



Standard Practice for Structural Design of Reinforcements for Fittings in Factory-Made Corrugated Steel Pipe for Sewers and Other Applications¹

This standard is issued under the fixed designation A 998/A 998M; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reappraisal. A superscript epsilon (ε) indicates an editorial change since the last revision or reappraisal.

1. Scope

1.1 This practice covers the structural design of reinforcement for fittings in factory-made, round corrugated steel pipe, conforming to Specifications A 760/A 760M or A 762/A 762M, for use as storm and sanitary sewers and other buried applications. This practice is for fittings on pipe installed in a trench or embankment and subjected to earth loads and live loads. It must be recognized that a buried corrugated pipe is a composite structure made up of the steel ring and the soil envelope, and both elements play a vital part. Both main and branch pipe shall be designed in accordance with Practice A 796/A 796M and installed in accordance with Practice A 798/A 798M.

1.2 This practice covers the structural design of reinforcement for fittings such as those for branch pipes. Refer to Section 5 for design limitations.

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

1.4 The values stated in either inch-pound units or SI units shall be regarded separately as standard. The values stated in each system are not exact equivalents; therefore, each system must be used independently of the other, without combining values in any way. SI units are shown in brackets in the text for clarity, but they are the applicable values when the design is to be performed using SI units.

2. Referenced Documents

2.1 ASTM Standards:

A 36/A 36M Specification for Carbon Structural Steel²

A 153 Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware³

A 307 Specification for Carbon Steel Bolts and Studs, 60 000 psi Tensile Strength⁴

A 760/A 760M Specification for Corrugated Steel Pipe, Metallic-Coated for Sewers and Drains³

A 762/A 762M Specification for Corrugated Steel Pipe, Polymer Precoated for Sewers and Drains³

A 796/A 796M Practice for the Structural Design of Corrugated Steel Pipe, Pipe-Arches, and Arches for Storm and Sanitary Sewers and Other Buried Applications³

A 798/A 798M Practice for Installing Factory-Made Corrugated Steel Pipe for Sewers and Other Applications³

A 902 Terminology Related to Metallic Coated Steel Products³

A 929/A 929M Specification for Steel Sheet, Metallic-Coated by the Hot-Dip Process for Corrugated Steel Pipe³

F 568M Specification for Carbon and Alloy Steel Externally Threaded Metric Fasteners³

2.2 AASHTO Standard:

Standard Specifications for Highway Bridges⁵

2.3 Society of Automotive Engineers:

J978, Steel Self-Drilling Tapping Screws⁶

3. Terminology

3.1 For definitions of general terms used in this standard, refer to Terminology A 902.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *branch pipe*—corrugated pipe with a diameter smaller than or equal to that of the main pipe, carrying a portion of the flow and connected to the main pipe through a fitting welded in place.

3.2.2 *fittings*—sections of main pipe fabricated to accommodate branch pipes or manhole pipes.

3.2.3 *main pipe*—corrugated pipe carrying the primary flow.

3.2.4 *reinforcement*—sheets, bars, or structural members connected to the main pipe to strengthen a fitting.

¹ This practice is under the jurisdiction of ASTM Committee A-5 on Metallic Coated Iron and Steel Products and is the direct responsibility of Subcommittee A05.17 on Corrugated Steel Pipe Specifications.

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² *Annual Book of ASTM Standards*, Vol. 01.04.

³ *Annual Book of ASTM Standards*, Vol. 01.06.

⁴ *Annual Book of ASTM Standards*, Vol. 15.08.

⁵ Available from American Association of State Highway and Transportation Officials, 444 North Capitol St., N.W., Suite 225, Washington DC, 20001.

⁶ Available from Society of Automotive Engineers, 600 Commonwealth Dr., Warrendale, PA.