Designation: F2947/F2947M – 21a

Standard Specification for 150 to 1500 mm [6 to 60 in.] Annular Corrugated Profile-Wall Polyethylene (PE) Pipe and Fittings for Sanitary Sewer Applications[1]

This standard is issued under the fixed designation F2947/F2947M; 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 150 to 1500 mm [6 to 60 in.].

1.2 The requirements of this specification are intended to provide pipe and fittings suitable for underground use for non-pressure sanitary sewer systems. 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 specification 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 are not necessarily exact equivalents; therefore, to ensure conformance with the standard, each system shall be used independently of the other, and values from the two systems shall not be combined.

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 Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

A666 Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar
D638 Test Method for Tensile Properties of Plastics
D618 Practice for Conditioning Plastics for Testing
D1600 Terminology for Abbreviated Terms Relating to Plastics
D1603 Test Method for Carbon Black Content in Olefin 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)
D2565 Practice for Xenon-Arc Exposure of Plastics Intended for Outdoor Applications
D2990 Test Methods for Tensile, Compressive, and Flexural Creep and Creep-Rupture of Plastics
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
D4389 Specification for Finished Glass Fabrics Woven From Rovings

[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 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**

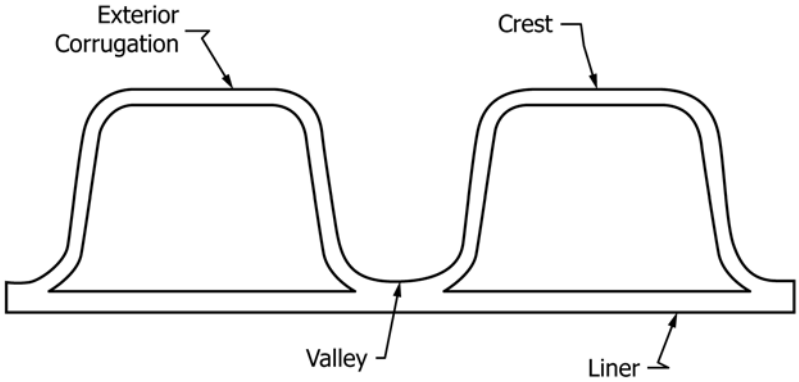

FIG. 1 Typical Annular Corrugated Pipe Profile

D4703 Practice for Compression Molding Thermoplastic Materials into Test Specimens, Plaques, or Sheets
D4883 Test Method for Density of Polyethylene by the Ultrasound Technique
D5630 Test Method for Ash Content in Plastics
D6992 Test Method for Accelerated Tensile Creep and Creep-Rupture of Geosynthetic Materials Based on Time-Temperature Superposition Using the Stepped Isothermal Method
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 (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
G154 Practice for Operating Fluorescent Ultraviolet (UV) Lamp Apparatus for Exposure of Nonmetallic Materials
G155 Practice for Operating Xenon Arc Lamp Apparatus for Exposure of Materials

2.2 *AASHTO Standard:*[3]
LRFD, Section 12 AASHTO LRFD Bridge Design Specifications Section 12–Buried Structures and Tunnel Liners

2.3 *NCHRP (National Cooperative Highway Research Program) Reports*[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 15270 Guidelines for the Recovery and Recycling of Plastic Waste

3. Terminology

3.1 *Definitions*—Definitions are in accordance with Terminology F412 and abbreviations are in accordance with Terminology D1600, unless otherwise specified. The abbreviation for polyethylene is PE.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *profile wall, n*—in this case, the profile pipe wall construction provides an interior liner in the waterway and includes ribs, corrugations, or other shapes, which can be either solid or hollow, that helps brace the pipe against diametrical deformation.

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

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 Diameters,
4.1.3 Total footage of each pipe diameter involved,
4.1.4 Pipe laying length,
4.1.5 Virgin or recycled materials,
4.1.6 Fitting type(s):
4.1.6.1 Size and type of fittings, including mainline and branch diameters, and
4.1.6.2 Number of fittings per diameter.

5. Materials and Manufacture

5.1 *Vigin Resin Pipe and Fabricated Fittings*—The pipe and fabricated fittings shall be made from virgin PE compound meeting the requirements of Specification D3350 with a minimum cell classification of 435400C or 435400E. Black

[3] Available from American Association of State Highway and Transportation Officials (AASHTO), 444 N. Capitol St., NW, Suite 249, Washington, DC 20001, http://www.transportation.org.

[4] Available from U.S. Government Printing Office, Superintendent of Documents, 732 N. Capitol St., NW, Washington, DC 20401-0001, http://www.access.gpo.gov.

[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.