



Standard Specification for Metric Outside Diameter Polyethylene (PE) Plastic Pipe (DR- PN)¹

This standard is issued under the fixed designation F3123; 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 reappraisal. A superscript epsilon (ε) indicates an editorial change since the last revision or reappraisal.

1. Scope*

1.1 This specification covers metric outside diameter polyethylene (PE) pipe made from polyethylene compound that qualifies for MRS, HDB and HDS ratings and for PE100 and PE4710 designations. Included are requirements for polyethylene compound, workmanship, dimensions, short-term stress and ductility, long-term stress, marking, quality assurance and verification of joining.

1.1.1 Polyethylene pipe in accordance with [Table 1](#) is intended to be compatible with nominal diameters in accordance with ISO 161-1, Specification [F714](#) and other pipe sizing conventions, nominal pressures in accordance with ISO 161-1 and wall thickness in accordance with ISO 4065.

1.1.2 Polyethylene pipe in accordance with [Table 2](#) is intended to be outside diameter compatible with steel pipe NPS/IPS nominal outside diameter pipe in accordance with specifications such as Specification [D3035](#), Specification [F714](#), or AWWA C906.

1.1.3 Polyethylene pipe in accordance with [Table 3](#) is intended to be outside diameter compatible with cast iron/ductile iron, DIPS/DIOD outside diameter pipe in accordance with specifications such as Specification [F714](#), or AWWA C906.

1.2 Pipes produced under this specification are intended for the pressure or non-pressure conveyance of liquid or gaseous media. Pipes produced under this specification are not intended as enclosures for electrical or communications components. See [Appendix X1](#).

1.3 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.4 The following safety hazards caveat pertains only to the test methods portion, 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.

1.5 The ANS label on this international standard certifies the development of this international standard in accordance with requirements for openness, balance, consensus and due process in accordance with *ANSI Essential Requirements: Due Process Requirements for American National Standards* and denotes in addition that this international standard is an American National Standard.

1.6 *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

- [D618 Practice for Conditioning Plastics for Testing](#)
- [D638 Test Method for Tensile Properties of Plastics](#)
- [D746 Test Method for Brittleness Temperature of Plastics and Elastomers by Impact](#)
- [D792 Test Methods for Density and Specific Gravity \(Relative Density\) of Plastics by Displacement](#)
- [D1238 Test Method for Melt Flow Rates of Thermoplastics by Extrusion Plastometer](#)
- [D1435 Practice for Outdoor Weathering of Plastics](#)
- [D1505 Test Method for Density of Plastics by the Density-Gradient Technique](#)
- [D1598 Test Method for Time-to-Failure of Plastic Pipe Under Constant Internal Pressure](#)
- [D1599 Test Method for Resistance to Short-Time Hydraulic Pressure of Plastic Pipe, Tubing, and Fittings](#)
- [D1600 Terminology for Abbreviated Terms Relating to Plastics](#)
- [D1603 Test Method for Carbon Black Content in Olefin Plastics](#)

¹ This specification is under the jurisdiction of ASTM Committee [F17](#) on Plastic Piping Systems and is the direct responsibility of Subcommittee [F17.26](#) on Olefin Based 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.

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

TABLE 1 Diameter and Wall Thickness Dimensions and Tolerances, mm

Nominal Diameter, DN	Outside Diameter			Minimum Wall Thickness, t															
	Min. (d_n)	Tol.	OOR Tol.	PN 25		PN 20		PN 16		PN 12.5		PN 10		PN 8		PN 6		PN 5	
				DR 7.4		DR 9		DR 11		DR 13.6		DR 17		DR 21		DR 26		DR 33	
				t	Tol. ^A	t	Tol. ^A	t	Tol. ^A	t	Tol. ^A	t	Tol. ^A	t	Tol. ^A	t	Tol. ^A	t	Tol. ^A
32	32	0.3	1.3	4.4	0.6	3.6	0.5	3	0.4	...	...	...	...	...	...	...	...	...	...
40	40	0.4	1.4	5.5	1.7	4.5	0.6	3.7	0.5	3.0	0.5	...	...	...	...	...	...	...	...
50	50	0.4	1.4	6.9	1.8	5.6	0.7	4.6	0.6	3.7	0.5	3.0	0.4	...	...	...	...	...	...
63	63	0.4	1.5	8.6	1	7.1	0.9	5.8	0.7	4.7	0.5	3.8	0.5	3	0.4	...	...	...	...
75	75	0.5	1.6	10.3	1.2	8.4	1	6.8	0.8	5.6	0.6	4.5	0.6	3.6	0.5	...	...	...	...
90	90	0.6	1.8	12.3	1.5	10.1	1.2	8.2	1	6.7	0.8	5.4	0.7	4.3	0.6	3.5	0.5	...	...
110	110	0.7	2.2	15.1	1.7	12.3	1.4	10	1.1	8.1	1	6.6	0.8	5.3	0.7	4.2	0.6	...	...
125	125	0.8	2.5	17.1	1.9	14	1.6	11.4	1.3	9.2	1.1	7.4	0.9	6	0.7	4.8	0.6	...	...
140	140	0.9	2.8	19.2	2.1	15.7	1.7	12.7	1.4	10.3	1.2	8.3	1	6.7	0.8	5.4	0.7	...	...
160	160	1	3.2	21.9	2.3	17.9	1.9	14.6	1.6	11.8	1.3	9.5	1.1	7.7	0.9	6.2	0.8	...	...
180	180	1.1	3.6	24.6	2.6	20.1	2.2	16.4	1.8	13.3	1.5	10.7	1.2	8.6	1	6.9	0.8	...	...
200	200	1.2	4	27.4	2.9	22.4	2.4	18.2	2	14.7	1.5	11.9	1.3	9.6	1.1	7.7	0.9	...	...
225	225	1.4	4.5	30.8	3.2	25.2	2.7	20.5	2.2	16.6	1.8	13.4	1.5	10.8	1.2	8.6	1	...	...
250	250	1.5	5	34.2	3.6	27.9	4.2	22.7	2.4	18.4	2	14.8	1.6	11.9	1.3	9.6	1.1	...	...
280	280	1.7	9.8	38.3	4	31.3	4.7	25.4	2.7	20.6	2.2	16.6	1.8	13.4	1.5	10.7	1.2	...	...
315	315	1.9	11.1	43.1	4.5	35.2	5.3	28.6	3	23.2	2.3	18.7	2	15	1.6	12.1	1.4	9.7	1.1
355	355	2.2	12.5	48.5	5	39.7	6	32.2	4.9	26.1	2.8	21.1	2.3	16.9	1.8	13.6	1.5	10.9	2.2
400	400	2.4	14	54.7	5.6	44.7	6.8	36.3	5.5	29.4	3.1	23.7	2.5	19.1	2.1	15.3	1.7	12.3	2.4
450	450	2.7	15.8	61.5	6.3	50.3	7.6	40.9	6.2	33.1	4.9	26.7	2.8	21.5	2.3	17.2	1.9	13.8	2.7
500	500	3	17.5	68.4	10.3	55.8	8.4	45.4	6.9	36.8	5.5	29.7	2.9	23.9	2.5	19.1	2.1	15.3	2.7
560	560	3.4	19.6	76.6	11.5	62.5	9.4	50.8	7.7	41.2	6.1	33.2	4.9	26.7	2.8	21.4	2.3	17.2	2.9
630	630	3.8	22.1	86.1	13	70.3	10.6	57.2	8.7	46.3	6.9	37.4	5.6	30	4.5	24.1	2.6	19.3	3.1
710	710	6.4	24.9	97.1	14.5	79.3	12	64.5	9.8	52.2	7.8	42.1	6.3	33.9	5	27.2	2.9	21.8	3.3
800	800	7.2	28	109.3	16.3	89.3	13.5	72.6	11	58.8	8.8	47.4	7.1	38.1	5.7	30.6	4.5	24.5	3.6
900	900	8.1	31.5	...	...	100.6	15	81.7	12.4	66.2	9.9	53.3	7.9	42.9	6.4	34.4	5.1	27.6	3.9
1000	1000	9	35	...	...	111.8	16.7	90.2	13.7	72.5	10.8	59.3	8.8	47.7	7.1	38.2	5.7	30.6	4.5
1200	1200	10.8	42	...	...	...	...	109.5	16.4	88.2	13.2	67.9	10.1	57.2	8.5	45.9	6.8	36.7	5.5
1400	1400	12.6	49	...	...	...	...	...	...	102.9	15.4	82.4	12.3	66.7	10	53.5	8	42.9	6.4
1600	1600	14.4	56	...	...	...	...	...	...	117.6	17.6	94.1	14.1	76.2	11.4	61.2	9.1	49	7.3
1800	1800	16.2	63	...	...	...	...	...	...	...	...	105.9	15.8	85.7	12.8	69.1	10.3	54.5	8.1
2000	2000	18	70	...	...	...	...	...	...	...	...	117.6	17.6	95.2	14.2	76.9	11.5	60.6	9
2100	2100	18.9	73.5	...	...	...	...	...	...	...	...	...	...	100	15	80.8	12.2	63.6	9.6
2250	2250	20.3	78.7	...	...	...	...	...	...	...	...	...	...	107.2	16.1	86	12.9	68.2	10.2
2300	2300	20.7	80.5	...	...	...	...	...	...	...	...	...	...	109.5	16.5	88.5	13.3	69.7	10.5
2500	2500	22.5	87.5	...	...	...	...	...	...	...	...	...	...	119	17.9	96.2	14.5	75.8	11.4

^A For minimum wall ≤ 30.0 mm, tolerance equals $0.1 \times$ minimum wall, rounded up to the nearest 0.1 mm. For minimum wall >30.0 mm, tolerance equals $0.15 \times$ minimum wall, to nearest whole 0.1 mm, with decimal values beyond 0.1 mm dropped.

D2122 Test Method for Determining Dimensions of Thermoplastic Pipe and Fittings
D2290 Test Method for Apparent Hoop Tensile Strength of Plastic or Reinforced Plastic Pipe
D2565 Practice for Xenon-Arc Exposure of Plastics Intended for Outdoor Applications
D2837 Test Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials or Pressure Design Basis for Thermoplastic Pipe Products
D3035 Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled Outside Diameter
D3350 Specification for Polyethylene Plastics Pipe and Fittings Materials
D3895 Test Method for Oxidative-Induction Time of Polyolefins by Differential Scanning Calorimetry
D4218 Test Method for Determination of Carbon Black Content in Polyethylene Compounds by the Muffle-Furnace Technique

F412 Terminology Relating to Plastic Piping Systems
F714 Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Outside Diameter
F905 Practice for Qualification of Polyethylene Saddle-Fused Joints
F1055 Specification for Electrofusion Type Polyethylene Fittings for Outside Diameter Controlled Polyethylene and Crosslinked Polyethylene (PEX) Pipe and Tubing
F1056 Specification for Socket Fusion Tools for Use in Socket Fusion Joining Polyethylene Pipe or Tubing and Fittings
F1290 Practice for Electrofusion Joining Polyolefin Pipe and Fittings
F1473 Test Method for Notch Tensile Test to Measure the Resistance to Slow Crack Growth of Polyethylene Pipes and Resins
F2620 Practice for Heat Fusion Joining of Polyethylene Pipe and Fittings