Designation: F1412 – 22

An American National Standard

Standard Specification for Polyolefin Pipe and Fittings for Corrosive Waste Drainage Systems[1]

This standard is issued under the fixed designation F1412; 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 specification covers requirements for non-pressure polyolefin pipe and fittings for corrosive waste drainage systems.

1.2 Pipe is produced in Schedule 40 and 80 IPS sizes, and in DR IPS sizes for two polyolefins, polyethylene (PE) and polypropylene (PP).

1.3 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.

1.4 Pipe and fittings are joined by the heat fusion method (Practice D2657 for PP butt and saddle fusion, Practice F2620 for PE butt, saddle and socket fusion and Practice F1290 for polyolefin electrofusion) or by using mechanical joints recommended by the manufacturer.

1.5 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.

1.6 The following safety hazards caveat pertains only to the test method, Section 8, 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.*

1.7 *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.*

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

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

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

D2657 Practice for Heat Fusion Joining of Polyolefin Pipe and Fittings

D3311 Specification for Drain, Waste, and Vent (DWV) Plastic Fittings Patterns

D3350 Specification for Polyethylene Plastics Pipe and Fittings Materials

D4101 Classification System and Basis for Specification for Polypropylene Injection and Extrusion Materials

F412 Terminology Relating to Plastic Piping Systems

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 *Federal Standard:*

Fed. Std. No. 123 Marking for Shipment (Civil Agencies)[3]

2.3 *Military Standard:*

MIL-STD-129 Marking for Shipment and Storage[3]

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

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

2.4 *Other Document:*
Uniform Plumbing Code[4]

3. Terminology

3.1 *Definitions:*

3.1.1 Definitions and abbreviations used in this specification are in accordance with the definitions and abbreviations given in Terminology F412, unless otherwise indicated.

3.1.2 The plumbing terminology used in this specification is in accordance with the definitions given in *Uniform Plumbing Code*, unless otherwise indicated.

3.2 *Definitions of Terms Specific to This Standard:*

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

4. Classification

4.1 *General*—This specification covers polyolefin pipe made from polyethylene or polypropylene in iron pipe sizes.

4.2 This specification also includes molded fittings and in larger sizes (8 in., 10 in., 12 in.) fabricated fittings.

5. Materials and Manufacture

5.1 Polyethylene (PE) virgin material for pipe or fittings shall be from a single compound manufacturer and shall be made from PE material that meets or exceeds the cell-classification requirements of 112110, 213330 or 324430 as defined in Specification D3350.

5.1.1 This specification covers PE pipe made from PE plastics as defined by hydrostatic design stresses developed on the basis of long-term tests.

5.2 Polypropylene (PP) virgin material for pipe or fittings shall meet the requirements for polypropylene Group 01, 02 or 03, as defined in Specification D4101.

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

5.3.1 Polyolefin material can be produced in both regular and flame-retardant compounds for pipe and fittings.

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

6. Requirements

6.1 *Dimensions and Tolerances—Pipe:*

6.1.1 Dimensions and tolerances for pipe shown in Table 1, Table 2, and Table 3 and shall be measured in accordance with Test Method D2122. The tolerance for out-of-roundness shall apply only to pipe prior to shipment.

6.1.2 *Toe-In*—The outside diameter when measured in accordance with Test Method D2122 shall meet the requirements of Table 1 and Table 2 when measured at any point within 1.5 pipe diameters or 11.8 in. (300 mm), whichever is less, to the cut end of the pipe length.

6.2 *Dimensions and Tolerances—Fittings.*

6.2.1 The minimum wall thickness of the body of all fittings shall not be less than the corresponding Schedule 40 pipe size and shall be measured in accordance with Test Method D2122.

6.2.2 Spigot ends of fittings shall conform to the diameter and out-of-roundness requirements for pipe.

TABLE 1 Outside Diameters and Tolerances for Polyolefin Pipe in. (mm)

Nominal Pipe Size	Average Outside Diameter	Tolerance	Out-of-Roundness (maximum minus minimum)
1¼	1.660 (42.16)	±0.005 (±0.13)	0.050 (1.27)
1½ [A]	1.750 (44.45)	±0.010 (±0.25)	0.060 (1.52)
1½	1.900 (48.26)	±0.006 (±0.15)	0.060 (1.52)
2	2.375 (60.32)	±0.006 (±0.15)	0.070 (1.78)
3	3.500 (88.90)	±0.008 (±0.20)	0.080 (2.03)
4	4.500 (114.30)	±0.009 (±0.23)	0.100 (2.54)
6	6.625 (168.28)	±0.011 (±0.28)	0.100 (2.54)
8	8.625 (219.08)	±0.015 (±0.38)	0.150 (3.81)
10	10.750 (273.05)	±0.015 (±0.38)	0.150 (3.81)
12	12.750 (323.85)	±0.015 (±0.38)	0.150 (3.81)

[A] Not an IPS size. Pipe shall be used with compatible fittings designed for this outside diameter. The wall thickness is the same as 1½ in. IPS Schedule 40 shown in Table 2.

TABLE 2 Wall Thickness and Tolerances for Polyolefin Pipe Schedules 40 and 80, in. (mm)

NOTE 1— For fittings, the wall thickness is a minimum value, except that a 10 % variation resulting from core shift is allowable. In such a case, the average of the two opposite wall thicknesses shall equal or exceed the value shown in the Schedule 40 table.

Nominal Pipe Size	Schedule 40		Schedule 80	
	Minimum	Tolerance	Minimum	Tolerance
1¼	0.140 (3.56)	+0.020 (+0.51)	0.191 (4.85)	+0.023 (+0.58)
1½	0.145 (3.68)	+0.020 (+0.51)	0.200 (5.08)	+0.024 (+0.61)
2	0.154 (3.91)	+0.020 (+0.51)	0.218 (5.54)	+0.026 (+0.66)
3	0.216 (5.49)	+0.026 (+0.66)	0.300 (7.62)	+0.036 (+0.91)
4	0.237 (6.02)	+0.028 (+0.71)	0.337 (8.56)	+0.040 (+1.02)
6	0.280 (7.11)	+0.034 (+0.86)	0.432 (10.97)	+0.052 (+1.32)
8	0.322 (8.18)	+0.039 (+0.99)	0.500 (12.70)	+0.060 (+1.52)
10	0.365 (9.27)	+0.044 (+1.12)	0.593 (15.06)	+0.071 (+1.80)
12	0.406 (10.31)	+0.049 (+1.24)	0.687 (17.45)	+0.082 (+2.08)

TABLE 3 Wall Thickness and Tolerances for Polyolefin Pipe SDR 17 and 26, in. (mm)

NOTE 1—For fittings, the wall thickness is a minimum value, except that a 10 % variation resulting from core shift is allowable. In such a case, the average of the two opposite wall thicknesses shall equal or exceed the value shown in the Table 3.

Nominal Pipe Size	SDR 26		SDR 17	
	Minimum	Tolerance	Minimum	Tolerance
2	0.091 (2.32)	+0.020 (+0.51)	0.140 (2.32)	+0.017 (+0.43)
3	0.135 (3.42)	+0.020 (+0.51)	0.206 (3.43)	+0.025 (+0.63)
4	0.173 (4.40)	+0.021 (+0.53)	0.265 (4.40)	+0.032 (+.81)
6	0.255 (6.47)	+0.031 (+0.78)	0.390 (6.47)	+0.047 (+1.19)
8	0.332 (8.43)	+0.040 (+1.01)	0.507 (8.43)	+0.061 (+1.55)
10	0.413 (10.50)	+0.050 (+1.26)	0.632 (10.50)	+0.076 (+1.93)
12	0.490 (12.46)	+0.059 (+1.50)	0.750 (12.46)	+0.090 (+2.29)

[4] Available from International Association of Plumbing and Mechanical Officials, 5001 E. Philadelphia St., Ontario, CA 91761, http://www.iapmo.org.