



Standard Specification for Polyethylene (PE) Pipe and Fittings for Roof Drain Systems¹

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1. Scope*

1.1 This specification covers requirements for polyethylene (PE) pipe and fittings for nonpressure roof drain systems.

1.2 This specification covers pipe and fittings intended for normal residential and commercial uses and is not intended for use in unusual corrosive conditions.

NOTE 1—Before installing pipe for waste disposal use, the approval of the cognizant building code authority shall be obtained as conditions not found in normal use or temperatures approaching 140 °F (60 °C) may be encountered.

1.3 Pipe is produced in dimensions based on outside diameters of 32 mm (1.250 in.) and larger in accordance with Specification F714.

1.4 The interchangeability of pipe and fittings made by different manufacturers is not addressed in this specification. Transition fittings for joining pipe and fittings of different manufacturers is provided for in this specification.

1.5 Pipe and fittings are joined by the heat-fusion method, by the electrofusion method, or by using mechanical joints (excluding insert fittings) recommended by the manufacturer.

1.6 In referee decisions, the SI units shall be used for metric-sized pipe and inch-pound units for pipe sized in the IPS system (ANSI B36.10). In all cases, the values given in parentheses are provided for information only.

1.7 The following safety hazards caveat pertains only to the test method, Section 7, of this specification. *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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.8 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

¹ This specification is under the jurisdiction of ASTM Committee F17 on Plastic Piping Systems and is the direct responsibility of Subcommittee F17.63 on DWV.

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2. Referenced Documents

2.1 ASTM Standards:²

- D543 Practices for Evaluating the Resistance of Plastics to Chemical Reagents
- D570 Test Method for Water Absorption of Plastics
- D618 Practice for Conditioning Plastics for Testing
- D883 Terminology Relating to Plastics
- D1600 Terminology for Abbreviated Terms Relating to Plastics
- D2122 Test Method for Determining Dimensions of Thermoplastic Pipe and Fittings
- D2412 Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading
- D2444 Practice for Determination of the Impact Resistance of Thermoplastic Pipe and Fittings by Means of a Tup (Falling Weight)
- D3311 Specification for Drain, Waste, and Vent (DWV) Plastic Fittings Patterns
- D3350 Specification for Polyethylene Plastics Pipe and Fittings Materials
- D4000 Classification System for Specifying Plastic Materials
- D4976 Specification for Polyethylene Plastics Molding and Extrusion Materials
- F412 Terminology Relating to Plastic Piping Systems
- F477 Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe
- F714 Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Outside Diameter
- F1290 Practice for Electrofusion Joining Polyolefin Pipe and Fittings
- F1498 Specification for Taper Pipe Threads 60° for Thermoplastic Pipe and Fittings
- F2620 Practice for Heat Fusion Joining of Polyethylene Pipe and Fittings

2.2 ANSI Standard:³

- B36.10 Standard Dimensions of Steel Pipe (IPS)

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.

³ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.

*A Summary of Changes section appears at the end of this standard

2.3 ISO Standards:³

161 Thermoplastic Pipe for the Transport of Fluids—Nominal Outside Diameters and Nominal Pressures

3607 Polyethylene Pipe: Tolerances on Outside Diameters and Wall Thicknesses

2.4 Federal Standard:⁴

Fed. Std. No. 123 Marking for Shipment (Civil Agencies)

2.5 Military Standard:⁴

MIL-STD-129 Marking for Shipment and Storage

3. Terminology

3.1 Definitions—Definitions used in this specification are in accordance with the definitions given in Terminologies **D883** and **F412**, and abbreviations are in accordance with Terminology **D1600**, unless otherwise indicated. Plastic materials are classified in accordance with Classification **D4000**.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 toe-in, n—a small reduction of the outside diameter at the cut end of a length of thermoplastic pipe.

4. Materials and Manufacture

4.1 Polyethylene (PE) virgin material for pipe or fittings shall be from a single compound manufacturer and shall meet or exceed the requirements of Cell Classification PE345430 as defined in Specification **D3350** and PE123 as defined in Specification **D4976**.

4.2 The polyethylene material shall contain suitable stabilizers and antioxidants and may contain pigments not detrimental to pipe and fittings provided the pipe and fittings produced meet the requirements of this specification.

4.3 Rework Materials—Clean rework material generated from the manufacturer's own pipe or fittings products may be used by the same manufacturer, using the same type and grade resin, provided that the pipe and fittings produced meet all the requirements of this specification.

NOTE 2—See Specification **D3350** for information and definitions related to both rework and recycled plastics.

5. Requirements

5.1 Dimensions and Tolerances—Pipe:

5.1.1 Outside Diameters—These shall be in accordance with **Table 1** (SI units) or **Table 2** (inch-pound units), and shall be measured in accordance with Test Method **D2122** at any point not closer than 300 mm (11.8 in.) to the cut end of a length of pipe. Conditioning to standard temperature, but not to standard humidity, is required.

5.1.2 Wall Thickness—The minimum thicknesses shall be in accordance with **Table 3** (millimetres) or **Table 4** (inches) when measured in accordance with Test Method **D2122**. Conditioning to standard temperature, but not to standard humidity, is required.

5.1.3 Eccentricity—The wall thickness variability as measured and calculated in accordance with Test Method **D2122** in any diametrical cross section of the pipe shall not exceed 12 %.

TABLE 1 Outside Diameters and Tolerances

ISO Sizing System (ISO 161/1)			
Nominal Pipe Size	Equivalent	Outside Diameter Do, mm	
mm	in.	min	max ^A
32	1.260	32	32.3
40	1.575	40	40.4
50	1.969	50	50.5
55	2.165	55	55.5
56 ^B	2.205	56	56.5
63 ^B	2.480	63	63.6
65	2.559	65	65.6
75	2.953	75	75.7
90	3.543	90	90.8
110	4.331	110	111.0
160	6.299	160	161.4
200	7.874	200	201.8
250	9.843	250	252.3
280	11.024	280	282.5
315	12.402	315	317.8

^A As specified in ISO 3607.

^B Special sizes.

TABLE 2 Outside Diameters and Tolerances

IPS Sizing System (ANSI B36.10)			
Nominal Pipe Size	Equivalent	Actual Outside Diameters in.	
in.	mm	Average	Tolerances, ±
1¼	45.2	1.780	0.008
1½	48.3	1.900	0.009
2	60.3	2.375	0.011
3	88.9	3.500	0.016
4	114.3	4.500	0.020
5	136.5	5.375	0.025
5 ^A	141.3	5.563	0.025
6	168.3	6.625	0.030
7	181.0	7.125	0.034
8 ^A	219.1	8.625	0.039
10	273.1	10.750	0.048
12	323.8	12.750	0.057

^A Special sizes.

5.1.4 Toe-In—When measured in accordance with **5.1.1**, the outside diameter at the cut-end of the pipe shall not be more than 1.5 % smaller than the undistorted outside diameter. Measurement of the undistorted outside diameter shall be made no closer than 1.5 pipe diameter or 11.8 in. (300 mm), whichever distance is less, from the cut-end of the pipe. Undistorted outside diameter shall meet specifications in **Table 1** or **Table 2**.

5.1.5 Special Sizes—When existing system conditions or special local requirements make other diameters or wall thickness necessary, both shall be acceptable for engineered applications when mutually agreed upon by the customer and the manufacturer, if the pipe is manufactured from plastic compounds meeting the material requirements of this specification, and the strength and design requirements are calculated on the same basis as those used in this specification. For diameters not shown in **Table 1** or **Table 2**, the tolerance shall be the same percentage as that shown in the corresponding tables for the next smaller listed size. Minimum wall thicknesses not shown in **Table 3** or **Table 4** shall comply with **5.1.2**, and the tolerance shall comply with **5.1.3**.

⁴ DLA Document Services Building 4/D 700 Robbins Avenue Philadelphia, PA 19111-5094 <http://quicksearch.dla.mil/>