



# Standard Specification for Smoothwall Polyethylene (PE) Pipe for Use in Drainage and Waste Disposal Absorption Fields<sup>1</sup>

This standard is issued under the fixed designation F810; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

## 1. Scope

1.1 This specification covers requirements and test methods for workmanship, flattening, dimensions, tolerances, stiffness, perforations, environmental stress cracking, bonding, and impact resistance for smoothwall perforated and nonperforated polyethylene (PE) pipe, including coextruded and closed profile pipe. Methods of marking are also included.

1.2 This specification includes two stiffness classes, referred to as, “Standard” and “Heavy Duty.”

1.3 The values stated in inch-pound units are to be regarded as the standard. The values given in parentheses are for information only.

1.4 The text of this specification references notes and footnotes that provide explanatory material. These notes and footnotes, excluding those in tables and figures, shall not be considered as requirements of this specification.

1.5 The following precautionary caveat pertains only to the test method portion, Section 7, of this specification: *This standard does not purport to address all of the safety problems, if any, associated with its use. It is the responsibility of whoever uses this standard to consult and 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>

D618 Practice for Conditioning Plastics for Testing

D1600 Terminology for Abbreviated Terms Relating to Plastics

D1693 Test Method for Environmental Stress-Cracking of Ethylene Plastics

D2122 Test Method for Determining Dimensions of Thermoplastic Pipe and Fittings

D2321 Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications

D2412 Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading<sup>2</sup>

D2444 Test Method for Determination of the Impact Resistance of Thermoplastic Pipe and Fittings by Means of a Tup (Falling Weight)

D2729 Specification for Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings

D2751 Specification for Acrylonitrile-Butadiene-Styrene (ABS) Sewer Pipe and Fittings

D2852 Specification for Styrene-Rubber (SR) Plastic Drain Pipe and Fittings

D3033 Specification for Type PSP Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings (Withdrawn 1987)<sup>3</sup>

D3034 Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings

D3350 Specification for Polyethylene Plastics Pipe and Fittings Materials

F412 Terminology Relating to Plastic Piping Systems

F481 Practice for Installation of Thermoplastic Pipe and Corrugated Pipe in Septic Tank Leach Fields

### 2.2 Federal Standard:

Fed. Std. No. 123 Marking for Shipments (Civil Agencies)<sup>4</sup>

<sup>1</sup> This specification is under the jurisdiction of ASTM Committee F17 on Plastic Piping Systems and is the direct responsibility of Subcommittee F17.65 on Land Drainage. Current edition approved Feb. 15, 2007; Nov. 1, 2012. Published February 2007; January 2013. Originally approved in 1983. Last previous edition approved in 2004/2007 as F810–04/F810–07. DOI: 10.1520/F0810-07-10.1520/F0810-12.

<sup>2</sup> 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.

<sup>3</sup> Withdrawn—The last approved version of this historical standard is referenced on www.astm.org.

<sup>4</sup> Available from Standardization Documents Order Desk, Bldg. 4 Section D, 700 Robbins Ave., Philadelphia, PA 19111-5094, Attn: NPODS.

2.3 *Military Standard:*  
**MIL-STD-129 Marking for Shipment and Storage**<sup>4</sup>

### 3. Terminology

3.1 *Definitions*—Definitions are in accordance with Terminology **F412** and abbreviations are in accordance with Terminology **D1600**, unless otherwise specified. The abbreviation for polyethylene is PE.

### 4. Significance and Use

4.1 The requirements of this specification are intended to provide smoothwall pipe suitable for soil drainage and waste disposal system absorption fields.

NOTE 1—Industrial waste disposal lines should be installed only with the specific approval of the cognizant code authority since chemicals not commonly found in drains and sewers and temperatures in excess of 140°F (60°C) may be encountered.

NOTE 2—The recommended uses of PE smoothwall pipe covered by this specification do not require watertight pressure rated joints. ABS, PVC, or styrene fittings may be used provided they conform to Specifications **D2729**, **D2751**, **D3033**, **D3034**, or **D2852**.

### 5. Materials

5.1 *General*—Those PE compounds used in the manufacture of PE smoothwall pipe shall conform with the requirements of cell class 424410 as defined and described in Specification **D3350**. The compound ingredients may consist of lubricants, stabilizers, nonpoly(ethylene) resin modifiers, and pigments essential for processing, property control, and coloring. Compounds that have higher cell classifications in one or more properties are acceptable provided product requirements are met.

5.1.1 Both Class C and Class B pigments may be used. The use of either pigment, used separately or together as is the case in coextruded tubing, should provide adequate ultraviolet protection and be acceptable to the purchaser as satisfactory for the intended use.

### 6. Requirements

6.1 *Workmanship*—The pipe or each layer of coextruded pipe shall be homogeneous throughout and essentially uniform in color, opacity, density, and other properties. The inside and outside surfaces shall be semi-matte or glossy in appearance and free of chalking, sticky, or tacky material. The pipe walls shall be free of cracks, holes, blisters, voids, foreign inclusion, or other defects that are visible to the naked eye and that may affect the wall integrity. Holes deliberately placed in perforated pipe are acceptable. The surfaces shall be free of excessive bloom. Bloom or chalking may develop in pipe exposed to direct rays of the sun (ultraviolet radiant energy) for extended periods and consequently these requirements do not apply to pipe after extended exposure to direct rays of the sun.

6.2 *Flattening*—There shall be no evidence of splitting, cracking, or breaking when the pipe is tested in accordance with **7.3**.

6.3 *Impact Resistance*—The impact resistance of the pipe shall be tested in accordance with Test Method **D2444**, using the 20-lb (9.1-kg) Tup B and Holder A, and shall comply with the requirements given in **Table 1**. Five specimens shall be tested, and all five must pass. For perforated pipe, samples are to be cut and tested at random without regard to hole locations, except that the point of impact shall not coincide with a perforation.

6.4 *Dimensions:*

6.4.1 Pipe dimensions (for both perforated and nonperforated pipe) shall comply with **Table 2** when measured in accordance with Test Method **D2122**.

6.4.2 Pipe shall be supplied in 10 ft ± ¼ in. (3.05 m ± 6.4 mm) laying lengths unless otherwise specified. The length of pipe is to be measured in accordance with Test Method **D2122**.

6.4.3 For belled pipe fabricated from pipe sections, the thickness of the belled section shall be considered satisfactory if the bell was formed from pipe meeting the requirements of **Table 2**. The minimum bell depth shall be 1¼ in. (44 mm). The length of bell is to be measured in accordance with Test Method **D2122** on socket depth.

6.5 *Pipe Stiffness*—The pipe stiffness at 5 % deflection (F/Δy) shall not be less than the values given in **Table 3** for the two stiffness classes when tested in accordance with Test Method **D2412**.

**TABLE 1 Impact Strength Requirements for PE Smoothwall Pipe at 73°F (23°C)**

Nominal Pipe Size, in. (mm)	Impact Strength	
	ft-lbf	J
3 (75)	40	54
4 (100)	45	61
6 (150)	70	95