Standard Specification for

Corrugated Polyethylene Drainage Pipe

AASHTO Designation: M 252-21

Technically Revised: 2021

Technical Subcommittee: 4b, Flexible and Metallic Pipe

AASHTO

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1. SCOPE

1.1. This specification covers the requirements and methods of test for corrugated polyethylene (PE) pipe, couplings, and fittings for use in subsurface drainage systems, storm sewers, and in surface drainage (culverts), where soil support is given to the pipe's flexible walls in all applications.

1.1.1. Nominal sizes of 75 to 250 mm (3 to 10 in.) are included.

1.1.2. Materials, workmanship, dimensions, pipe stiffness, environmental stress-crack resistance, perforations, joining systems, brittleness, and form of markings are specified.

Note 1—When PE pipe is to be used in locations where the ends may be exposed, consideration should be given to combustibility of the PE and the deteriorating effects of prolonged exposure to ultraviolet radiation.

1.2. *Units*—The values stated in SI units are to be regarded as standard. Within the text, the U.S. Customary units are shown in parentheses, and may not be exact equivalents.

1.3. The following precautionary caveat pertains only to the test method portion, Section 9.3 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 and health practices and determine the applicability of regulatory limitations prior to use.*

2. REFERENCED DOCUMENTS

2.1. *ASTM Standards*:

- D618, Standard Practice for Conditioning Plastics for Testing
- D883, Standard Terminology Relating to Plastics
- D1693, Standard Test Method for Environmental Stress-Cracking of Ethylene Plastics
- D2122, Standard Test Method for Determining Dimensions of Thermoplastic Pipe and Fittings
- D2412, Standard Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading
- D3350, Standard Specification for Polyethylene Plastics Pipe and Fittings Materials
- D4218, Standard Test Method for Determination of Carbon Black Content in Polyethylene Compounds by the Muffle-Furnace Technique
- F667/F667M, Standard Specification for 3 through 24 in Corrugated Polyethylene (PE) Pipe and Fittings
- F412, Standard Terminology Relating to Plastic Piping Systems

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2.2. *Federal Standard*:

- Fed. Std. No. 29, CFR 1910.1200 OSHA Hazard Communication Standard; see also Permissible Exposure Limits—Annotated Tables, available at https://www.osha.gov/dsg/annotated-pels/

3. TERMINOLOGY

3.1. The terminology used in this standard is in accordance with the definitions given in ASTM D883 and ASTM F412 unless otherwise specified.

3.2. *buckling*—during pipe flattening testing, any decrease or downward deviation in the pipe load-deflection test curve shall be considered a buckling point.

3.3. *crack*—any break or split that extends through the wall or liner.

3.4. *crease*—a visible irrecoverable indentation.

3.5. *reworked material*—a plastic from a processor's own production that has been reground, pelletized, or solvated after having been previously processed by molding, extrusion, etc. (ASTM D883).

3.6. *delamination*—a separation between the liner and outer corrugated wall of Type S pipe as evidenced by a visible gap extending completely through at least one corrugation valley at any point around the circumference of the pipe.

3.7. *polyethylene (PE) plastics*—plastics based on polymers made with ethylene as essentially the sole monomer (ASTM D883).

4. CLASSIFICATION

4.1. *The corrugated PE pipe covered by this specification is classified as follows*:

4.1.1. *Type C*—This pipe shall have a full circular cross section, with a corrugated surface both inside and outside. Corrugations may be either annular or helical.

4.1.1.1. *Type CP*—This pipe shall be Type C with Class 2 perforations.

4.1.2. *Type S*—This pipe shall have a full circular cross section, with an outer corrugated pipe wall and a smooth inner liner. Corrugations may be either annular or helical. Type S pipe is not available in nominal sizes of less than 100 mm (4 in.).

4.1.2.1. *Type SP*—This pipe shall be Type S with either Class 1 or Class 2 perforations.

4.2. Class 1 and Class 2 perforations are as described in Sections 7.4.1 and 7.4.2.

5. ORDERING INFORMATION

5.1. *Orders using this specification shall include the following information as necessary to adequately describe the desired product*:

5.1.1. AASHTO designation and year of issue;

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5.1.2. Type of pipe (Section 4.1);

5.1.3. Diameter and length required, either total length or length of each piece and number of pieces;

Note 2—Type C and CP pipe less than 200 mm (8 in.) in diameter may be supplied coiled; coiling of Type C and CP pipe 200 mm (8 in.) in diameter or greater is not recommended; Type S and SP pipe is not supplied in coils.

5.1.4. Number of couplings;

5.1.5. For Type SP pipe, class of perforations (Class 2 is furnished if not specified) (Section 7.4); and

5.1.6. Certification, if desired (Section 12.1).

6. MATERIALS

6.1. *Basic Materials*:

6.1.1. *Extruded Pipe and Blow Molded Fittings*—Pipe and fittings shall be made of virgin PE resin compounds meeting the requirements of ASTM D3350 and cell classification 424420C, except that the carbon black content shall not exceed 4 percent when tested in accordance with D4218. Resins that have higher cell classifications in one or more properties are acceptable provided product requirements are met.

6.1.2. *Rotational Molded Fittings and Couplings*—Fittings and couplings shall be made of virgin PE resins meeting the requirements of ASTM D3350 and cell classification 213320C, except that the carbon black content shall not exceed 4 percent when tested in accordance with D4218. Resins that have higher cell classifications in one or more properties are acceptable provided product requirements are met.

6.1.3. *Injection Molded Fittings and Couplings*—Fittings and couplings shall be made of virgin PE resins meeting the requirements of ASTM D3350 and cell classification 314420C, except that the carbon black content shall not exceed 4 percent when tested in accordance with D4218. Resins that have higher cell classifications in one or more properties are acceptable provided product requirements are met.

6.2. *Reworked Material*—In lieu of virgin PE, clean reworked material may be used, provided that it meets the cell class requirements as described in Section 6.1.

7. REQUIREMENTS

7.1. *Workmanship*—The pipe and fittings shall be free of foreign inclusions and visible defects as defined herein. The ends of the pipe shall be cut squarely and cleanly so as not to adversely affect joining or connecting.

7.1.1. *Visible Defects*—Cracks, creases, delamination, and unpigmented or non-uniformly pigmented pipe are not permissible in the pipe or fittings as furnished. There shall be no evidence of cracking or delamination when tested in accordance with Section 9.2.

7.1.2. *Liner*—For Type S and SP pipe, the liner shall be fused to the outer corrugated wall at all internal corrugation crests.

7.2. *Pipe Dimensions*:

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