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(Revision of ANSI/AWWA C208-17)

AWWA Standard

Dimensions for Fabricated Steel Water Pipe Fittings

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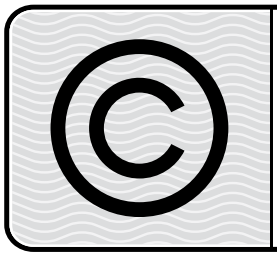
AWWA Standard

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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 the 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.

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5. Deletion of Table 4.

6. Deletion of alternative 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.

9. The information in Table 1 was changed from a tabular format to a formula format 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–2D concerning hoop tension concentration in elbows with a radius of less than 2.5D. ANSI/AWWA C208-83, including ANSI/AWWA Addendum 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 M11, *Steel Pipe: A Guide for Design and Installation.* Table 2 was deleted from the standard. ANSI/AWWA C208-01 was approved on June 17, 2001. ANSI/AWWA C208-07 was approved on June 24, 2007. ANSI/AWWA C208-12 was approved on June 10, 2012. ANSI/AWWA C208-17 was approved on June 11, 2017. This edition of ANSI/AWWA C208 was approved on Oct. 24, 2022.

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 information should be provided 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 (such as elbow, tee, reducer, wye, lateral, etc.).

3. Radius of elbows (such as 1D, 1.5D, 2.5D, or other).

4. Number of pieces or segments for elbows.

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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 (such as plain end, beveled end for field butt-joint welding, bell or spigot for field lap welding, bell or spigot O-ring, flanged, grooved or shouldered coupling, 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 of the provisions, definitions, or terminology in this standard must be provided by the purchaser.

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

1. Sec. 4.1.2 was modified to note nominal diameter as the basis for calculating reducer length.

2. Sec. 4.1.7, Sec. 4.1.8, Sec. 4.1.9, Figure 1E Case I, Figure 1E Case II, and Figure 5 were modified to delineate lateral lower angular deflection limits based on the type of reinforcement being used: 45° for laterals using crotch plate reinforcement and 30° for laterals not using crotch plate reinforcement. The changes address potential fabrication/welding difficulties in the acute crotch of the lateral. Figure 5 was further modified to add two new angular variables for clarification.

3. Sec. 4.1.10, minimum bifurcation angle was increased from 30° to 45°. This increase addresses potential fabrication/welding difficulties in the acute crotch of the bifurcation.

4. Figures 1A–1H were modified to identify outlets using verbiage consistent with AWWA M11.

5. Figure 2B was modified to reflect the maximum deflection angle of 30°.

V. Comments. If you have any comments or questions about this standard, please call AWWA Engineering and Technical Services at 303.794.7711, FAX at 303.795.7603, write to the department at 6666 West Quincy Avenue, Denver, CO 80235-3098; or email at standards@awwa.org.

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ANSI/AWWA C208-22
(Revision of ANSI/AWWA C208-17)

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AWWA Standard

Dimensions for Fabricated Steel Water Pipe Fittings

SECTION 1: GENERAL

Sec. 1.1 Scope

This standard provides formulas to calculate overall dimensions of fittings 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 through 6 are the minimum dimensions for fittings with plain ends. In practice, fittings can be provided as individual pieces as shown, shop fabricated into full lengths 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 a design standard for wall thickness, pressure ratings, structural design, or hydraulic design. Reinforcement of fittings, which may include increased wall thickness, collars, wrapper plates, or crotch plates, is not described in this standard. The design of fittings should be performed in accordance with the applicable section(s) in AWWA M11, *Steel Pipe: A Guide for Design and Installation*.

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