



# Standard Practice for Structural Design of Thermoplastic Corrugated Wall Stormwater Collection Chambers<sup>1</sup>

This standard is issued under the fixed designation F2787; 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 reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

## 1. Scope\*

1.1 This practice standardizes structural design of thermoplastic corrugated wall arch-shaped chambers used for collection, detention, and retention of stormwater runoff. The practice is for chambers installed in a trench or bed and subjected to earth and live loads. Structural design includes the composite system made up of the chamber arch, the chamber foot, and the soil envelope. Relevant recognized practices include design of thermoplastic culvert pipes and design of foundations.

1.2 This practice standardizes methods for manufacturers of buried thermoplastic structures to design for the time dependent behavior of plastics using soil support as an integral part of the structural system. This practice is not applicable to thermoplastic structures that do not include soil support as a component of the structural system.

1.3 This practice is limited to structural design and does not provide guidance on hydraulic, hydrologic, or environmental design considerations that may need to be addressed for functional use of stormwater collection chambers.

1.4 Stormwater chambers are most commonly embedded in open graded, angular aggregate which provide both structural support and open porosity for water storage. Should soils other than open graded, angular aggregate be specified for embedment, other installation and functional concerns may need to be addressed that are outside the scope of this practice.

1.5 Chambers are produced in arch shapes to meet classifications that specify chamber rise, chamber span, minimum foot width, minimum wall thickness, and minimum arch stiffness constant. Chambers are manufactured with integral footings.

1.6 Polypropylene chamber classifications are found in Specification F2418. Specification F2418 also specifies chamber manufacture and qualification.

1.7 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.

1.8 *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.*

## 2. Referenced Documents

### 2.1 ASTM Standards:<sup>2</sup>

D2487 Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)

D2990 Test Methods for Tensile, Compressive, and Flexural Creep and Creep-Rupture of Plastics

D6992 Test Method for Accelerated Tensile Creep and Creep-Rupture of Geosynthetic Materials Based on Time-Temperature Superposition Using the Stepped Isothermal Method

F2418 Specification for Polypropylene (PP) Corrugated Wall Stormwater Collection Chambers

### 2.2 AASHTO LRFD Bridge Design Specifications:<sup>3</sup>

Section 3 Loads and Load Factors, 3.5 Permanent Loads; 3.6 Live Loads

Section 10 Foundations, 10.6 Spread Footings

Section 12 Buried Structures and Tunnel Liners, 12.12 Thermoplastic Pipes

### 2.3 AASHTO Standard Specifications:<sup>3</sup>

M 43 Standard Specification for Size of Aggregate for Road and Bridge Construction

M 145 Standard Specification for Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes

<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

<sup>3</sup> AASHTO LRFD Bridge Design Specifications-Dual Units, 4th Edition, 2007 and AASHTO Standard Specifications for Transportation Materials and Sampling, 28th edition, 2008. Available from American Association of State Highway and Transportation Officials (AASHTO), 444 N. Capitol St., NW, Suite 249, Washington, DC 20001.

<sup>1</sup> This practice is under the jurisdiction of ASTM Committee F17 on Plastic Piping Systems and is the direct responsibility of Subcommittee F17.65 on Land Drainage.

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