



Designation: F2306/F2306M – 25a

Standard Specification for 300 mm to 1500 mm [12 in. to 60 in.] Annular Corrugated Profile-Wall Polyethylene (PE) Pipe and Fittings for Non- Pressure Gravity-Flow Storm Sewer and Subsurface Drainage Applications¹

This standard is issued under the fixed designation F2306/F2306M; 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 and test methods for annular, corrugated profile wall polyethylene pipe and fittings with an interior liner. The nominal inside diameters covered are 300 mm to 1500 mm [12 in. to 60 in.].

1.2 The requirements of this specification are intended to provide pipe and fittings for underground use for non-pressure gravity-flow storm sewer and subsurface drainage systems.

NOTE 1—Pipe and fittings produced in accordance with this specification shall be installed in compliance with Practice D2321.

1.3 This specification covers pipe and fittings with an interior liner using a corrugated exterior profile (Fig. 1).

1.4 The products manufactured under this standard use either virgin or recycled (post-industrial or post-consumer) materials in accordance with the requirements specified for each.

1.5 *Units*—The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in non-conformance with the standard.

1.6 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 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 Recom-*

mendations 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
- 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)
- D3212 Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals
- 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
- D4883 Test Method for Density of Polyethylene by the Ultrasound Technique
- D5630 Test Method for Ash Content in Plastics
- D7399 Test Method for Determination of the Amount of Polypropylene in Polypropylene/Low Density Polyethylene Mixtures Using Infrared Spectrophotometry
- F412 Terminology Relating to Plastic Piping Systems
- F477 Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe
- F2136 Test Method for Notched, Constant Ligament-Stress

¹ This specification is under the jurisdiction of ASTM Committee F17 on Plastic Piping Systems and is the direct responsibility of Subcommittee F17.62 on Sewer.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at www.astm.org/contact. 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

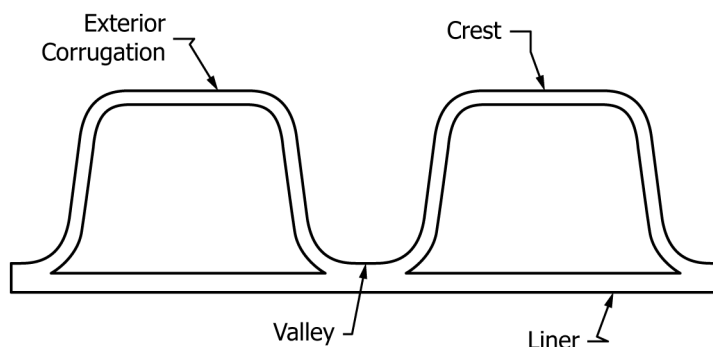


FIG. 1 Typical Annular Corrugated Pipe Profile

(NCLS) Test to Determine Slow-Crack-Growth Resistance of HDPE Resins or HDPE Corrugated Pipe

F3181 Test Method for The Un-notched, Constant Ligament Stress Crack Test (UCLS) for HDPE Materials Containing Post- Consumer Recycled HDPE

F3308 Practice for Sampling and Testing Frequency for Recycled Materials in Polyethylene (PE) Pipe for Non-Pressure Applications

2.2 AASHTO Standard:³

AASHTO LRFD Bridge Design Specifications

LRFD, Section 12 Bridge Design Specifications Section 12 – Buried Structures and Tunnel Liners

AASHTO M 145 : Classification of Soils and Aggregate Mixtures

2.3 NCHRP (National Cooperative Highway Research Program) Report:⁴

NCHRP Report 631 Updated Test and Design Methods for Thermoplastic Drainage Pipe

NCHRP Report 870 Performance of Corrugated Pipe Manufactured with Recycled Content

2.4 ISO Standard:⁵

ISO 9969 Thermoplastics pipes —Determination of ring stiffness

ISO 15270 Guidelines for the Recovery and Recycling of Plastic Waste

3. Terminology

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

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *design diameter, n*—the manufacturer's stated inside diameter.

3.2.2 *mold line, n*—a line formed on the product as a result of the mold blocks coming together during manufacturing.

3.2.3 *profile wall, n*—a pipe wall construction that presents an interior liner in the waterway but includes ribs, corrugations, or other shapes, which can be either solid or hollow, that helps brace the pipe against diametrical deformation.

3.2.4 *service temperature, n*—the average ambient temperature of the insitu conditions at which the pipe will be operating for the life of the project.

3.2.5 *NID, n*—numerical designation, which is approximately equal to the nominal inside diameter by which a pipe or fitting is defined.

3.2.6 *SN, n*—numerical designation of the ring stiffness of the pipe or fitting, determined according to ISO 9969, which is a convenient round number, indicating the minimum required ring stiffness of the pipe or stiffness of the fitting.

4. Ordering Information

4.1 Orders for product made to this specification shall include the following information to adequately describe the desired product:

4.1.1 This ASTM designation and year of issue,

4.1.2 Perforations:

4.1.2.1 With perforations,

4.1.2.2 Without perforations,

4.1.3 Diameters,

4.1.4 Total footage of each pipe diameter involved,

4.1.5 Pipe laying length, and

4.1.6 Virgin or recycled resins.

4.1.7 Fitting type(s):

4.1.7.1 Size and type of fittings, including mainline and branch diameters, and

4.1.7.2 Number of fittings per diameter.

5. Materials and Manufacture

5.1 *Virgin Resin Products:*

5.1.1 *Pipe and Blow-Molded Fittings*—The pipe and fittings shall be made of virgin PE plastic compound meeting the requirements of Specification D3350 cell classification 435400C or 435400E.

5.1.2 The carbon black content in compounds meeting cell classification 435400C shall be greater than 2 % but not exceed 4 %. Compounds that have a higher cell classification in one or more properties shall be permitted provided the density of the

³ Available from American Association of State Highway and Transportation Officials (AASHTO), 555 12th Street NW, Suite 1000 Washington DC, 20004, <http://www.transportation.org>.

⁴ Transportation Research Board, The National Academies 500 Fifth Street, NW Washington, DC 20001. <http://www.TRB.org>

⁵ Available from International Organization for Standardization (ISO), ISO Central Secretariat, BIBC II, Chemin de Blandonnet 8, CP 401, 1214 Vernier, Geneva, Switzerland, <http://www.iso.org>.