



Standard Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Outside Diameter¹

This standard is issued under the fixed designation F714; 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 polyethylene (PE) pipe made in three standard outside diameter sizing systems, based on outside diameters of DIPS 3, IPS 4, Metric 90 mm and larger. For smaller sizes refer to Specification D3035. See 5.2.5 for guidelines on special sizes.

1.2 The piping is intended for new construction and insertion renewal of old piping systems used for the transport of water, municipal sewage, domestic sewage, industrial process liquids, effluents, slurries, etc., in both pressure and nonpressure systems.

NOTE 1—The user should consult the manufacturer to ensure that any mechanical or chemical effects to the polyethylene pipe caused by the material being transported will not affect the service life beyond limits acceptable to the user. See PPI TR-19 Chemical Resistance of Thermoplastic Piping Materials for guidance on chemical effects, www.plasticpipe.org

1.3 All pipes produced under this specification are pressure-rated. See Appendix X5 for information on pressure rating.

NOTE 2—References and material descriptions for PE2406, PE3408 and materials having a HDB of 1450 psi have been removed from Specification F714 due to changes in Specification D3350 and PPI TR-3. For removed designations, refer to previous editions of Specification F714, Specification D3350, PPI TR-3 and PPI TR-4. The removal of these materials does not affect pipelines that are in service. See Note 4 and Note 9.

1.4 This specification includes criteria for choice of raw material, together with performance requirements and test methods for determining conformance with the requirements.

1.5 Quality-control measures are to be taken by manufacturers. See Appendix X4 for general information on quality control.

1.6 *Units*—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.

1.7 The following safety hazards caveat pertains only to the test methods portion, Section 6, 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.*

2. Referenced Documents

2.1 ASTM Standards:²

- D1238 Test Method for Melt Flow Rates of Thermoplastics by Extrusion Plastometer
- 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 (Withdrawn 2024)³
- 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
- 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
- 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

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.

Current edition approved Feb. 1, 2024. Published February 2024. Originally approved in 1981. Last previous edition approved in 2022 as F714 – 22. DOI: 10.1520/F0714-24.

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 The last approved version of this historical standard is referenced on www.astm.org.

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

D3350 Specification for Polyethylene Plastics Pipe and Fittings Materials

F412 Terminology Relating to Plastic Piping Systems

F585 Guide for Insertion of Flexible Polyethylene Pipe Into Existing Sewers

2.2 *Federal Standard*:⁴

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

2.3 *Military Standard*:⁴

MIL-STD-129 Marking for Shipment and Storage

2.4 *NSF/ANSI Standards*:

Standard No. 14 for Plastic Piping Components and Related Materials⁵

Standard No. 61 (NSF/ANSI/CAN standard) for Drinking Water Systems Components—Health⁵

2.5 *Other Documents*:

PPI TR-3 Policies and Procedures for Developing Hydrostatic Design Basis (HDB), Pressure Design Basis (PDB), Strength Design Basis (SDB), and Minimum Required Strength (MRS) Ratings for Thermoplastic Piping Materials or Pipe⁶

PPI TR-4 HDB/SDB/PDB/MRS Listed Materials, PPI Listing of Hydrostatic Design Basis (HDB), Strength Design Basis (SDB), Pressure Design Basis (PDB), and Minimum Required Strength (MRS) Ratings for Thermoplastic Piping Materials or Pipe⁶

PPI TN-44 2015 Long Term Resistance of AWWA C906 Polyethylene (PE) Pipe to Potable Water Disinfectants

PPI TR-19 Chemical Resistance of Thermoplastic Piping Materials

APWA Uniform Color Code⁷

3. Terminology

3.1 Unless otherwise specified, definitions are in accordance with Terminology **F412** and abbreviations are in accordance with Terminology **D1600**.

3.2 *Definitions of Terms Specific to This Standard*:

3.2.1 *dimension ratio, hydrostatic design stress, and pressure rating relationship*:—

$$P = \frac{2S}{(D_o/t) - 1}$$

where:

S = hydrostatic design stress, HDS, for water at 73 °F (23 °C), psi (or kPa or MPa),

P = pressure rating, PR, psi (or kPa or MPa),

D_o = outside diameter, in. (or mm), per **Table 3**, **Table 4**, or **Table 5**

t = minimum wall thickness, in. (or mm), per **Tables Table 6**, **Table 7**, or **Table 8**

D_o/t = dimension ratio (DR).

3.2.2 *hydrostatic design basis and hydrostatic design stress*—the hydrostatic design stress, S , is determined by multiplying the hydrostatic design basis (HDB) by a design factor, DF that has a value less than 1.0.

NOTE 3—Hydrostatic design stress (HDS) ratings for PE compounds are in accordance with this specification and are specified in Section 4.

4. Materials

4.1 *Polyethylene Compound*—Polyethylene compounds suitable for use in the manufacture of pipe under this specification shall meet thermoplastic materials designation codes

TABLE 1 Polyethylene Compound Requirements

Requirement	Material Designation			
	PE2708	PE3608	PE4608	PE4710
	Required Value			
Minimum HDB at 140 °F (60 °C), psi (MPa), per D2837 and PPI TR-3	800 (5.5) ^A	800 (5.5) ^A	800 (5.5) ^A	1000 (6.9) ^A
HDS for water at 73 °F (23 °C) psi (MPa), per D2837 and PPI TR-3 ⁴	800 (5.5)	800 (5.5)	800 (5.5)	1000 (6.9)
Melt flow rate per D1238	≤0.40 g/10 min Cond. 190/2.16 or ≤20 g/10 min Cond. 190/21.6	≤0.15 g/10 min Cond. 190/2.16 or ≤20 g/10 min Cond. 190/21.6	≤0.15 g/10 min Cond. 190/2.16 or ≤20 g/10 min Cond. 190/21.6	≤0.15 g/10 min Cond. 190/2.16 or ≤20 g/10 min Cond. 190/21.6
Specification D3350	Required Value			
Cell Classification Property				
Density (natural base resin)	2	3	4	4
SCG Resistance	7	6	6	7
Color and UV Stabilizer Code	C or E	C or E	C or E	C or E

^AContact manufacturer or see PPI TR-4 for listed value.