.6 (1.44)	49.3 (1.94)	74.7 (2.94)	98.6 (3.88)
	L	47.8 (1.88)	53.8 (2.12)	71.4 (2.81)	100.1 (3.94)	125.5 (4.94)
DWV 45-deg elbow, FTG × C	K	12.7 (0.50)	14.2 (0.56)	20.6 (0.81)	30.2 (1.19)	41.1 (1.62)
	G	25.9 (1.06)	30.2 (1.19)	38.1 (1.50)	50.8 (2.00)	68.3 (2.69)

**GENERAL NOTES:**

- (a) Dimensions are in millimeters (inches).
- (b) See [Table 6-16](#) for reducing sizes.
- (c) See [Table 6-17](#) for continuation of dimensions.

**Table 6-16**  
**Dimensions of DWV Reducing Elbows**

Nominal Size	DWV 90-deg Elbow, C × F		DWV 90-deg Elbow, C × M	
	<i>K</i>	<i>L</i>	<i>K</i>	<i>L</i>
1½ × 1¼	33.3 (1.31)	50.8 (2.00)	33.3 (1.31)	47.8 (1.88)

GENERAL NOTES:

- (a) Dimensions are in millimeters (inches).
- (b) Refer to illustrations for [Table 6-15](#).

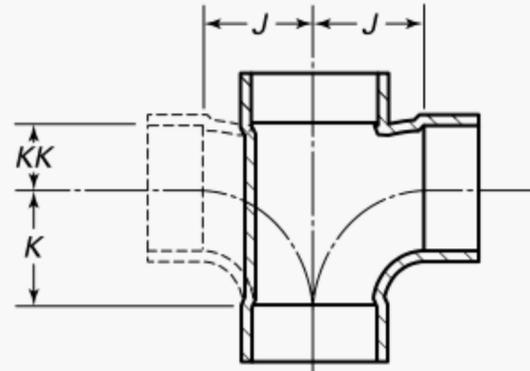
**Table 6-17**  
**Dimensions of DWV Elbows**

Angle	Dimensions	Nominal Size		
		1¼	1½	2
DWV 60-deg elbow, C × M	<i>K</i>	16.8 (0.66)	20.6 (0.81)	27.7 (1.09)
	<i>L</i>	32.5 (1.28)	38.1 (1.50)	46.7 (1.84)
DWV 45-deg elbow, C × F	<i>K</i>	7.6 (0.30)	9.1 (0.36)	19.1 (0.75)
	<i>L</i>	32.5 (1.28)	35.1 (1.38)	42.2 (1.66)
DWV 45-deg elbow, C × M	<i>K</i>	12.7 (0.50)	14.2 (0.56)	19.1 (0.75)
	<i>L</i>	30.2 (1.19)	33.3 (1.31)	33.8 (1.33)
DWV 45-deg elbow, FTG × M	<i>L</i>	26.9 (1.06)	31.8 (1.25)	33.8 (1.33)
	<i>G</i>	26.2 (1.03)	30.2 (1.19)	33.0 (1.30)
DWV 22½-deg elbow, C × M	<i>K</i>	4.8 (0.19)	6.4 (0.25)	8.6 (0.34)
	<i>L</i>	20.6 (0.81)	23.9 (0.94)	27.7 (1.09)
DWV 11¼-deg elbow, C × M	<i>K</i>	3.0 (0.12)	3.0 (0.12)	4.8 (0.19)
	<i>L</i>	19.1 (0.75)	20.5 (0.81)	23.9 (0.94)

GENERAL NOTES:

- (a) Dimensions are in millimeters (inches).
- (b) Refer to illustrations for [Table 6-15](#).

**Table 6-18**  
**Dimensions of DWV Tees and Double Tees**

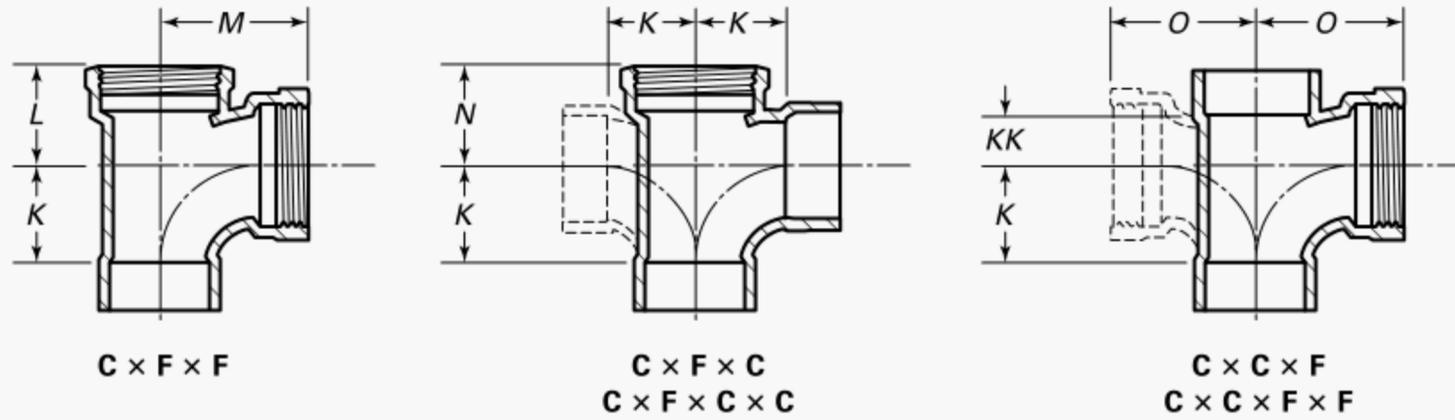


**DWV Tees**  
**C × C × C**  
**C × C × C × C**

Nominal Size	<i>J</i>	<i>K</i>	<i>KK</i>
1¼	30.2 (1.19)	30.2 (1.19)	17.5 (0.69)
1½	36.6 (1.44)	36.6 (1.44)	20.6 (0.81)
1½ × 1½ × 1¼	33.3 (1.31)	30.2 (1.19)	17.5 (0.69)
1½ × 1¼ × 1½	36.6 (1.44)	36.6 (1.44)	20.6 (0.81)
1½ × 1¼ × 1¼	33.3 (1.31)	30.2 (1.19)	19.1 (0.75)
2	49.3 (1.94)	49.3 (1.94)	25.4 (1.00)
2 × 2 × 1½	42.9 (1.69)	36.6 (1.44)	20.6 (0.81)
2 × 2 × 1¼	39.6 (1.56)	30.2 (1.19)	17.5 (0.69)
2 × 1½ × 2	49.3 (1.94)	49.3 (1.94)	25.4 (1.00)
2 × 1½ × 1½	42.9 (1.69)	36.6 (1.44)	20.6 (0.81)
2 × 1½ × 1¼	42.9 (1.69)	36.6 (1.44)	19.1 (0.75)
3	74.7 (2.94)	74.7 (2.94)	38.1 (1.50)
3 × 3 × 2	62.0 (2.44)	49.3 (1.94)	25.4 (1.00)
3 × 3 × 1½	55.6 (2.19)	36.6 (1.44)	20.6 (0.81)
3 × 3 × 1¼	52.3 (2.06)	30.2 (1.19)	17.5 (0.69)
3 × 2 × 3	74.7 (2.94)	74.7 (2.94)	32.5 (1.28)
3 × 2 × 2	62.0 (2.44)	49.3 (1.94)	24.6 (0.97)
3 × 2 × 1½	71.4 (2.81)	36.6 (1.44)	21.3 (0.84)
3 × 1½ × 3	74.7 (2.94)	74.7 (2.94)	31.8 (1.25)
3 × 1½ × 1½	55.6 (2.19)	36.6 (1.44)	17.5 (0.69)
4	98.6 (3.88)	98.6 (3.88)	52.3 (2.06)
4 × 4 × 3	87.4 (3.44)	74.7 (2.94)	38.1 (1.50)
4 × 4 × 2	73.2 (2.88)	49.3 (1.94)	25.4 (1.00)
4 × 4 × 1½	66.5 (2.62)	36.6 (1.44)	20.6 (0.81)
4 × 4 × 1¼	63.5 (2.15)	30.2 (1.19)	17.5 (0.69)
4 × 2 × 4	98.6 (3.88)	98.6 (3.88)	31.8 (1.25)
5	124.0 (4.88)	124.0 (4.88)	58.7 (2.31)
5 × 5 × 4	111.3 (4.38)	98.6 (3.88)	49.3 (1.94)
6	147.6 (5.81)	147.6 (5.81)	69.9 (2.75)
6 × 6 × 4	124.0 (4.88)	98.6 (3.88)	49.3 (1.94)
6 × 4 × 4	122.2 (4.81)	98.6 (3.88)	38.1 (1.50)
8	198.4 (7.81)	198.4 (7.81)	87.4 (3.44)
8 × 8 × 6	169.9 (6.69)	147.6 (5.81)	68.3 (2.69)
8 × 6 × 6	171.5 (6.75)	147.6 (5.81)	58.7 (2.31)

GENERAL NOTE: Dimensions are in millimeters (inches).

**Table 6-19**  
**Dimensions of DWV Tees and Double Tees**

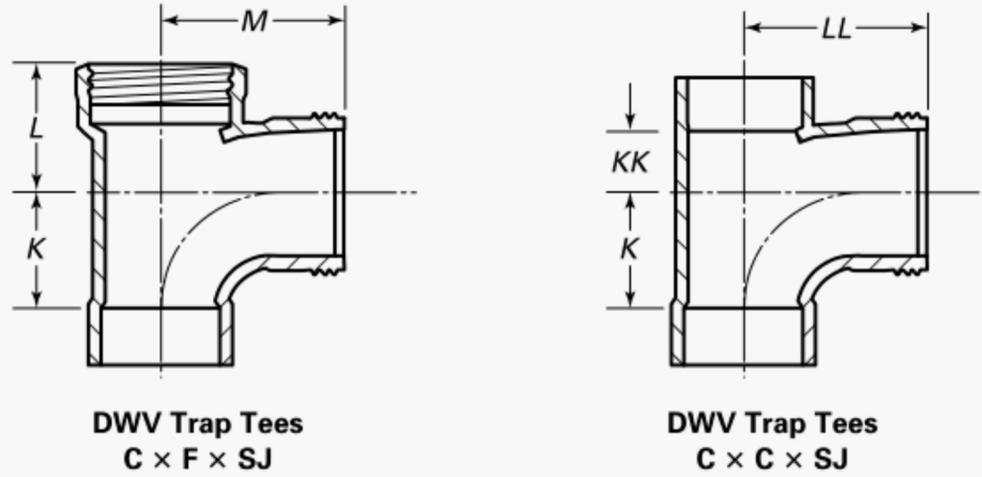


**DWV Tees and Double Tees**

Nominal Size	<i>K</i>	<i>L</i>	<i>M</i>	<i>N</i>	<i>O</i>	<i>KK</i>
1¼	30.2 (1.19)	35.1 (1.38)	47.8 (1.88)	35.1 (1.38)	47.8 (1.88)	17.5 (0.69)
1½	36.6 (1.44)	39.6 (1.56)	55.6 (2.19)	38.1 (1.50)	53.8 (2.12)	20.6 (0.81)
1½ x 1½ x 1¼	30.2 (1.19)	39.6 (1.56)	55.6 (2.19)	...	50.8 (2.00)	17.5 (0.69)
1½ x 1¼ x 1½	36.6 (1.44)	39.6 (1.56)	55.6 (2.19)	...	53.8 (2.12)	20.6 (0.81)
2	49.3 (1.94)	44.5 (1.75)	68.3 (2.69)	44.5 (1.75)	68.3 (2.69)	25.4 (1.00)
2 x 2 x 1½	36.6 (1.44)	44.5 (1.75)	60.5 (2.38)	...	60.5 (2.38)	20.6 (0.81)
2 x 2 x 1¼	30.2 (1.19)	44.5 (1.75)	57.2 (2.25)	...	57.2 (2.25)	17.5 (0.69)
2 x 1½ x 1½	36.6 (1.44)	39.6 (1.56)	60.5 (2.38)	...	60.5 (2.38)	22.4 (0.88)
2 x 1½ x 2	49.3 (1.94)	...	...	44.5 (1.75)	...	...
3	74.7 (2.94)	68.3 (2.69)	100.1 (3.94)	63.5 (2.50)	100.1 (3.94)	38.1 (1.50)
3 x 3 x 2	49.3 (1.94)	...	...	...	81.0 (3.19)	25.4 (1.00)
3 x 3 x 1½	36.6 (1.44)	...	...	...	73.2 (2.88)	20.6 (0.81)
3 x 3 x 1¼	30.2 (1.19)	...	...	...	69.9 (2.75)	17.5 (0.69)
4	98.6 (3.88)	84.1 (3.31)	125.5 (4.94)	84.1 (3.31)	125.5 (4.94)	49.3 (1.94)
4 x 4 x 3	74.7 (2.94)	...	...	...	112.8 (4.44)	38.1 (1.50)
4 x 4 x 2	49.3 (1.94)	...	...	...	91.9 (3.62)	25.4 (1.00)
4 x 4 x 1½	36.6 (1.44)	...	...	...	84.1 (3.31)	20.6 (0.81)
4 x 4 x 1¼	30.2 (1.19)	...	...	...	81.0 (3.19)	17.5 (0.69)

GENERAL NOTE: Dimensions are in millimeters (inches).

**Table 6-20**  
**Dimensions of DWV Trap Tees**

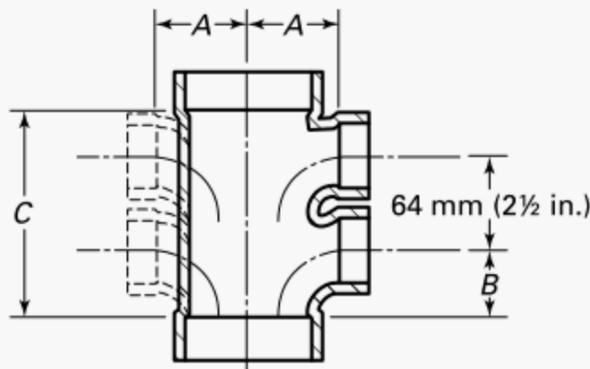


Nominal Size	K	L	M	KK	LL
1 <sup>1</sup> / <sub>4</sub>	30.2 (1.19)	35.1 (1.38)	50.8 (2.00)	19.1 (0.75)	49.3 (1.94)
1 <sup>1</sup> / <sub>2</sub>	36.6 (1.44)	39.6 (1.56)	58.7 (2.31)	20.6 (0.81)	57.2 (2.25)
1 <sup>1</sup> / <sub>2</sub> × 1 <sup>1</sup> / <sub>2</sub> × 1 <sup>1</sup> / <sub>4</sub>	30.2 (1.19)	39.6 (1.56)	55.6 (2.19)	19.1 (0.75)	53.8 (2.12)
2	49.3 (1.94)	44.5 (1.75)	70.6 (2.78)	28.4 (1.12)	66.5 (2.62)

GENERAL NOTES:

- (a) Dimensions are in millimeters (inches).
- (b) For dimensions of slip joint ends, see Table 6-49.

**Table 6-21**  
**Dimensions of DWV Double and Quadruple Branch Fittings**

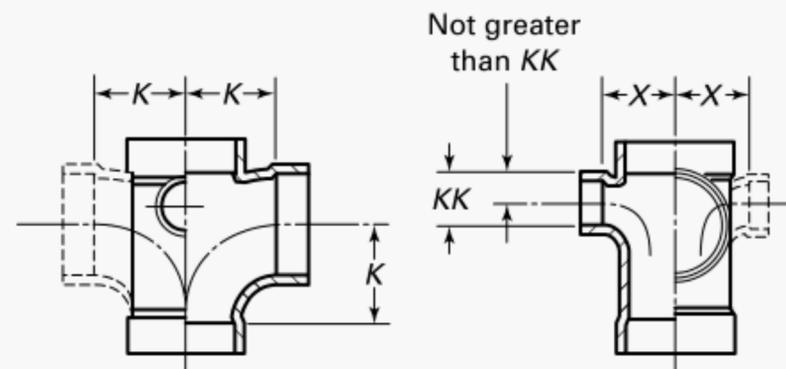


**C × C × C × C**  
**C × C × C × C × C × C**  
**DWV Branch Fittings**

Nominal Size	A	B	C
3 × 3 with 1 <sup>1</sup> / <sub>2</sub> -in. inlets	55.6 (2.19)	39.6 (1.56)	125.5 (4.94)
3 × 3 with 1 <sup>1</sup> / <sub>4</sub> -in. inlets	52.3 (2.06)	39.6 (1.56)	125.5 (4.94)
4 × 4 with 1 <sup>1</sup> / <sub>2</sub> -in. inlets	66.5 (2.62)	36.6 (1.44)	112.8 (4.44)
4 × 4 with 1 <sup>1</sup> / <sub>4</sub> -in. inlets	63.5 (2.50)	36.6 (1.44)	112.8 (4.44)

GENERAL NOTE: Dimensions are in millimeters (inches).

**Table 6-22**  
**Dimensions of Short Design DWV Tees With Side Inlet(s) (90 deg to Main Inlet), Single and Double**



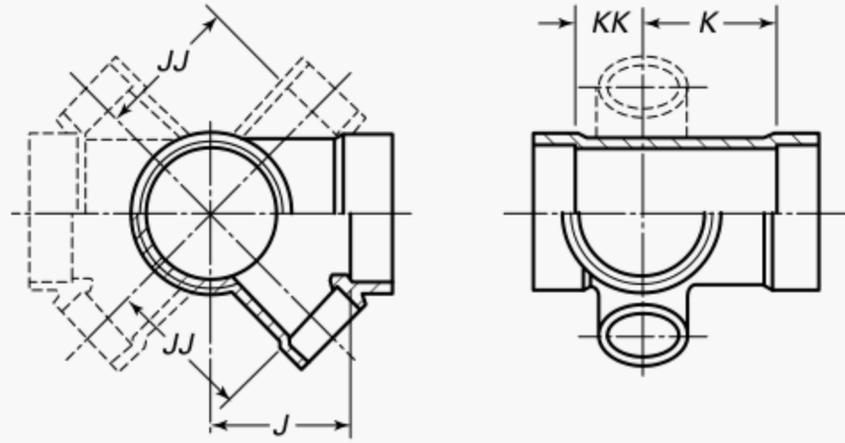
**C × C × C With One or Two C Side Inlet(s)**  
**C × C × C × C With One or Two C Side Inlet(s)**  
**DWV Tees — Short Design**

Nominal Sizes	K	KK	X
3 × 3 × 3 with 2-in. inlet(s)	74.7 (2.94)	38.1 (1.50)	57.2 (2.25)
3 × 3 × 3 with 1 <sup>1</sup> / <sub>2</sub> -in. inlet(s)	74.7 (2.94)	38.1 (1.50)	53.8 (2.12)

GENERAL NOTES:

- (a) Dimensions are in millimeters (inches).
- (b) To determine whether inlets are right-hand or left-hand, place the fitting with large side inlet facing toward you. The side on which the other inlet appears determines its designation.

**Table 6-23**  
**Dimensions of Short Design DWV Tees With Side Inlet(s) (45 deg to Main Inlet), Single and Double**



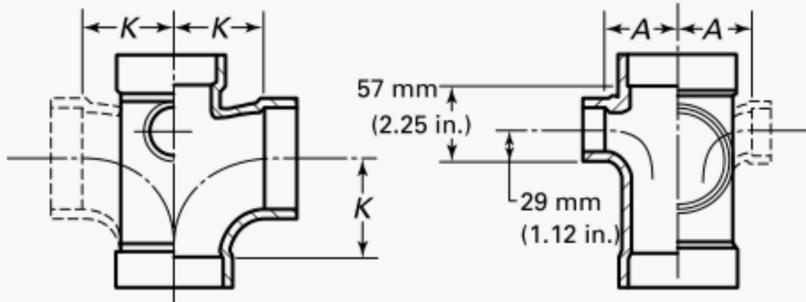
**C × C × C With One or Two C Side Inlet(s)**  
**DWV Tees — Short Design**

Nominal Size	<i>K</i>	<i>KK</i>	<i>J</i>	<i>JJ</i>
3 × 3 × 3 with 2-in. inlet(s)	74.7 (2.94)	39.6 (1.56)	77.7 (3.06)	85.9 (3.38)
3 × 3 × 3 with 1½-in. inlet(s)	74.7 (2.94)	39.6 (1.56)	77.7 (3.06)	79.2 (3.12)

GENERAL NOTES:

- (a) Dimensions are in millimeters (inches).
- (b) To determine whether inlets are right-hand or left-hand, place the fitting with large side inlet facing toward you. The side on which the other inlet appears determines its designation.

**Table 6-24**  
**Dimensions of Long Design DWV Tees With Side Inlet(s)**  
**(90 deg to Main Inlet), Single and Double**



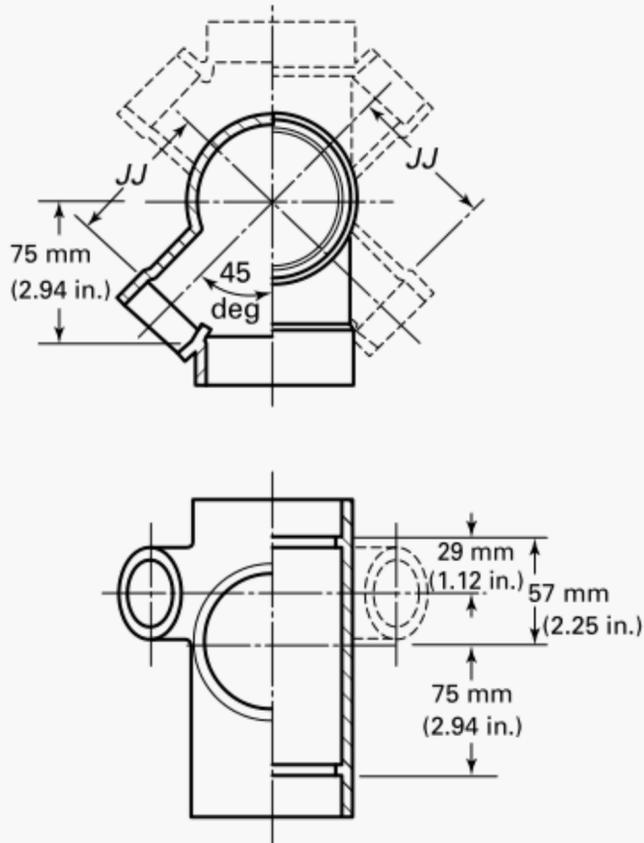
**C × C × C With One or Two C Side Inlet(s)**  
**C × C × C × C With One or Two C Side Inlet(s)**  
**DWV Tees — Long Design**

Nominal Size	<i>A</i>	<i>K</i>
3 × 3 × 3 with 2-in. inlet(s)	62.0 (2.44)	74.7 (2.94)
3 × 3 × 3 with 1½-in. inlet(s)	55.6 (2.19)	74.7 (2.94)
3 × 3 × 3 with 1¼-in. inlet(s)	52.3 (2.06)	74.7 (2.94)
4 × 4 × 4 with 2-in. inlet(s)	73.2 (2.88)	98.6 (3.88)
4 × 4 × 4 with 1½-in. inlet(s)	66.5 (2.62)	98.6 (3.88)

GENERAL NOTES:

- (a) Dimensions are in millimeters (inches).
- (b) To determine whether inlets are right-hand or left-hand, place the fitting with large side inlet facing toward you. The side on which the other inlet appears determines its designation.

**Table 6-25**  
**Dimensions of Long Design DWV Tees With Side Inlet(s)**  
**(45 deg to Main Inlet), Single and Double**



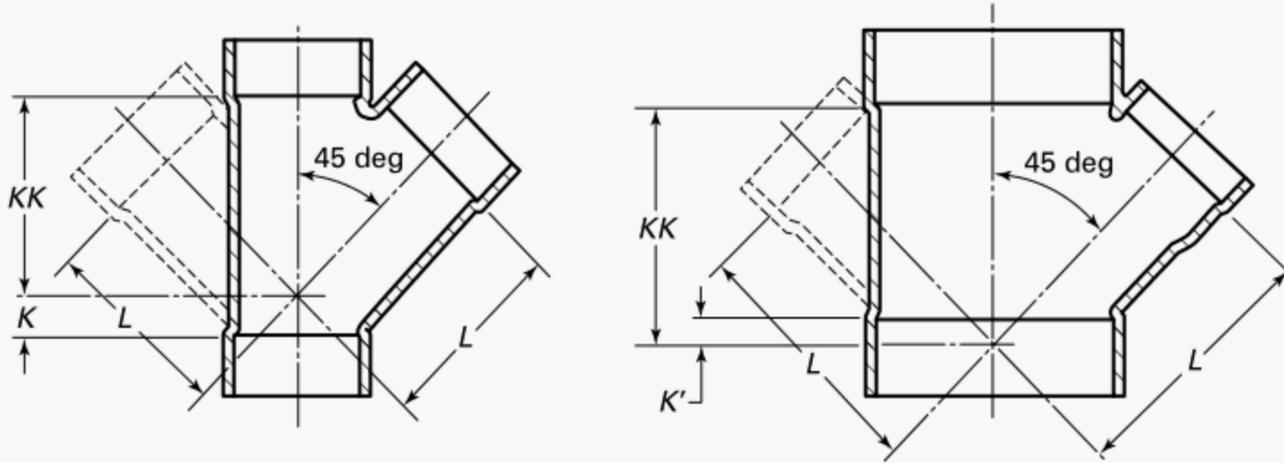
**C × C × C With One or Two C Side Inlet(s)**  
**C × C × C × C With One or Two C Side Inlet(s)**  
**DWV Tees — Long Design**

Nominal Size	<i>JJ</i>
3 × 3 × 3 with 2-in. inlet(s)	88.9 (3.50)
3 × 3 × 3 with 1½-in. inlet(s)	81.0 (3.19)

**GENERAL NOTES:**

- (a) Dimensions are in millimeters (inches).
- (b) To determine whether inlets are right-hand or left-hand, place the fitting with large side inlet facing toward you. The side on which the other inlet appears determines its designation.

**Table 6-26**  
**Dimensions of Single and Double DWV 45-deg Ys**

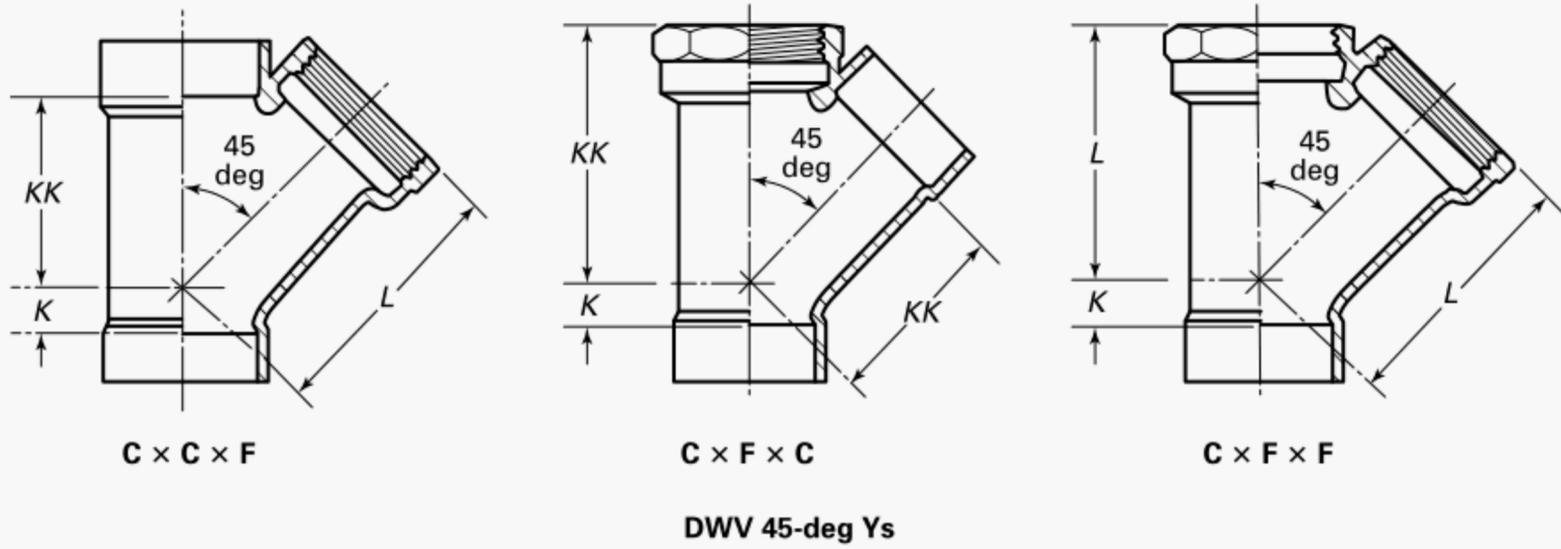


**C × C × C**  
**C × C × C × C**  
**DWV 45-deg Ys**

Nominal Size	K	K'	KK	L	Nominal Size	K	K'	KK	L
1¼	7.9 (0.31)	...	47.8 (1.88)	47.8 (1.88)	4	26.9 (1.06)	...	136.7 (5.38)	136.7 (5.38)
1½	9.7 (0.38)	...	55.6 (2.19)	55.6 (2.19)	4 × 4 × 3	8.6 (0.34)	...	117.3 (4.62)	120.7 (4.75)
1½ × 1½ × 1¼	6.4 (0.25)	...	50.8 (2.00)	52.3 (2.06)	4 × 4 × 2	...	8.6 (0.34)	98.6 (3.88)	106.4 (4.19)
1½ × 1¼ × 1½	11.2 (0.44)	...	53.8 (2.12)	52.3 (2.06)	4 × 4 × 1½	...	16.8 (0.66)	90.4 (3.56)	100.1 (3.94)
1½ × 1¼ × 1¼	6.4 (0.25)	...	49.3 (1.94)	49.3 (1.94)	4 × 4 × 1¼	...	21.3 (0.84)	85.9 (3.38)	96.8 (3.81)
2	9.1 (0.36)	...	69.9 (2.75)	69.9 (2.75)	5	30.2 (1.19)	...	165.1 (6.50)	165.1 (6.50)
2 × 2 × 1½	5.6 (0.22)	...	63.5 (2.50)	65.0 (2.56)	5 × 5 × 4	14.2 (0.56)	...	146.1 (5.75)	152.4 (6.00)
2 × 2 × 1¼	1.5 (0.06)	...	58.7 (2.31)	62.0 (2.44)	5 × 5 × 3	...	1.5 (0.06)	130.0 (5.12)	140.5 (5.53)
2 × 1½ × 2	13.5 (0.53)	...	66.5 (2.62)	64.3 (2.53)	6	38.1 (1.50)	...	195.3 (7.69)	195.3 (7.69)
2 × 1½ × 1½	7.1 (0.28)	...	55.6 (2.19)	55.6 (2.19)	6 × 6 × 4	1.5 (0.06)	...	158.8 (6.25)	169.9 (6.69)
2 × 1¼ × 1¼	1.5 (0.06)	...	59.4 (2.34)	65.0 (2.56)	6 × 6 × 3	...	15.7 (0.62)	142.7 (5.62)	157.2 (6.19)
3	20.6 (0.81)	...	104.6 (4.12)	104.6 (4.12)	6 × 6 × 2	...	31.8 (1.25)	124.0 (4.88)	144.5 (5.69)
3 × 3 × 2	3.0 (0.12)	...	85.9 (3.38)	88.9 (3.50)	6 × 4 × 4	1.5 (0.06)	...	134.9 (5.31)	134.9 (5.31)
3 × 3 × 1½	...	4.8 (0.19)	76.2 (3.00)	82.6 (3.25)	6 × 4 × 2	...	31.8 (1.25)	100.1 (3.94)	109.5 (4.31)
3 × 3 × 1¼	...	9.7 (0.38)	73.2 (2.88)	77.7 (3.06)	8	35.1 (1.38)	...	258.8 (10.19)	258.8 (10.19)
3 × 2 × 3	2.3 (0.09)	...	69.9 (2.75)	69.9 (2.75)	8 × 8 × 6	13.5 (0.53)	...	223.0 (8.78)	234.2 (9.22)
3 × 1½ × 3	...	9.7 (0.38)	62.0 (2.44)	64.8 (2.55)	8 × 6 × 6	13.5 (0.53)	...	196.9 (7.75)	196.9 (7.75)
3 × 1½ × 1½	...	8.6 (0.34)	55.6 (2.19)	55.6 (2.19)					

GENERAL NOTE: Dimensions are in millimeters (inches).

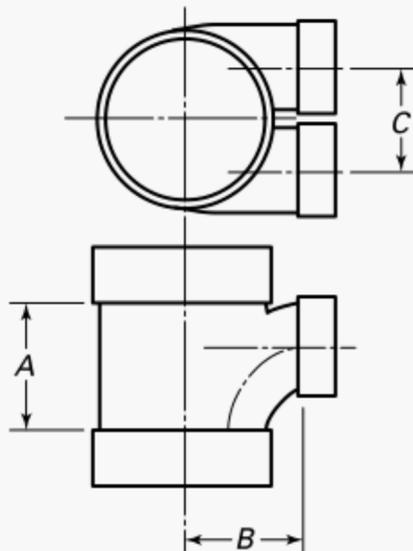
**Table 6-27  
Dimensions of DWV 45-deg Ys**



Nominal Size	<i>K</i>	<i>KK</i>	<i>L</i>
1¼	7.9 (0.31)	47.8 (1.88)	69.9 (2.75)
1½	9.7 (0.38)	55.6 (2.19)	79.2 (3.12)
2	14.2 (0.56)	69.9 (2.75)	95.3 (3.75)
2 × 1½ × 2	14.2 (0.56)	73.2 (2.88)	95.3 (3.75)
3	20.6 (0.81)	104.6 (4.12)	144.5 (5.69)
4	26.9 (1.06)	136.7 (5.38)	176.3 (6.94)

GENERAL NOTE: Dimensions are in millimeters (inches).

**Table 6-28  
Dimensions of DWV Horizontal Twin Branch Tees**

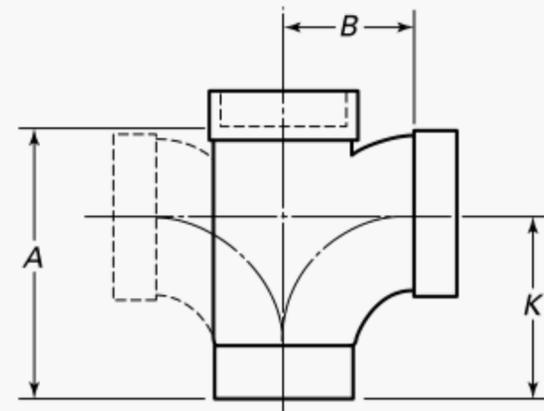


**DWV Horizontal Twin Branch Tees  
C × C × C × C**

Nominal Size	<i>A</i>	<i>B</i>	Minimum, <i>C</i>
3 × 3 × 1½ × 1½	62.0 (2.44)	56.4 (2.22)	47.8 (1.88)
3 × 3 × 1¼ × 1¼	55.6 (2.19)	55.6 (2.19)	46.5 (1.83)

GENERAL NOTE: Dimensions are in millimeters (inches).

**Table 6-29  
Dimensions of DWV Fitting Tees, Single and Double**

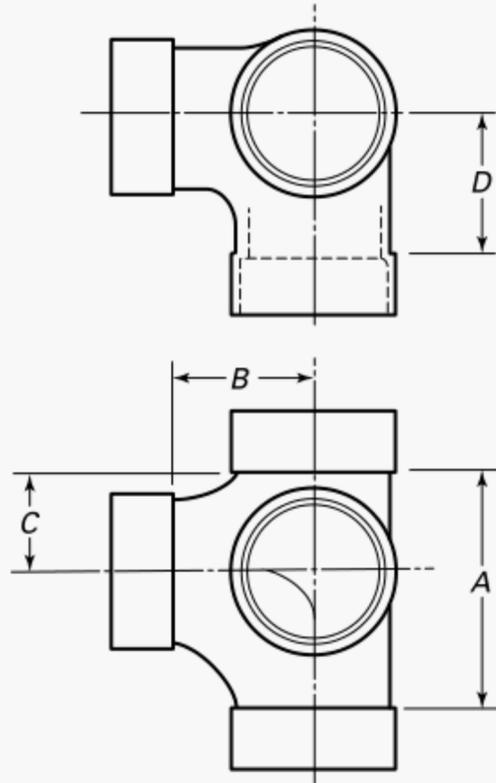


**DWV Fitting Tees — Single and Double  
FTG × C × C  
FTG × C × C × C**

Nominal Size	<i>A</i>	<i>B</i>	<i>K</i>
1½	70.6 (2.78)	35.8 (1.41)	50.0 (1.97)
2	87.6 (3.45)	47.8 (1.88)	63.5 (2.50)
3 × 3 × 2	95.3 (3.75)	60.5 (2.38)	66.5 (2.62)
3 × 3 × 1½	81.0 (3.19)	54.9 (2.16)	56.4 (2.22)
3 × 3 × 1¼	69.1 (2.72)	50.8 (2.00)	47.5 (1.87)
3	133.4 (5.25)	73.2 (2.88)	91.9 (3.62)
3 × 2 × 3	125.5 (4.94)	73.2 (2.88)	91.9 (3.62)

GENERAL NOTE: Dimensions are in millimeters (inches).

**Table 6-30**  
**Dimensions of DWV Utility Tees**

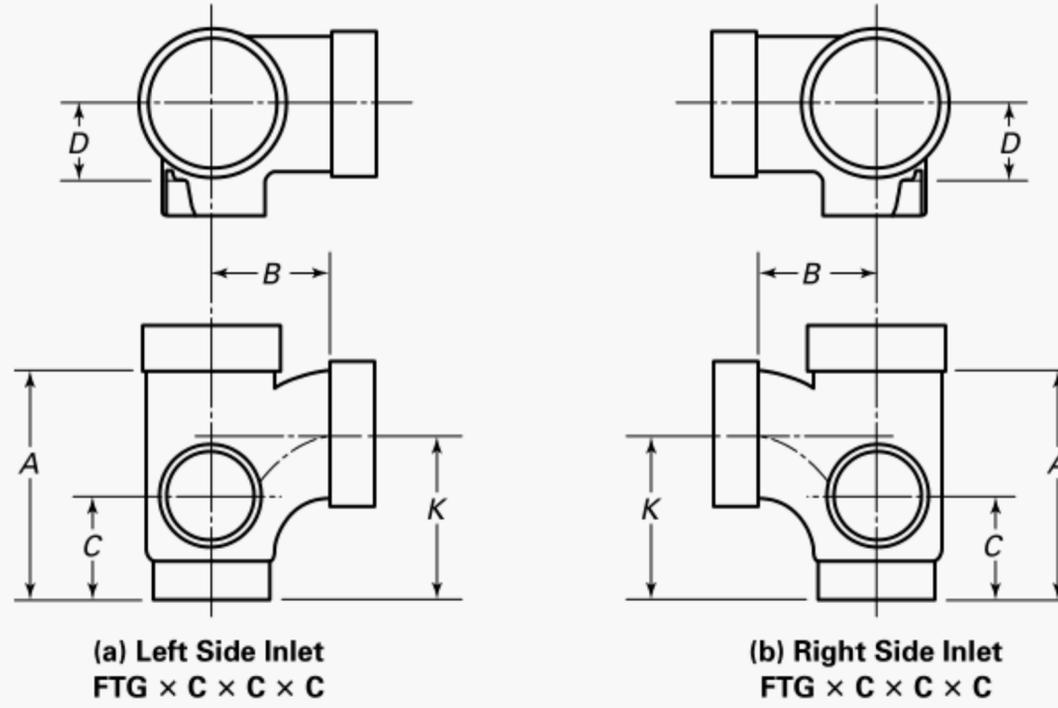


**DWV Utility Tees**  
**C × C × C × C**

Nominal Size	A	B	C	D
1½	57.2 (2.25)	36.6 (1.44)	20.6 (0.81)	36.6 (1.44)
2	81.0 (3.19)	49.3 (1.94)	31.8 (1.25)	49.3 (1.94)
2 × 2 × 1½ × 1½	58.7 (2.31)	42.2 (1.66)	22.4 (0.88)	42.2 (1.66)

GENERAL NOTE: Dimensions are in millimeters (inches).

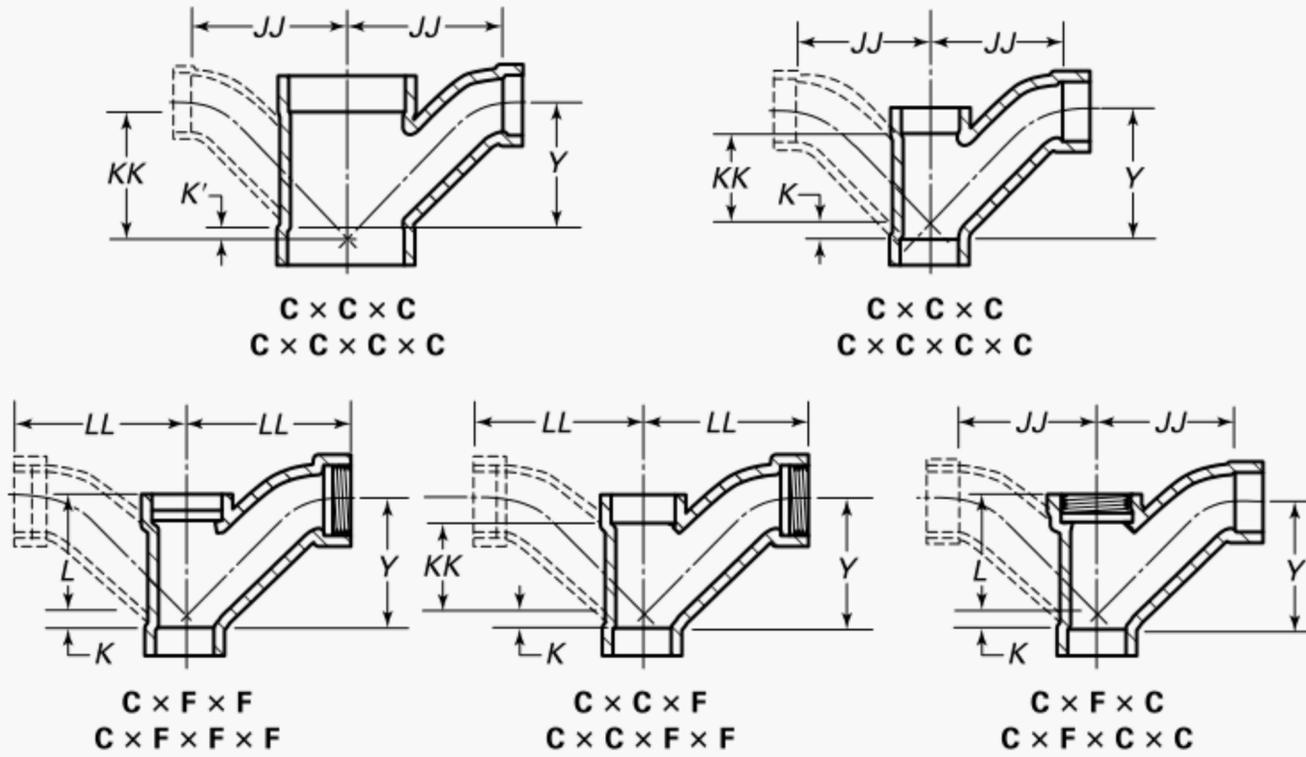
**Table 6-31**  
**Dimensions of DWV Fitting Tees With Side Inlet Maximum Below Centerline**



Nominal Size	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	<i>K</i>
3 × 3 × 3 × 1½	133.4 (5.25)	74.7 (2.94)	54.9 (2.16)	44.5 (1.75)	95.3 (3.75)
3 × 3 × 3 × 2	133.4 (5.25)	74.7 (2.94)	61.2 (2.41)	44.5 (1.75)	95.3 (3.75)

GENERAL NOTE: Dimensions are in millimeters (inches).

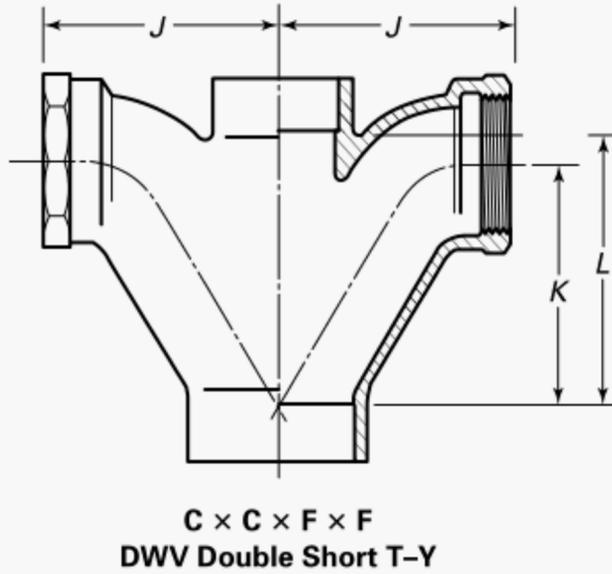
**Table 6-32**  
**Dimensions of DWV Long Turn T-Ys, Single and Double**



Nominal Size	$JJ$	$K$	$K'$	$KK$	$L$	$LL$	$Y$
1 $\frac{1}{4}$	63.50 (2.50)	7.87 (0.31)	...	44.45 (1.75)	66.55 (2.62)	100.08 (3.94)	63.50 (2.50)
1 $\frac{1}{2}$	76.20 (3.00)	9.65 (0.38)	...	53.85 (2.12)	79.25 (3.12)	96.77 (3.81)	76.20 (3.00)
1 $\frac{1}{2}$ $\times$ 1 $\frac{1}{2}$ $\times$ 1 $\frac{1}{4}$	71.37 (2.81)	4.83 (0.19)	...	49.28 (1.94)	76.20 (3.00)	96.77 (3.81)	66.55 (2.62)
2	101.60 (4.00)	14.22 (0.56)	...	66.55 (2.62)	91.95 (3.62)	122.17 (4.81)	101.60 (4.00)
2 $\times$ 2 $\times$ 1 $\frac{1}{2}$	87.38 (3.44)	6.35 (0.25)	...	60.45 (2.38)	85.85 (3.38)	112.78 (4.44)	81.03 (3.19)
2 $\times$ 2 $\times$ 1 $\frac{1}{4}$	76.20 (3.00)	1.52 (0.06)	...	53.85 (2.12)	...	...	68.33 (2.69)
2 $\times$ 1 $\frac{1}{2}$ $\times$ 2	101.60 (4.00)	14.22 (0.56)	...	71.37 (2.81)	...	...	101.60 (4.00)
2 $\times$ 1 $\frac{1}{4}$ $\times$ 2	101.60 (4.00)	12.70 (0.50)	...	61.98 (2.44)	...	...	101.60 (4.00)
3	149.35 (5.88)	20.57 (0.81)	...	98.55 (3.88)	138.18 (5.44)	228.60 (9.00)	149.35 (5.88)
3 $\times$ 3 $\times$ 2	119.13 (4.69)	2.29 (0.09)	...	82.55 (3.25)	...	...	104.65 (4.12)
3 $\times$ 3 $\times$ 1 $\frac{1}{2}$	100.08 (3.94)	...	5.59 (0.22)	73.15 (2.88)	...	...	82.55 (3.25)
3 $\times$ 3 $\times$ 1 $\frac{1}{4}$	95.25 (3.75)	...	10.41 (0.41)	70.61 (2.78)	...	...	71.37 (2.81)
3 $\times$ 2 $\times$ 3	149.35 (5.88)	20.57 (0.81)	...	87.38 (3.44)	...	...	149.35 (5.88)
3 $\times$ 2 $\times$ 2	114.30 (4.50)	1.52 (0.06)	...	69.85 (2.75)	...	...	101.60 (4.00)
4	196.85 (7.75)	26.92 (1.06)	...	127.00 (5.00)	169.93 (6.69)	228.60 (9.00)	196.85 (7.75)
4 $\times$ 4 $\times$ 3	142.75 (5.62)	11.18 (0.44)	...	114.30 (4.50)	...	...	130.05 (5.12)
4 $\times$ 4 $\times$ 2	130.05 (5.12)	...	6.35 (0.25)	98.55 (3.88)	...	...	107.95 (4.25)
4 $\times$ 4 $\times$ 1 $\frac{1}{2}$	123.95 (4.88)	...	15.75 (0.62)	88.14 (3.47)	...	...	91.95 (3.62)
5	252.48 (9.94)	31.75 (1.25)	...	165.10 (6.50)	...	...	248.41 (9.78)
5 $\times$ 5 $\times$ 4	218.95 (8.62)	14.99 (0.59)	...	148.34 (5.84)	...	...	202.44 (7.97)
5 $\times$ 5 $\times$ 3	184.15 (7.25)	...	1.52 (0.06)	131.83 (5.19)	...	...	156.46 (6.16)
6	299.97 (11.81)	38.86 (1.53)	...	197.61 (7.78)	...	...	295.15 (11.62)
6 $\times$ 6 $\times$ 5	265.18 (10.44)	22.35 (0.88)	...	180.09 (7.09)	...	...	248.41 (9.78)
6 $\times$ 6 $\times$ 4	230.89 (9.09)	4.83 (0.19)	...	161.04 (6.34)	...	...	200.91 (7.91)
6 $\times$ 6 $\times$ 3	195.33 (7.69)	...	12.70 (0.50)	144.53 (5.69)	...	...	155.45 (6.12)

GENERAL NOTE: Dimensions are in millimeters (inches).

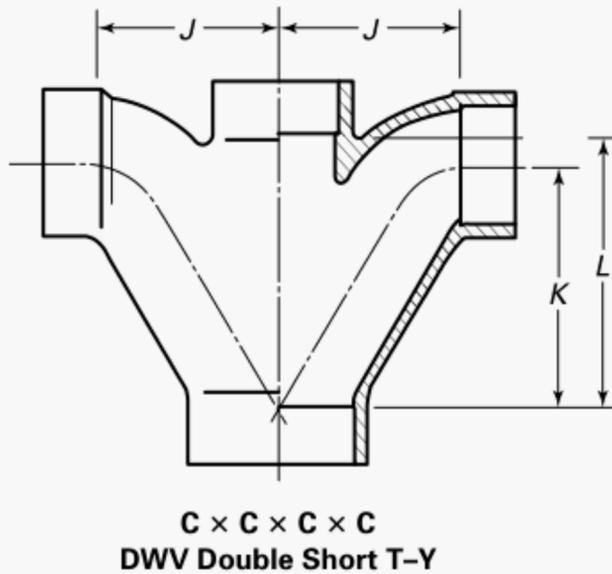
**Table 6-33**  
**Dimensions of DWV Double Short T-Y ( $C \times C \times F \times F$ )**



Nominal Size	J	K	L
$2 \times 1\frac{1}{2} \times 1\frac{1}{2} \times 1\frac{1}{2}$	77.7 (3.06)	81.0 (3.19)	82.6 (3.25)
$2 \times 2 \times 1\frac{1}{2} \times 1\frac{1}{2}$	87.4 (3.44)	91.9 (3.62)	93.0 (3.66)
$2 \times 1\frac{1}{2} \times 2 \times 2$	95.3 (3.75)	106.4 (4.19)	106.4 (4.19)
$2 \times 1\frac{1}{2} \times 1\frac{1}{4} \times 1\frac{1}{4}$	77.7 (3.06)	81.0 (3.19)	90.4 (3.56)

GENERAL NOTE: Dimensions are in millimeters (inches).

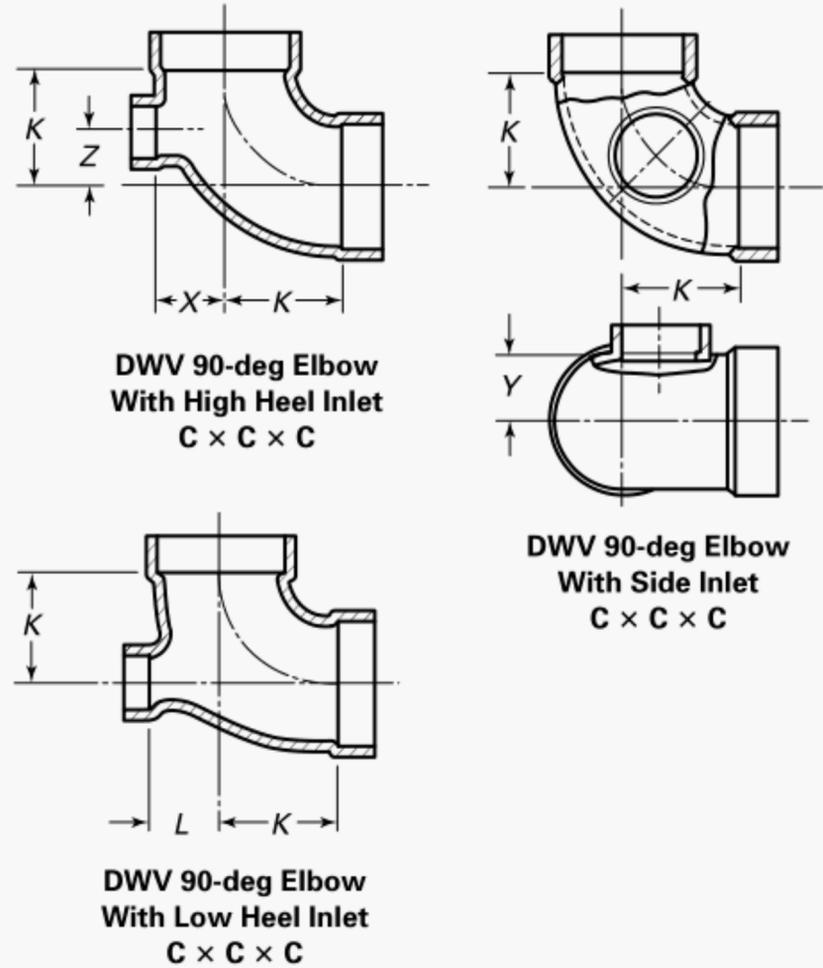
**Table 6-34**  
**Dimensions of DWV Double Short T-Y ( $C \times C \times C \times C$ )**



Nominal Size	J	K	L
$1\frac{1}{2}$	63.8 (2.51)	82.8 (3.26)	83.6 (3.29)
2	85.9 (3.38)	103.9 (4.09)	101.6 (4.00)
$2 \times 2 \times 1\frac{1}{2} \times 1\frac{1}{2}$	70.6 (2.78)	91.9 (3.62)	93.5 (3.68)
$2 \times 1\frac{1}{2} \times 2 \times 2$	76.2 (3.00)	106.4 (4.19)	106.4 (4.19)
$2 \times 1\frac{1}{2} \times 1\frac{1}{2} \times 1\frac{1}{2}$	60.5 (2.38)	81.0 (3.19)	82.6 (3.25)
3	112.8 (4.44)	143.8 (5.66)	146.1 (5.75)

GENERAL NOTE: Dimensions are in millimeters (inches).

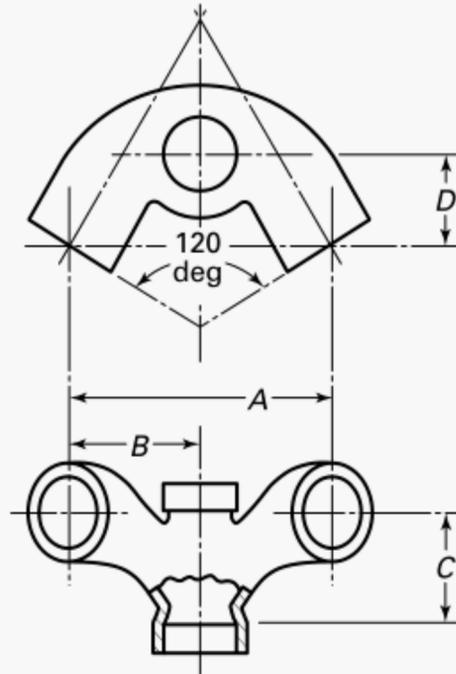
**Table 6-35**  
**Dimensions of DWV Elbow With Inlets**



Nominal Size	K	X	Y	Z	L
$3 \times 3 \times 2$	74.7 (2.94)	42.9 (1.69)	42.9 (1.69)	38.1 (1.50)	32.5 (1.28)
$3 \times 3 \times 1\frac{1}{2}$	74.7 (2.94)	42.9 (1.69)	42.9 (1.69)	38.1 (1.50)	30.2 (1.19)
$3 \times 3 \times 1\frac{1}{4}$	74.7 (2.94)	42.9 (1.69)	42.9 (1.69)	38.1 (1.50)	28.4 (1.12)
$4 \times 4 \times 2$	98.6 (3.88)	53.8 (2.12)	57.2 (2.25)	50.8 (2.00)	47.8 (1.88)
$4 \times 4 \times 1\frac{1}{2}$	98.6 (3.88)	52.3 (2.06)	57.2 (2.25)	50.8 (2.00)	32.5 (1.28)

GENERAL NOTE: Dimensions are in millimeters (inches).

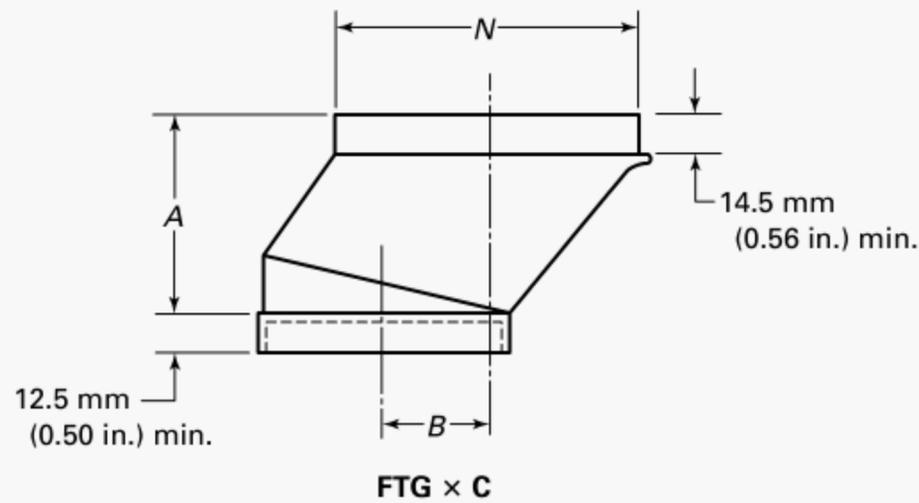
**Table 6-36**  
**Dimensions of DWV Double Branch Sink Fittings**



Type	Nominal Size	A	B	C	D
C × C × F × F	2 × 1½ × 1½ × 1½	158.8 (6.25)	79.2 (3.12)	57.2 (2.25)	47.8 (1.88)
C × C × C × C	2 × 1½ × 1½ × 1½	158.8 (6.25)	79.2 (3.12)	57.2 (2.25)	47.8 (1.88)

GENERAL NOTE: Dimensions are in millimeters (inches).

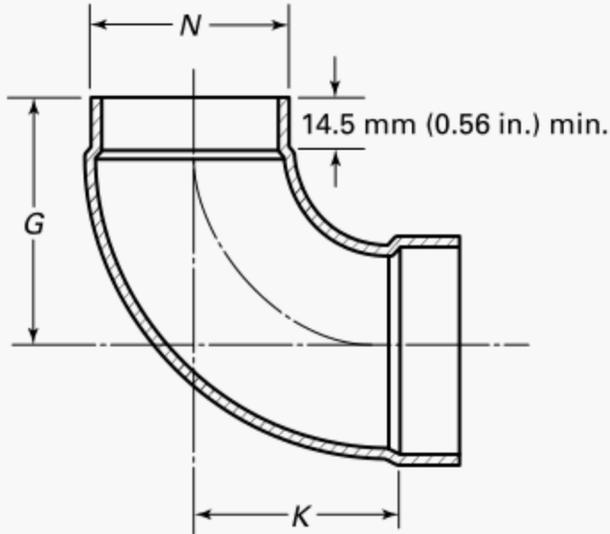
**Table 6-37**  
**Dimensions of DWV Closet Offset Fittings**



Nominal Size	A	B	N	
			Minimum	Maximum
4	63.5 (2.50)	49.3 (1.94)	104.686 (4.1215)	104.826 (4.1270)
4 × 3	63.5 (2.50)	36.6 (1.44)	104.686 (4.1215)	104.826 (4.1270)

GENERAL NOTE: Dimensions are in millimeters (inches).

**Table 6-38**  
**Dimensions of DWV 90-deg Closet Elbow**

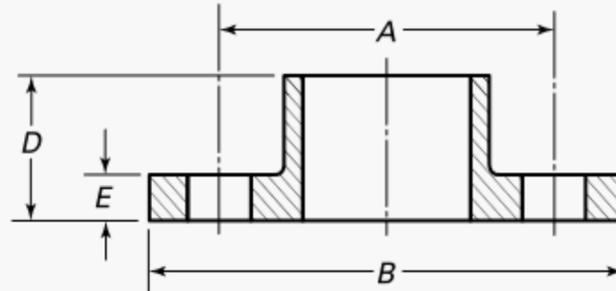


**DWV 90-deg Closet Elbow**  
**FTG × C**

Nominal Size	$K$	$N$		$G$
		Min.	Max.	
4	98.6 (3.88)	104.686 (4.1215)	104.826 (4.1270)	112.8 (4.44)
3	74.7 (2.94)	79.286 (3.1215)	79.426 (3.1270)	88.9 (3.50)
4 × 3	73.2 (2.88)	104.686 (4.1215)	104.826 (4.1270)	94.5 (3.72)

GENERAL NOTE: Dimensions are in millimeters (inches).

**Table 6-39**  
**Dimensions of Floor Flange Vent Support**



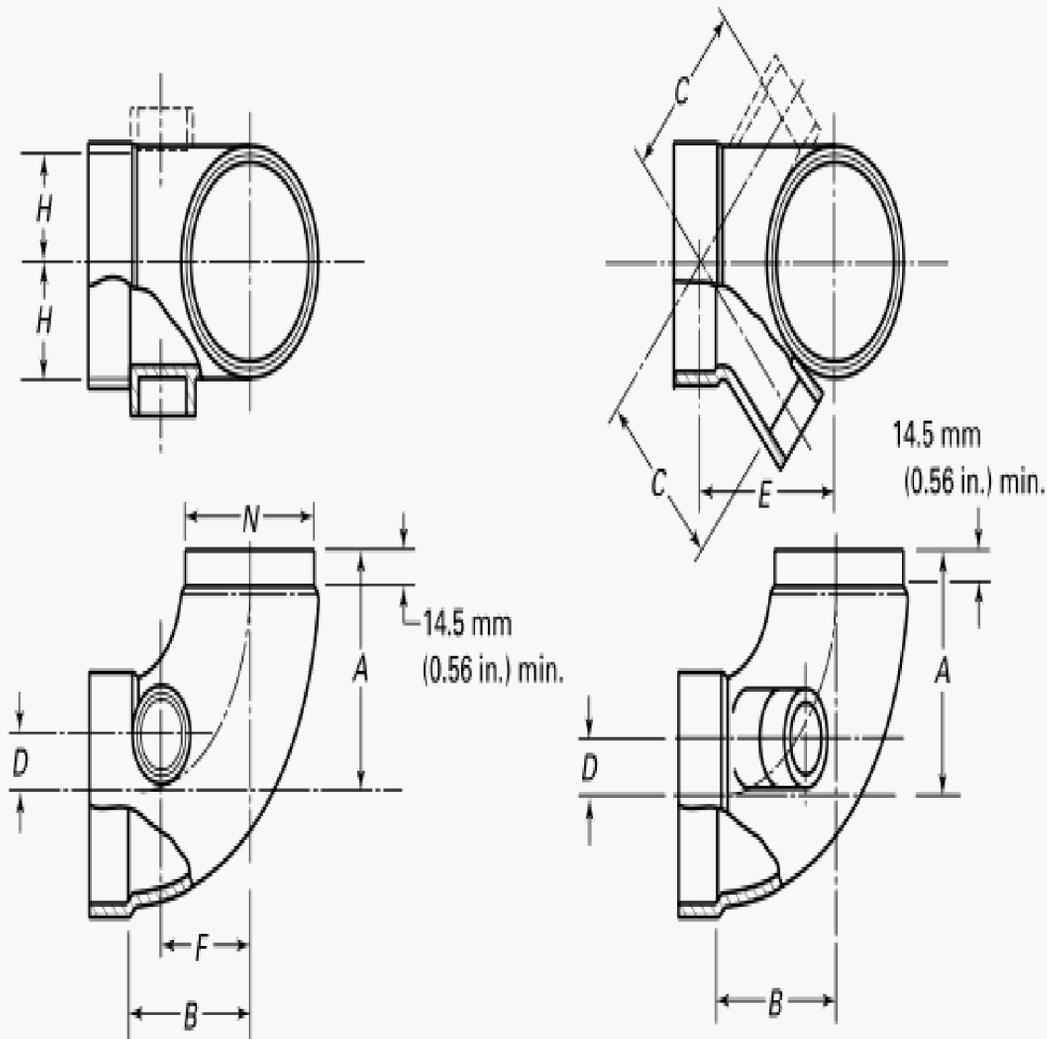
**Floor Flange Vent Support**

Nominal Size	$A$	$B$	$D$	Minimum, $E$	Bolt Hole Size	Number of Holes
1¼	66.5 (2.62)	77.7 (3.06)	15.7 (0.62)	4.8 (0.19)	5.6 (0.22)	2
1½	66.5 (2.62)	77.5 (3.05)	17.5 (0.69)	4.8 (0.19)	5.6 (0.22)	2
2	85.9 (3.38)	100.1 (3.94)	19.1 (0.75)	4.8 (0.19)	5.6 (0.22)	2
3	114.3 (4.50)	130.0 (5.12)	23.9 (0.94)	4.8 (0.19)	6.4 (0.25)	2
4	139.7 (5.50)	155.4 (6.12)	30.2 (1.19)	4.8 (0.19)	6.4 (0.25)	2
5	176.3 (6.94)	203.2 (8.00)	36.6 (1.44)	9.7 (0.38)	11.2 (0.44)	4
6	200.2 (7.88)	228.6 (9.00)	42.9 (1.69)	12.7 (0.50)	14.2 (0.56)	4
8	254.0 (10.00)	279.4 (11.00)	53.8 (2.12)	15.7 (0.62)	14.2 (0.56)	4

GENERAL NOTES:

- (a) Dimensions are in millimeters (inches).
- (b) May be round or oval design.

**Table 6-40**  
**Dimensions of DWV Closet Ells With Side Inlet(s) (90 deg and 45 deg) to Main Inlet(s)**



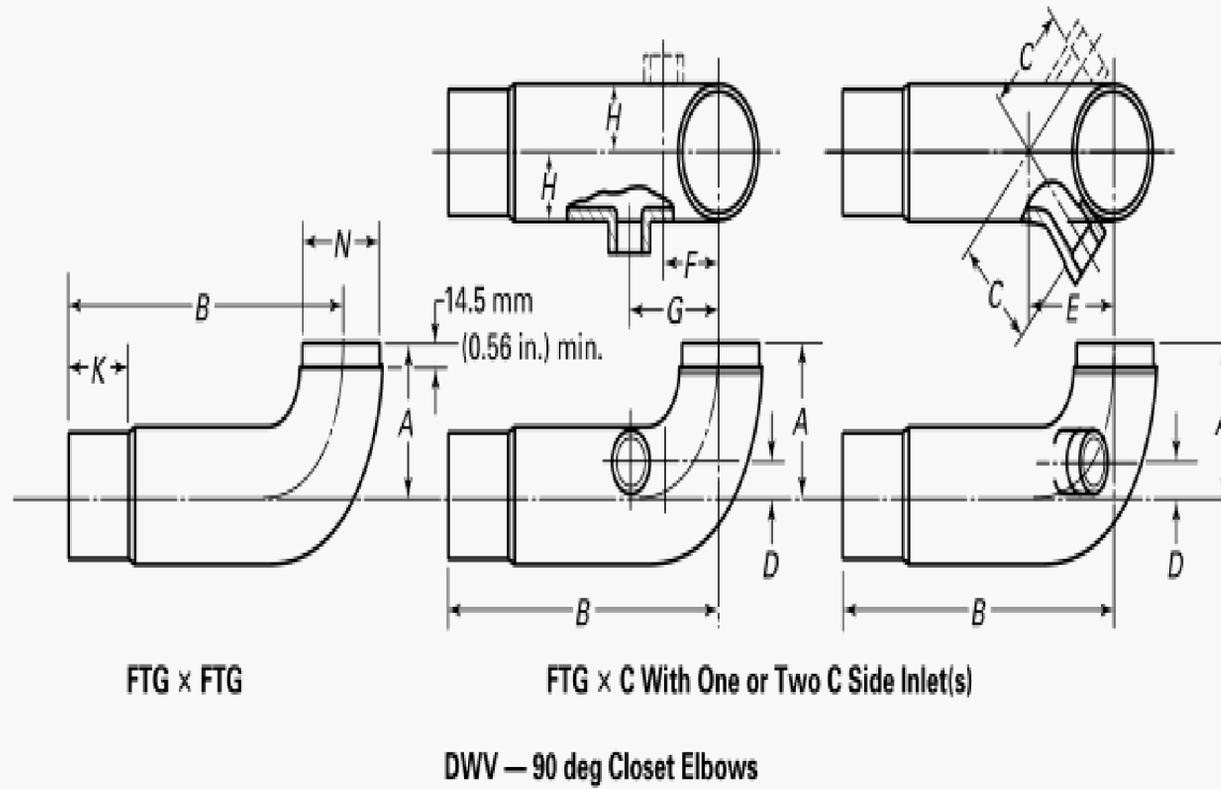
**FTG × C With One or Two C Side Inlet(s)**  
**DWV — 90-deg Closet Elbows**

Nominal Size	A	B	C	D	E	F	H	N	
								Min.	Max.
4 × 3 with 1½-in. inlet(s)	112.78 (4.44)	98.55 (3.88)	91.95 (3.62)	14.22 (0.56)	102.36 (4.03)	71.37 (2.81)	43.69 (1.72)	104.72 (4.123)	104.83 (4.127)
4 × 4 with 1½-in. inlet(s)	112.78 (4.44)	98.55 (3.88)	96.77 (3.81)	25.40 (1.00)	107.19 (4.22)	53.09 (2.81)	53.09 (2.09)	104.72 (4.123)	104.83 (4.127)

**GENERAL NOTES:**

- (a) Dimensions are in millimeters (inches).
- (b) To determine whether inlets are right-hand or left-hand, place the fitting with large side inlet facing up and toward you. The side on which the other inlet appears determines its designation.

**Table 6-41**  
**Dimensions of DWV Closet Ells With or Without Side Inlet(s) (90 deg and 45 deg) to Main Inlet(s)**



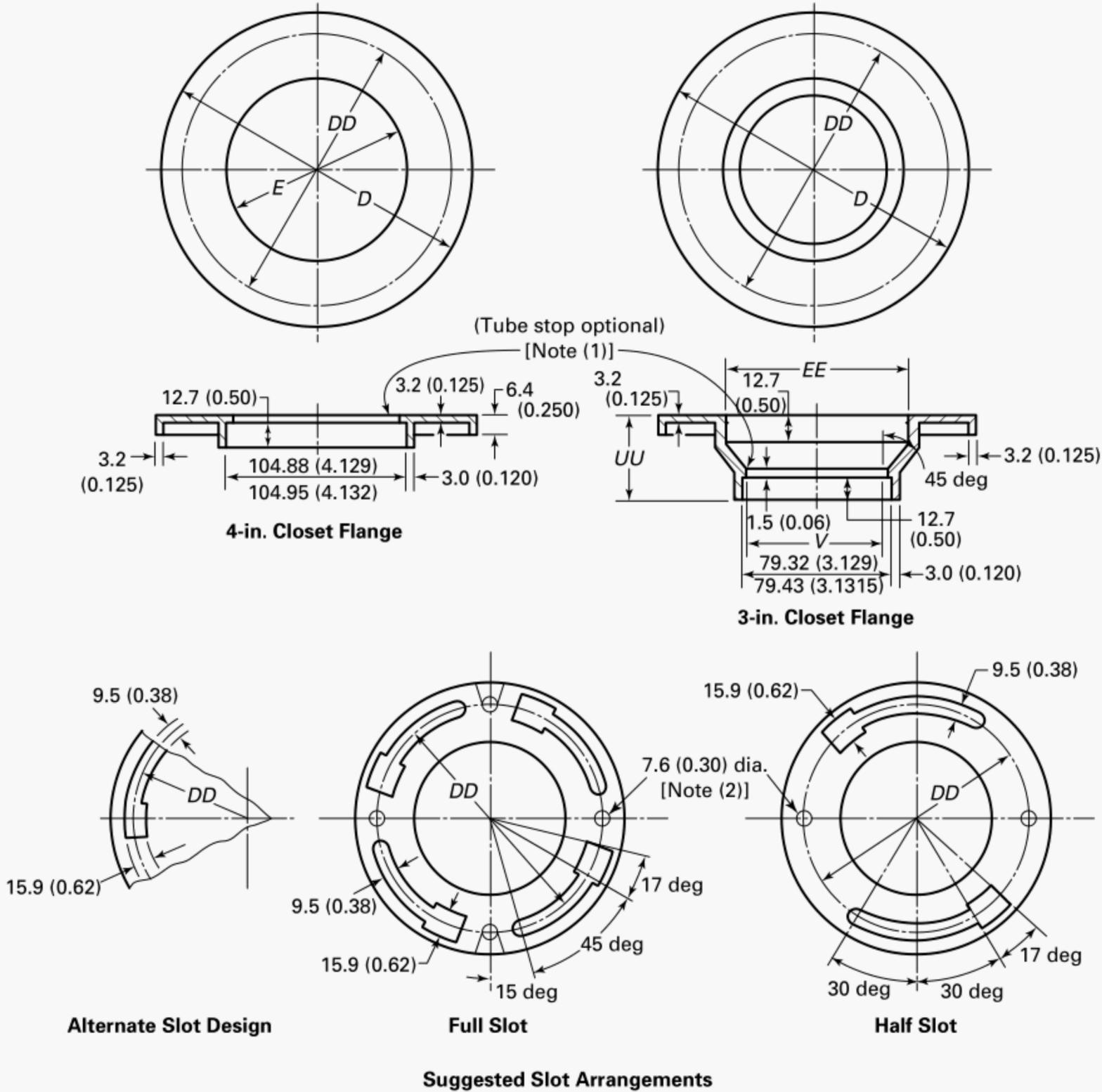
31

Nominal Size	Minimum, A	B	C	D	E	F	G	H	K	N	
										Min.	Max.
4 × 3	112.8 (4.44)	355.6 (14.00)	...	...	...	...	...	...	80.8 (3.18)	104.724 (4.123)	...
4 × 3 with 1½-in. inlet(s)	112.8 (4.44)	355.6 (14.00)	91.9 (3.62)	14.2 (0.56)	102.4 (4.03)	74.7 (2.94)	119.1 (4.69)	43.7 (1.72)	80.8 (3.18)	...	104.826 (4.127)
4 × 4	112.8 (4.44)	355.6 (14.00)	...	...	...	...	...	...	80.8 (3.18)	104.724 (4.123)	...
4 × 4 with 1½-in. inlet(s)	112.8 (4.44)	355.6 (14.00)	96.8 (3.81)	25.4 (1.00)	107.2 (4.22)	71.4 (2.81)	115.8 (4.56)	53.1 (2.09)	80.8 (3.18)	...	104.826 (4.127)

**GENERAL NOTES:**

- (a) Dimensions are in millimeters (inches).
- (b) To determine whether inlets are right-hand or left-hand, place the fitting with large side inlet facing up and toward you. The side on which the other inlet appears determines its designation.
- (c) Closet flange attaches to 4-in. end.

**Table 6-42  
Dimensions of DWV Closet Flanges**



$D$	Outside diameter of flange, max.	177.8 (7.00)
$DD$	Diameter of centerline of slots	152.4 (6.00)
$E$	Inside diameter of 4-in. flange (if tube stop is used)	100.1 (3.94)
$EE$	Inside diameter of 3-in. flange	104.6 (4.12)
$UU$	Length of 3-in. flange	42.9 (1.69)
$V$	Bore tube stop in 3-in. flange	74.7 (2.94)

GENERAL NOTE: Dimensions are in millimeters (inches).

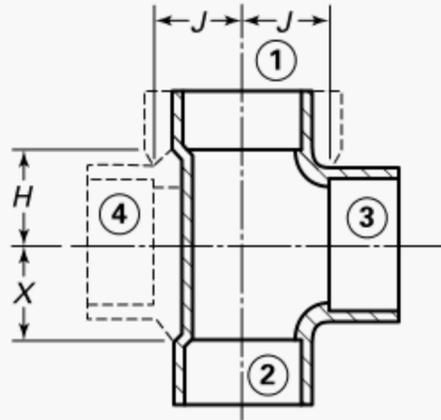
NOTES:

(1) 45-deg angle may be extended to face flange.

(2) Optional:

- (a) the addition of 7.6-mm (0.30-in.)-diameter holes with or without countersink on bolt circle  $DD$  and/or
- (b) two 9.7-mm (0.38-in.)-wide notches on centerline extending from the outer edge of flange

**Table 6-43**  
**Dimensions of Vent Tees and Vent Double Tees**



**Vent Tees and Vent Double Tees**  
**Vent Increases With Side Inlets**

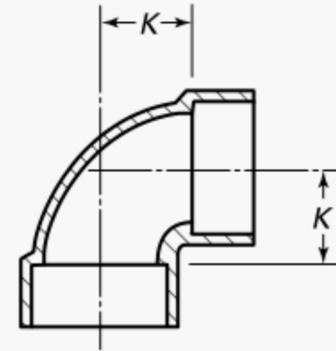
**C × C × C and C × C × C × C**  
① ② ③ ① ② ③ ④

Nominal Size	H	J	X
1¼	22.1 (0.87)	22.1 (0.87)	22.1 (0.87)
1½	25.4 (1.00)	25.4 (1.00)	25.4 (1.00)
1½ × 1½ × 1¼	22.1 (0.87)	25.4 (1.00)	22.1 (0.87)
2	31.8 (1.25)	31.8 (1.25)	31.8 (1.25)
2 × 2 × 1½	25.4 (1.00)	31.8 (1.25)	25.4 (1.00)
2 × 2 × 1¼	22.1 (0.87)	31.8 (1.25)	22.1 (0.87)
3	44.5 (1.75)	44.5 (1.75)	44.5 (1.75)
3 × 3 × 2	31.8 (1.25)	44.5 (1.75)	31.8 (1.25)
3 × 3 × 1½	25.4 (1.00)	44.5 (1.75)	25.4 (1.00)
3 × 3 × 1¼	22.1 (0.87)	44.5 (1.75)	22.1 (0.87)
3 × 4 × 2	30.2 (1.19)	55.6 (2.19)	30.2 (1.19)
3 × 4 × 1½	26.9 (1.06)	53.8 (2.12)	25.4 (1.00)

**GENERAL NOTES:**

- (a) Dimensions are in millimeters (inches).
- (b) Vent fittings are designed for dry vents only. They are not specified for waste lines. Vent fittings must be marked: VENT ONLY.

**Table 6-44**  
**Dimensions of Vent Elbows**



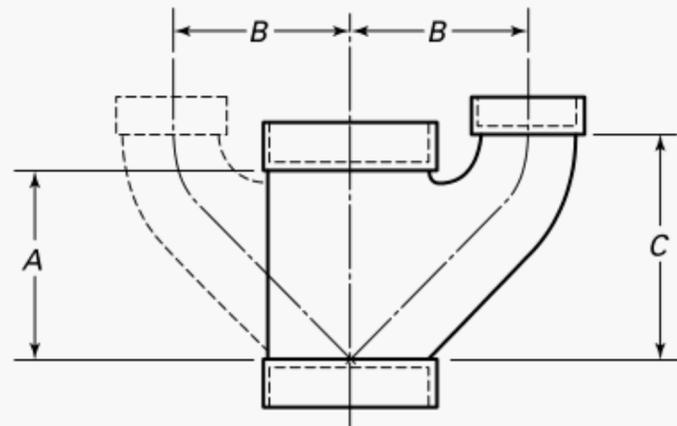
**Vent Elbows**  
**C × C**

Nominal Size	K
1¼	22.1 (0.87)
1½	25.4 (1.00)
2	31.8 (1.25)
3	44.5 (1.75)

**GENERAL NOTES:**

- (a) Dimensions are in millimeters (inches).
- (b) Vent fittings are designed for dry vents only. They are not specified for waste lines. Vent fittings must be marked: VENT ONLY.

**Table 6-45**  
**Dimensions of DWV Stack Upturns, Single and Double**



**DWV Stack Upturns,**  
**Single and Double**  
**C × C × C and C × C × C × C**

Nominal Size	A	B	C
2	82.6 (3.25)	88.9 (3.50)	119.9 (4.72)
2 × 2 × 1½	65.0 (2.56)	79.2 (3.12)	97.5 (3.84)
2 × 1½ × 1¼	60.5 (2.38)	69.9 (2.75)	88.1 (3.47)
3	129.3 (5.09)	95.3 (3.75)	144.5 (5.69)
3 × 3 × 2	87.4 (3.44)	86.6 (3.41)	106.4 (4.19)
3 × 3 × 1½	68.3 (2.69)	80.3 (3.16)	87.4 (3.44)
4 × 4 × 3	127.8 (5.03)	108.0 (4.25)	143.8 (5.66)

GENERAL NOTE: Dimensions are in millimeters (inches).

**Table 6-46**  
**Dimensions of Slip Joint Pieces**



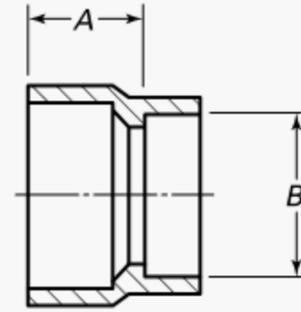
**DWV Slip Joint Thread Pieces**  
**C × SJ**  
[Note (1)]

Nominal Size	A
1 <sup>1</sup> / <sub>4</sub>	9.7 (0.38)
1 <sup>1</sup> / <sub>2</sub>	9.7 (0.38)
1 <sup>1</sup> / <sub>4</sub> × 1 <sup>1</sup> / <sub>2</sub>	9.7 (0.38)
2	9.7 (0.38)

GENERAL NOTE: Dimensions are in millimeters (inches).

NOTE: (1) For slip joint threads, see [Table 6-49](#).

**Table 6-48**  
**Dimensions of Trap Extended Bushings**

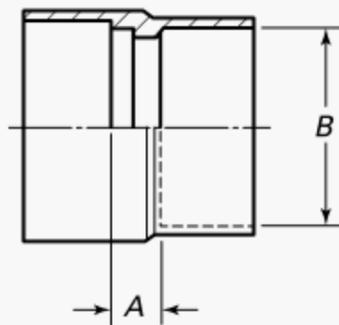


**DWV Trap Extended Bushing**  
**FTG × Outside Diameter of Tube (FTG × O.D. Tube)**

Nominal Size	A	B
1 <sup>1</sup> / <sub>2</sub> × 1 <sup>1</sup> / <sub>4</sub> O.D.	19.1 (0.75)	31.8 (1.25)
1 <sup>1</sup> / <sub>2</sub> × 1 <sup>1</sup> / <sub>2</sub> O.D.	19.1 (0.75)	38.1 (1.50)

GENERAL NOTE: Dimensions are in millimeters (inches).

**Table 6-47**  
**Dimensions of Trap Coupling**

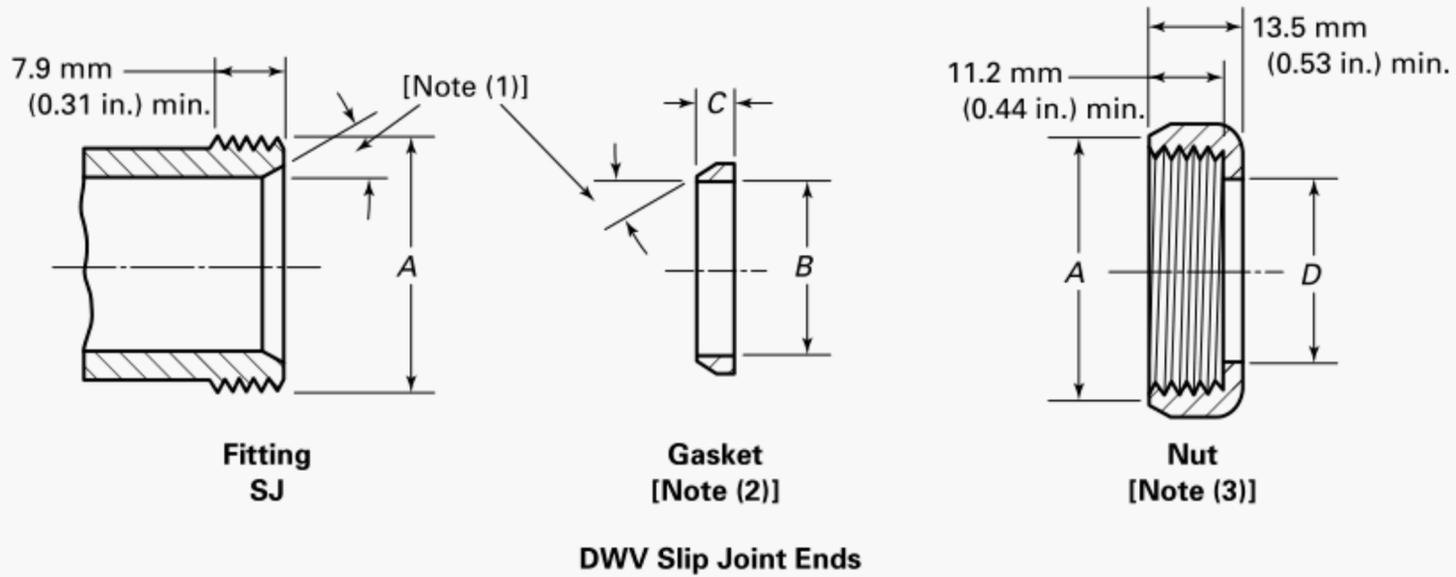


**DWV Trap Coupling**  
**C × O.D. Tube**

Nominal Size	A	B
1 <sup>1</sup> / <sub>4</sub> × 1 <sup>1</sup> / <sub>4</sub> O.D.	3.3 (0.13)	31.8 (1.25)
1 <sup>1</sup> / <sub>2</sub> × 1 <sup>1</sup> / <sub>2</sub> O.D.	5.6 (0.22)	38.1 (1.50)
1 <sup>1</sup> / <sub>2</sub> × 1 <sup>1</sup> / <sub>4</sub> O.D.	6.4 (0.25)	31.8 (1.25)
2 × 1 <sup>1</sup> / <sub>2</sub> O.D.	10.4 (0.41)	38.1 (1.50)

GENERAL NOTE: Dimensions are in millimeters (inches).

**Table 6-49  
Dimensions of Slip Joint Ends**



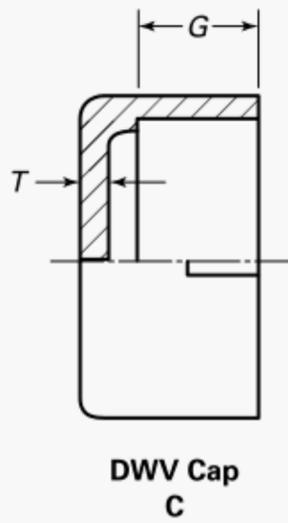
Nominal Size	A	B	Minimum, C	D
1¼	1¼ NPSM	32.0 (1.260)	11.7 (0.16)	32.5 (1.28)
1½	1½ NPSM	38.4 (1.510)	4.8 (0.19)	38.9 (1.53)
2	2 NPSM	51.1 (2.010)	4.8 (0.19)	51.6 (2.03)

GENERAL NOTE: Dimensions are in millimeters (inches).

NOTES:

- (1) Angles must be equal.
- (2) Gasket to be pliable material not subject to aging or drying out.
- (3) Nut may be any material specified in section 8, or any other suitable nonferrous alloy.

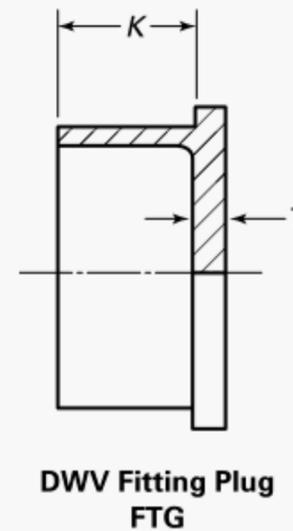
**Table 6-50  
Dimensions of DWV Cap**



Nominal Size	G	T
1¼	12.7 (0.50)	2.5 (0.100)
1½	14.2 (0.56)	2.5 (0.100)
2	15.7 (0.62)	2.5 (0.100)
3	19.1 (0.75)	3.0 (0.120)
4	25.4 (1.00)	3.0 (0.120)

GENERAL NOTE: Dimensions are in millimeters (inches).

**Table 6-51  
Dimensions of DWV Fitting Plugs**

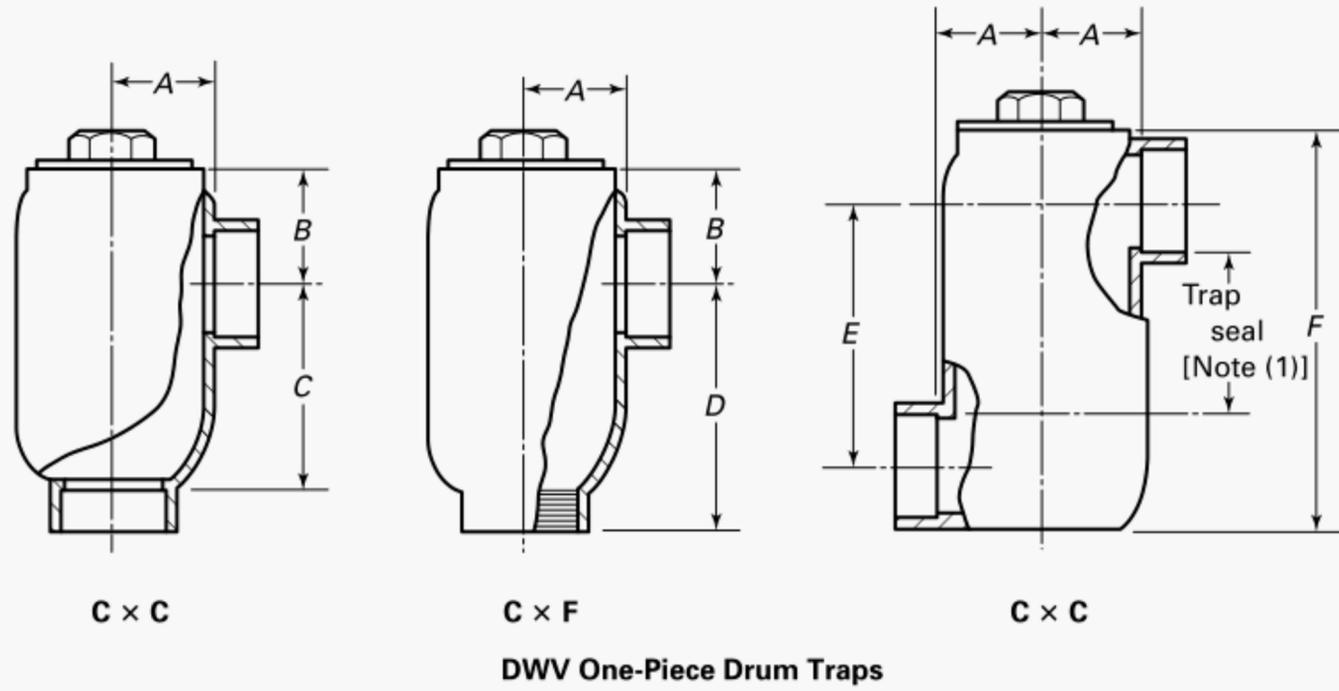


Nominal Size	K	T
1¼	14.2 (0.56)	2.5 (0.100)
1½	15.7 (0.62)	2.5 (0.100)
2	17.5 (0.69)	2.5 (0.100)
3	20.6 (0.81)	3.0 (0.120)

GENERAL NOTE: Dimensions are in millimeters (inches).

(21)

**Table 6-52  
Dimensions of DWV Drum Traps**

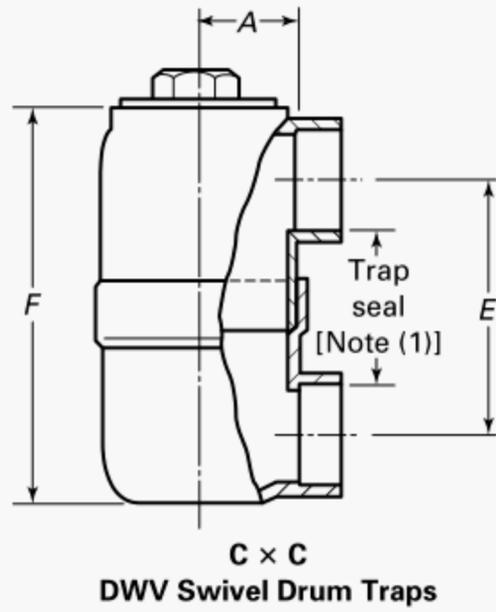


Type	Drum Size	Pipe and Tubing Size	Plug Size	A	B	C	D	E	Maximum, F
C × C	3 × 5	1½	2	38.1 (1.50)	43.7 (1.72)	75.4 (2.97)	...	...	...
C × F	3 × 5	1½	2	38.1 (1.50)	43.7 (1.72)	...	81.8 (3.22)	...	...
C × C	3 × 6	1½	2	38.1 (1.50)	...	...	...	98.6 (3.88)	171.5 (6.75)
C × F	4 × 5	1½	3	50.8 (2.00)	31.0 (1.22)	...	82.6 (3.25)	...	...
C × C	4 × 5	1½	3	50.8 (2.00)	31.0 (1.22)	...	...	...	...
C × C	4 × 8	1½	3	50.8 (2.00)	...	...	...	119.9 (4.72)	203.2 (8.00)
C × F	4 × 5	1¼	3	50.8 (2.00)	31.0 (1.22)	...	82.6 (3.25)	...	...
C × C	4 × 5	1¼	3	50.8 (2.00)	31.0 (1.22)	...	...	...	...

GENERAL NOTE: Dimensions are in millimeters (inches).

NOTE: (1) Trap seal is 50 mm (2 in.) minimum.

**Table 6-53**  
**Dimensions of DWV Swivel Drum Traps**

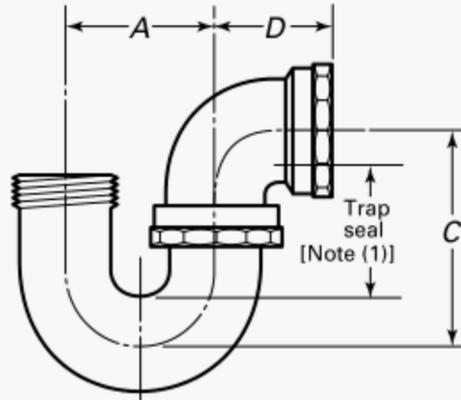


Type	Drum Size	Tube Size	Plug Size	A	E	Maximum, F
C × C	3 × 6	1½	2	38.1 (1.50)	98.6 (3.88)	171.5 (6.75)
C × C	4 × 8	1½	3	50.8 (2.00)	119.9 (4.72)	203.2 (8.00)
C × C	3 × 6	2	2	38.1 (1.50)	93.0 (3.66)	169.2 (6.66)
C × C	4 × 8	2	3	50.8 (2.00)	110.2 (4.34)	197.6 (7.78)

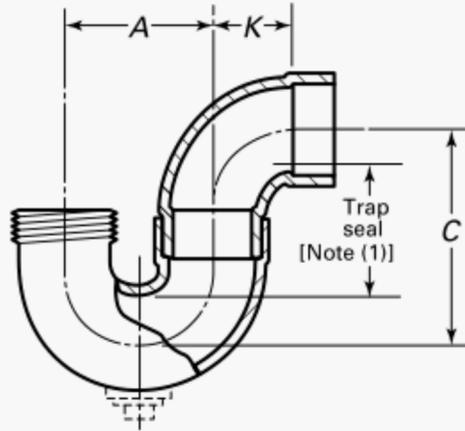
GENERAL NOTE: Dimensions are in millimeters (inches).

NOTE: (1) Trap seal is 50 mm (2 in.) minimum.

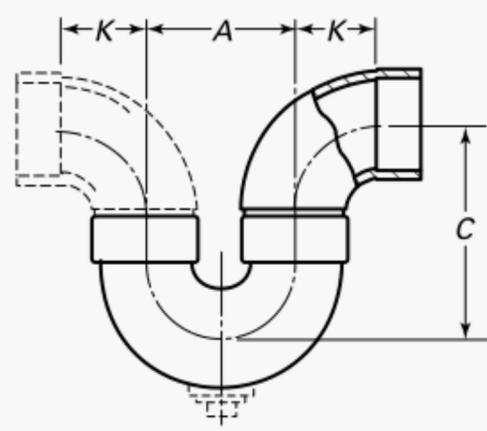
**Table 6-54  
Dimensions of DWV Traps**



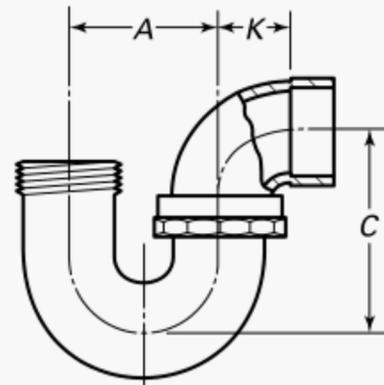
**DWV P-Trap With Union Joint  
SJ × F**



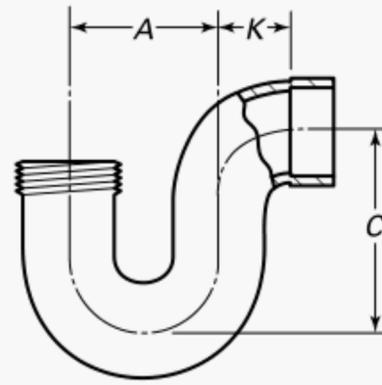
**DWV P-Trap With or  
Without Cleanout  
SJ × C**



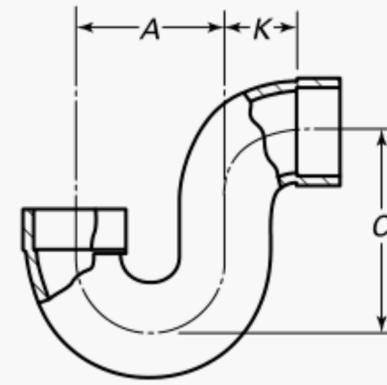
**DWV P-Trap or Running Trap  
With or Without Cleanout  
C × C**



**DWV P-Trap With Union Joint  
SJ × C**



**DWV One-Piece P-Trap  
SJ × C**



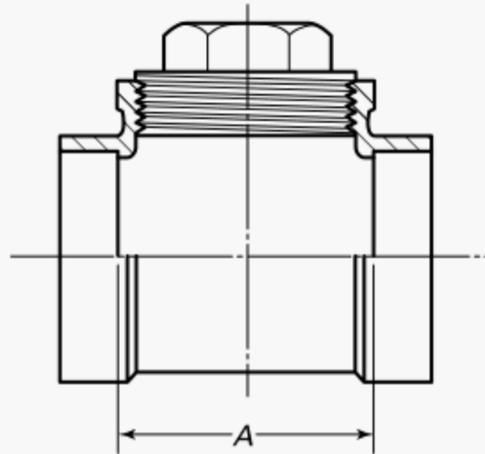
**DWV One-Piece Line P-Trap  
C × C**

Description	Nominal Size	A	K	Minimum, C	D
P-trap SJ × C with or without cleanout	1¼	55.6 (2.19)	30.2 (1.19)	83.3 (3.28)	...
P-trap C × C with or without cleanout	1½	62.0 (2.44)	36.6 (1.44)	89.7 (3.53)	...
Running P-trap C × C with or without cleanout	2	74.7 (2.94)	49.3 (1.94)	108.0 (4.25)	...
P-trap swivel SJ × C	1¼	60.5 (2.38)	28.4 (1.12)	80.3 (3.16)	49.3 (1.94)
P-trap swivel SJ × F	1½	66.5 (2.62)	28.4 (1.12)	87.4 (3.44)	49.3 (1.94)
P-trap one-piece SC	2	79.2 (3.12)	37.3 (1.47)	99.3 (3.91)	71.4 (2.81)
P-trap one-piece CC	1½	62.0 (2.44)	36.6 (1.44)	89.7 (3.53)	...

GENERAL NOTE: Dimensions are in millimeters (inches).

NOTE: (1) Trap seal is 50 mm (2 in.) minimum (all traps).

**Table 6-55**  
**Dimensions of DWV Test Tees With Plug**

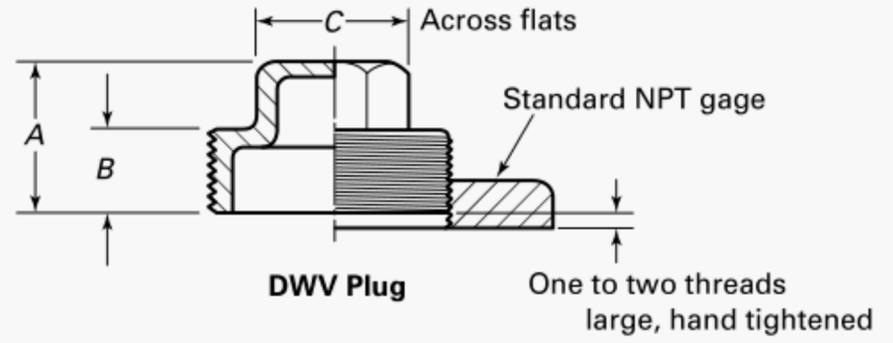


**DWV Test Tees With Plug**  
**C × C × F**

Nominal Size	A
1 <sup>1</sup> / <sub>4</sub> × 1 <sup>1</sup> / <sub>4</sub> × 1 <sup>1</sup> / <sub>4</sub>	50.8 (2.00)
1 <sup>1</sup> / <sub>2</sub> × 1 <sup>1</sup> / <sub>2</sub> × 1 <sup>1</sup> / <sub>2</sub>	57.2 (2.25)
2 × 2 × 2	69.9 (2.75)
3 × 3 × 3	98.6 (3.88)
4 × 4 × 4	139.7 (5.50)

GENERAL NOTE: Dimensions are in millimeters (inches).

**Table 6-56**  
**Dimensions of DWV Plugs**



Nominal Size	A	B	C
1 <sup>1</sup> / <sub>4</sub>	22.4 (0.88)	11.2 (0.44)	22.4 (0.88)
1 <sup>1</sup> / <sub>2</sub>	25.4 (1.00)	12.7 (0.50)	25.4 (1.00)
2	27.7 (1.09)	13.5 (0.53)	28.4 (1.12)
3	33.3 (1.31)	15.7 (0.62)	35.1 (1.38)
4	35.1 (1.38)	16.8 (0.66)	35.1 (1.38)
5	36.6 (1.44)	17.5 (0.69)	38.1 (1.50)
6	38.9 (1.53)	18.3 (0.72)	38.1 (1.50)
8	44.5 (1.75)	19.1 (0.75)	44.5 (1.75)

GENERAL NOTE: Dimensions are in millimeters (inches).

## MANDATORY APPENDIX I REFERENCES

(21)

The following is a list of publications referenced in this Standard. Unless otherwise specified, the latest edition of ASME publications shall apply. Materials manufactured to other editions of the referenced ASTM standards shall be permitted to be used to manufacture fittings meeting the requirements of this Standard as long as the fitting manufacturer verifies that the material meets the requirements of the referenced edition.

ASME B1.20.1, Pipe Threads, General Purpose (Inch)  
 ASME B16.12, Iron Threaded Drainage Fittings  
 ASME B16.18, Cast Copper Alloy Solder Joint Pressure Fittings  
 ASME B16.29, Wrought Copper and Wrought Copper Alloy Solder-Joint Drainage Fittings — DWV  
 Publisher: The American Society of Mechanical Engineers (ASME), Two Park Avenue, New York, NY 10016-5990 ([www.asme.org](http://www.asme.org))

ASTM A74-2020, Standard Specification for Cast Iron Soil Pipe and Fittings  
 ASTM B32-2020, Standard Specification for Solder Metal  
 ASTM B62-2017, Standard Specification for Composition Bronze or Ounce Metal Castings  
 ASTM B306-2020, Standard Specification for Copper Drainage Tube (DWV)

ASTM B584-2014, Standard Specification for Copper Alloy Sand Castings for General Applications  
 ASTM E29-2019, Standard Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications  
 Publisher: American Society for Testing and Materials (ASTM International), 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959 ([www.astm.org](http://www.astm.org))

ISO 9000:2015, Quality management systems — Fundamentals and vocabulary<sup>1</sup>  
 ISO 9001:2015, Quality management systems — Requirements<sup>1</sup>  
 ISO 9004:2018, Quality management — Quality of an organization — Guidance to achieve sustained success<sup>1</sup>  
 Publisher: International Organization for Standardization (ISO), Central Secretariat, Chemin de Blandonnet 8, Case Postale 401, 1214 Vernier, Geneva, Switzerland ([www.iso.org](http://www.iso.org))

MSS SP-25-2018, Standard Marking System for Valves, Fittings, Flanges, and Unions  
 Publisher: Manufacturers Standardization Society of the Valve and Fittings Industry, Inc. (MSS), 127 Park Street, NE, Vienna, VA 22180 ([www.msshq.org](http://www.msshq.org))

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

## **NONMANDATORY APPENDIX A QUALITY SYSTEM PROGRAM**

The products manufactured in accordance with this Standard shall be produced under a quality system program following the principles of the ISO 9000 series.<sup>1</sup> A determination of the need for registration and/or certification of the product manufacturer's quality system program by an independent organization shall be the responsibility of the manufacturer. The detailed documentation demonstrating program compli-

ance shall be available to the purchaser at the manufacturer's facility. A written summary description of the program utilized by the product manufacturer shall be available to the purchaser upon request. The product manufacturer is defined as the entity whose name or trademark appears on the product in accordance with the marking or identification requirements of this Standard.

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<sup>1</sup>The series is also available from the American National Standards Institute (ANSI) and the American Society for Quality (ASQ) as American National Standards that are identified by the prefix "Q," replacing the prefix "ISO." Each standard of the series is listed under References in Mandatory Appendix I.

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# **B16 AMERICAN NATIONAL STANDARDS FOR PIPING, PIPE FLANGES, FITTINGS, AND VALVES**

B16.1-2020	Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250
B16.3-2021	Malleable Iron Threaded Fittings: Classes 150 and 300
B16.4-2021	Gray Iron Threaded Fittings: Classes 125 and 250
B16.5-2020	Pipe Flanges and Flanged Fittings: NPS ½ Through NPS 24 Metric/Inch Standard
B16.9-2018	Factory-Made Wrought Butt welding Fittings
B16.10-2017	Face-to-Face and End-to-End Dimensions of Valves
B16.11-2016	Forged Fittings, Socket-Welding and Threaded
B16.12-2019	Cast Iron Threaded Drainage Fittings
B16.14-2018	Ferrous Pipe Plugs, Bushings, and Locknuts With Pipe Threads
B16.15-2018	Cast Copper Alloy Threaded Fittings
B16.18-2021	Cast Copper Alloy Solder Joint Pressure Fittings
B16.20-2017	Metallic Gaskets for Pipe Flanges
B16.21-2021	Nonmetallic Flat Gaskets for Pipe Flanges
B16.22-2021	Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings
B16.23-2021	Cast Copper Alloy Solder Joint Drainage Fittings: DWV
B16.24-2021	Cast Copper Alloy Pipe Flanges, Flanged Fittings, and Valves: Classes 150, 300, 600, 900, 1500, and 2500
B16.25-2017	Butt welding Ends
B16.26-2018	Cast Copper Alloy Fittings for Flared Copper Tubes
B16.29-2017	Wrought Copper and Wrought Copper Alloy Solder-Joint Drainage Fittings — DWV
B16.33-2012 (R2017)	Manually Operated Metallic Gas Valves for Use in Gas Piping Systems Up to 175 psi (Sizes NPS ½ Through NPS 2)
B16.34-2020	Valves — Flanged, Threaded, and Welding End
B16.36-2020	Orifice Flanges
B16.38-2012 (R2017)	Large Metallic Valves for Gas Distribution: Manually Operated, NPS 2½ (DN 65) to NPS 12 (DN 300), 125 psig (8.6 bar) Maximum
B16.39-2019	Malleable Iron Threaded Pipe Unions: Classes 150, 250, and 300
B16.40-2019	Manually Operated Thermoplastic Gas Shutoffs and Valves in Gas Distribution Systems
B16.42-2021	Ductile Iron Pipe Flanges and Flanged Fittings: Classes 150 and 300
B16.44-2012 (R2017)	Manually Operated Metallic Gas Valves for Use in Aboveground Piping Systems Up to 5 psi
B16.47-2020	Large Diameter Steel Flanges: NPS 26 Through NPS 60 Metric/Inch Standard
B16.48-2020	Line Blanks
B16.49-2017	Factory-Made, Wrought Steel, Butt welding Induction Bends for Transportation and Distribution Systems
B16.50-2021	Wrought Copper and Copper Alloy Braze-Joint Pressure Fittings
B16.51-2021	Copper and Copper Alloy Press-Connect Pressure Fittings
B16.52-2018	Forged Nonferrous Fittings, Socket-Welding and Threaded (Titanium, Titanium Alloys, Aluminum, and Aluminum Alloys)

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# ASME B16.23-2021

ISBN 978-0-7918-7491-2



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