



Standard Specification for Synthetic Fiber Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe¹

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1. Scope

1.1 This specification covers synthetic fiber reinforced concrete pipe (Syn-FRCP) of internal diameters 12-48 in., intended to be used for the conveyance of sewage, industrial wastes, and storm water and for the construction of culverts.

NOTE 1—Experience has shown that the successful performance of this product depends upon the proper selection of the pipe strength, the type of bedding and backfill, the care that the installation conforms to the construction specifications, and provision for adequate inspection at the construction site. This specification does not include requirements for bedding, backfill, the relationship between field load conditions and the strength designation of pipe, or durability under unusual environmental conditions. These requirements should be included in the project specification.

NOTE 2—This product is a rigid pipe and it does not depend upon deflection (pipe stiffness) for additional support from the soil.

NOTE 3—This standard requires long-term testing of Syn-FRCP in accordance with Section 9 that goes above and beyond what is typically required for steel reinforced concrete pipe, in order to evaluate the long-term material strength of the fiber-concrete matrix.

1.2 *Units*—The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

2. Referenced Documents

2.1 ASTM Standards:²

- C33/C33M Specification for Concrete Aggregates
- C150/C150M Specification for Portland Cement
- C260/C260M Specification for Air-Entraining Admixtures for Concrete
- C309 Specification for Liquid Membrane-Forming Compounds for Curing Concrete
- C494/C494M Specification for Chemical Admixtures for Concrete

¹ This test method is under the jurisdiction of ASTM Committee C13 on Concrete Pipe and is the direct responsibility of Subcommittee C13.02 on Reinforced Sewer and Culvert Pipe.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

- C497 Test Methods for Concrete Pipe, Manhole Sections, or Tile
- C595/C595M Specification for Blended Hydraulic Cements
- C618 Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
- C822 Terminology Relating to Concrete Pipe and Related Products
- C989/C989M Specification for Slag Cement for Use in Concrete and Mortars
- C1017/C1017M Specification for Chemical Admixtures for Use in Producing Flowing Concrete
- C1116/C1116M Specification for Fiber-Reinforced Concrete
- D7508/D7508M Specification for Polyolefin Chopped Strands for Use in Concrete
- E105 Practice for Probability Sampling of Materials

3. Terminology

3.1 *Definitions*—For definitions of terms relating to concrete pipe not defined in this standard, see Terminology C822.

3.2 Definitions:

3.2.1 D_{Reload} —the $D_{Service}$ load divided by the long-term serviceability factor α as determined in accordance with Section 9.

3.2.2 $D_{Service}$ —the D-Load the pipe is required to sustain while in service.

3.2.3 D_{Ult} —the load the pipe is required to support in the three-edge bearing test expressed as a D-load.

3.2.4 α —long-term serviceability factor to account for possible creep in the pipe over time (unitless).

4. Classification

4.1 Pipe furnished under this specification shall be designated as Class I, II, III, IV, or V. The corresponding strength requirements are prescribed in Table 1. Special designs for pipe strengths not designated in Table 1 are permitted provided all other requirements of this specification are met.

5. Basis of Acceptance

5.1 The acceptability of the pipe design shall be in accordance with Section 10.