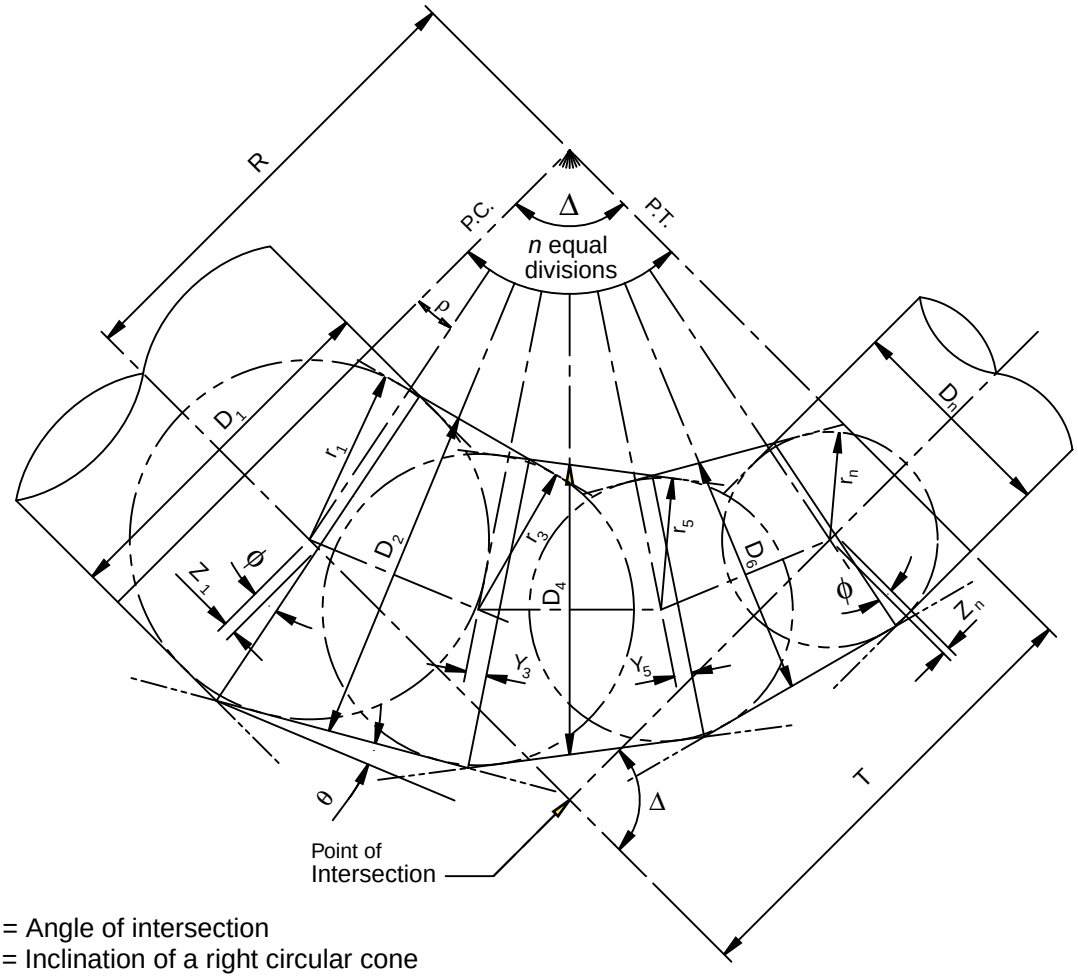
American Water Works Association

Erratum to
ANSI/AWWA C208-07
Standard
for

Dimensions for Fabricated Steel Water Pipe Fittings

(November 2009)

1. Replace Fig. 5, Reducing Elbow, with the new Fig. 5, which includes corrections to symbols and definitions used in the figure.



Δ = Angle of intersection
θ = Inclination of a right circular cone
R = Radius of bend
n = number of miter cuts × 2
D_1 = Inside diameter of large pipe
D_n = Inside diameter of small pipe

$$\rho = \frac{\Delta}{n}$$

$$\sin\theta = \frac{D_1 - D_n}{2(n-2)R(\tan\rho)}$$

$$r_1 = \frac{D_1}{2}$$

$$r_n = \frac{D_n}{2}$$

$$r_x = r_1 - (x-1)R(\tan\rho)(\sin\theta)$$

$$D_x = \frac{D_1 - 2(x-1)R(\tan\rho)(\sin\theta)}{\cos\theta}$$

where x = number of divisions from P.C. to point under consideration.

$$\tan\phi = \frac{\sin 2\rho}{\cos 2\rho + \cos\theta}$$

$$Z_1 = \frac{r_1(\sin\theta)}{\cos 2\rho + \cos\theta}$$

$$Z_n = \frac{r_n(\sin\theta)}{\cos 2\rho + \cos\theta}$$

$$Y_x = \frac{r_x(\sin\theta)}{\cos\rho}$$

$$T = R\tan\frac{\Delta}{2}$$

Figure 5 Reducing Elbow

ANSI/AWWA C208-07
(Revision of ANSI/AWWA C208-01)

American Water Works Association

The Authoritative Resource on Safe Water®

AWWA Standard

Dimensions for Fabricated Steel Water Pipe Fittings

Effective date: May 1, 2008.
First edition approved by AWWA Board of Directors Jan. 26, 1959.
This edition approved June 24, 2007.
Approved by American National Standards Institute Jan. 16, 2008.

6666 West Quincy Avenue
Denver, CO 80235-3098
T 800.926.7337
www.awwa.org

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AWWA Standard

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Committee Personnel

The Steel Water Pipe-Manufacturers Technical Advisory Committee (SWPMTAC) Task Group on C208, which developed this revision, had the following personnel at the time:

John L. Luka, *Chair*

K. Beul, Price Brothers, Dayton, Ohio	(AWWA)
R.J. Card, Victaulic, Atlanta, Ga.	(AWWA)
R.R. Collins, JCM Industries, Nash, Texas	(AWWA)
B.D. Keil, Continental Pipe Manufacturing Company, Pleasant Grove, Utah	(AWWA)
J.L. Luka, American Spiral Weld Pipe Company, Columbia, S.C.	(AWWA)
G.C. Robb, Ameron Concrete & Steel Pipe, Fontana, Calif.	(AWWA)
R.N. Satyarthi, Baker Coupling Company Inc., Los Angeles, Calif.	(AWWA)
K.L. Shaddix, Smith-Blair Inc., Texarkana, Texas	(AWWA)
B. Terrell, RTLC Piping Products Inc., Kosse, Texas	(AWWA)
B.F. Vanderploeg, Northwest Pipe Company, Portland, Ore.	(AWWA)
D.R. Wagner, DRW/Consultant, St. Louis, Mo.	(AWWA)

The Standards Committee on Steel Pipe, which developed this standard, had the following personnel at the time of approval:

John H. Bambei Jr., *Chair*
George J. Tupac, *Vice-Chair*
Dennis Dechant, *Secretary*

General Interest Members

J.B. Allen,* Standards Engineer Liaison, AWWA, Denver, Colo.	(AWWA)
W.R. Brunzell, Brunzell Associates Ltd., Skokie, Ill.	(AWWA)
R.L. Coffey, Kirkham Michael & Associates, Omaha, Neb.	(AWWA)
H.E. Dunham, MWH Inc., Bothell, Wash.	(AWWA)
S.N. Foellmi, Black & Veatch Corporation, Irvine, Calif.	(AWWA)
J.W. Green, McDonough Associates Inc., Chicago, Ill.	(AWWA)
M.B. Horsley,† Black & Veatch Corporation, Kansas City, Mo.	(AWWA)

* Liaison, nonvoting
† Alternate

J.K. Jeyapalan, Pipeline Consultant, New Milford, Conn. (AWWA)
J.L. Mattson, Corrosion Control Technologies, Sandy, Utah (AWWA)
W.J. Moncrief,* HDR Engineering Inc., San Diego, Calif. (AWWA)
R. Ortega, Lockwood Andrews & Newnam, Houston, Texas (AWWA)
A.E. Romer, Boyle Engineering Corporation, Newport Beach, Calif. (AWWA)
H.R. Stoner, Consultant, North Plainfield, N.J. (AWWA)
C.C. Sundberg, CH2M Hill, Issaquah, Wash. (AWWA)
G.J. Tupac, G.J. Tupac & Associates Inc., Pittsburgh, Pa. (AWWA)
W.R. Whidden, Post Buckley Schuh & Jernigan, Orlando, Fla. (AWWA)
K.E. Wilson,† Standards Council Liaison, Post Buckley Schuh & Jernigan, Inc., Tampa, Fla. (AWWA)

Producer Members

S.A. Arnaout, Hanson Pressure Pipe Inc., Dallas, Texas (AWWA)
H.H. Bardakjian, Ameron International, Rancho Cucamonga, Calif. (AWWA)
M. Bauer, Tnemec Company Inc., Kansas City, Mo. (AWWA)
R.J. Card, Victaulic, Atlanta, Ga. (AWWA)
R.R. Carpenter, American Cast Iron Pipe Company, Birmingham, Ala. (MSS)
D. Dechant, Northwest Pipe Company, Denver, Colo. (AWWA)
B.D. Keil, Continental Pipe Manufacturing Company, Pleasant Grove, Utah (SPFA)
J.L. Luka,* American SpiralWeld Pipe Company, Columbia, S.C. (AWWA)
B.F. Vanderploeg,* Northwest Pipe Company, Portland, Ore. (AWWA)
J.A. Wise, Canus International Sales Inc., Surrey, B.C. (AWWA)

User Members

G.A. Andersen, New York City Bureau of Water Supply, Little Neck, N.Y. (AWWA)
J.H. Bambei Jr., Denver Water, Denver, Colo. (AWWA)
D.W. Coppes, Massachusetts Water Resources Authority, Southborough, Mass. (NEWWA)
R.V. Frisz, US Bureau of Reclamation, Denver, Colo. (USBR)
G. George, Tacoma Water, Water Supply Section, Tacoma, Wash. (AWWA)
T.J. Jordan, Metropolitan Water District of Southern California, LaVerne, Calif. (AWWA)
M. McReynolds,* La Mirada, Calif. (AWWA)

* Alternate
† Liaison, nonvoting

G. Oljaca, Greater Vancouver Regional District, Burnaby, B.C. (AWWA)
V.B. Soto, Los Angeles Department of Water & Power, Los Angeles, Calif. (AWWA)
G.P. Stine, San Diego County Water Authority, Escondido, Calif. (AWWA)
J.V. Young, City of Richmond, Richmond, B.C. (AWWA)

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Contents

All AWWA standards follow the general format indicated subsequently. Some variations from this format may be found in a particular standard.

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Foreword

This foreword is for information only and is not a part of ANSI/AWWA C208.

I. Introduction.

I.A. *Background.* Steel pipe has been used for waterlines in the United States since the 1850s. With the development of the Bessemer process in 1855 and the open-hearth process in 1861, steel, the strongest and most versatile refinement of iron, became available for water pipe.

Available records disclose installations of steel water pipe as early as 1858. The pipe was first manufactured by rolling steel sheets or plates into shape and riveting the seams. This method of fabrication continued with improvements into the 1930s. In 1905, lock-bar pipe was introduced and, by 1930, had nearly supplanted riveted pipe. By the early 1930s, both riveted and lock-bar methods were gradually phased out and welding dominated the pipe-making process. As welding became more universal in pipeline construction and manufacturing, varying steel shapes able to accommodate pipeline hydraulics and locations became more prevalent. Over the years, rigid specifications have been developed and new product developments and improvements in manufacturing techniques and processes have been established to ensure the purchaser a product of high standards.

I.B. *History.* This standard was first proposed in 1955 to provide standard dimensions for steel water pipe fittings. It was approved as a "tentative" standard on July 14, 1955. Revisions in the text were approved on Dec. 31, 1957, and were incorporated in the fourth and later printings. The revisions consisted of the addition of an explanatory paragraph, changes in the table for fittings for service in transmission and distribution mains, and clarification of the figures detailing the various fittings. The standard was approved without further revision on Jan. 26, 1959.

Revisions to the text were approved on June 21, 1983, and incorporated in the sixth and later printings. These revisions include the following:

1. Addition of a foreword to provide the history of a standard and major revisions.
2. Revision of Table 1, deleting 4-in. pipe size and extending pipe sizes to 144 in.
3. Revision of Table 2.
4. Expansion of Figure 3 to include sizes to 144 in.
5. Deletion of Table 4.
6. Deletion of alternate Table 3.
7. Deletion of Table 5.
8. Addition of reducing tees and deletion of smooth 90° elbow category from Figure 1 and Table 1.

The information in Table 1 was changed from a tabular format to a formula format in order

to ascertain dimensions for tees, crosses, wyes, laterals, and reducers. A factor, *f*, was introduced in the new Table 1 to facilitate the use of formulas for computing fitting dimensions and provided formulas for elbow layout to facilitate the design of elbows not tabulated.

Addendum C208-84 was approved on June 4, 1984. The addendum added a note of caution to Tables 2A through 2D concerning hoop tension concentration in elbows with a radius of less than 2.5*D*. ANSI/AWWA C208-83, including ANSI/AWWA C208-84, was reaffirmed without revision on June 18, 1989. ANSI/AWWA C208-96 was approved by the Board of Directors on June 23, 1996. The major revision was to clarify that the standard is a dimensional guide only and that design of fittings should be in accordance with applicable sections of AWWA Manual M11. Table 2 was deleted from the standard. ANSI/AWWA C208-01 was approved on June 17, 2001. This edition of ANSI/AWWA C208 was approved on June 24, 2007.

I.C. Acceptance. This standard has no applicable information for this section.

II. Special Issues. This standard has no applicable information for this section.

III. Use of This Standard. It is the responsibility of the user of an AWWA standard to determine that the products described in that standard are suitable for use in the particular application being considered.

III.A. *Purchaser Options and Alternatives.* The following items should be covered by the purchaser:

1. Standard used—that is, ANSI/AWWA C208, Dimensions for Fabricated Steel Water Pipe Fittings, of latest revision.
2. Type of fitting required (i.e., elbow, tee, reducer, wye, lateral, etc.).
3. Radius of elbows (i.e., 1*D*, 1.5*D*, 2.5*D*, or other).
4. Number of pieces or segments for elbows.
5. Design pressure and specifications for pipe to which the steel fitting will connect (i.e., ANSI/AWWA C200, AWWA M11).
6. Type of end connection required (i.e., plain, beveled end for field butt welding, bell or spigot for field lap welding, bell or spigot O-ring, and flanged or mechanical coupling).
7. Submittal of shop detail and assembly drawings.
8. Special handling, inspection, or testing requirements.
9. Lining and coating required.

III.B. *Modification to Standard.* Any modification to the provisions, definitions, or terminology in this standard must be provided by the purchaser.

IV. Major Revisions. Major revisions made to this standard in this edition include the following:

1. Several symbols have been added to Sec. 4.1.2.

2. The figures in the standard have been redone to reflect changes made to AWWA M11.

3. The computational methods and formulas for compound elbow have been taken out of the standard and added to AWWA M11.

4. A reducing elbow figure has been added to the standard as Figure 5.

V. Comments. If you have any comments or questions about this standard, please call the AWWA Volunteer and Technical Support Group at 303.794.7711, FAX at 303.795.7603, write to the group at 6666 West Quincy Avenue, Denver, CO 80235-3098, or e-mail at standards@awwa.org.

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ANSI/AWWA C208-07
(Revision of ANSI/AWWA C208-01)

American Water Works Association

AWWA Standard

Dimensions for Fabricated Steel Water Pipe Fittings

SECTION 1: GENERAL

Sec. 1.1 Scope

This standard provides overall dimensions for fabricating steel water pipe fittings for sizes 6 in. through 144 in. (150 mm through 3,600 mm)* for steel water transmission and distribution facilities.

Many configurations of fittings are possible and alternatives to this standard may be agreed on between the purchaser and manufacturer. The fitting dimensions shown in Figures 1, 2, 3, 4, 5, and in Table 1 are the minimum dimensions for fittings with plain ends. In practice, fittings are seldom provided as individual pieces as shown but are shop fabricated into full or special lengths of pipe or fabricated into assemblies, combining a number of fittings.

1.1.1 *Conditions not covered in this standard.* This standard is intended to serve as a dimensional guide only. It is not intended to be a standard for wall thickness, pressure ratings, and structural or hydraulic design. Reinforcement of fittings, which may include increased wall thickness, collars, wrapper plates, or

* Metric conversions given in this standard are direct conversions of US customary units and are not those specified in International Organization for Standardization (ISO) standards.