
Standard Specification for Class PS46 Poly(Vinyl Chloride) (PVC) Pipe

AASHTO Designation: M 278-22

Technically Revised: 2022

Technical Subcommittee: 4b, Flexible and Metallic Pipe



**American Association of State Highway and Transportation Officials
555 12th Street NW, Suite 1000
Washington, DC 20004**

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1. SCOPE

- 1.1. This specification covers the requirements and methods of test for smooth-wall perforated and unperforated poly(vinyl chloride) (PVC) plastic pipe, couplings, and fittings for use in subsurface drainage and surface drainage (culverts) of transportation facilities, where soil support is given to its flexible walls in all applications. It includes provisions for solid wall and solid wall coextruded poly(vinyl chloride) (PVC) plastic pipe. Solid wall coextruded pipe has three layers including a center layer and concentric inner and outer layers. The inner and outer layers are made of virgin or reworked PVC compound and the center layer has external recycled PVC content.
- 1.1.1. Nominal sizes of 100 to 375 mm in a stiffness class designated as PS46 are included.
- 1.1.2. Materials, dimensions, flattening, impact resistance, pipe stiffness, extrusion quality, joining systems, perforations, and form of marking are specified.
- 1.2. The following precautionary caveat pertains only to the test method portion, Section 10, 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.*
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2. REFERENCED DOCUMENTS

- 2.1. *AASHTO Standards:*
- M 294, Corrugated Polyethylene Pipe, 300- to 1500-mm (12- to 60-in.) Diameter
 - M 339M/M 339, Thermometers Used in the Testing of Construction Materials
- 2.2. *ASTM Standards:*
- D618, Standard Practice for Conditioning Plastics for Testing
 - D883, Standard Terminology Relating to Plastics
 - D1784, Standard Classification System for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds
 - D2122, Standard Test Method for Determining Dimensions of Thermoplastic Pipe and Fittings
 - D2152, Standard Test Method for Adequacy of Fusion of Extruded Poly(Vinyl Chloride) (PVC) Pipe and Molded Fittings by Acetone Immersion
 - D2412, Standard Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading
 - D2444, Standard Practice for Determination of the Impact Resistance of Thermoplastic Pipe and Fittings by Means of a Tup (Falling Weight)

- D2564, Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems
- D2855, Standard Practice for the Two-Step (Primer and Solvent Cement) Method of Joining Poly (Vinyl Chloride) (PVC) or Chlorinated Poly (Vinyl Chloride) (CPVC) Pipe and Piping Components with Tapered Sockets
- D3034, Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings
- D3212, Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals
- E1, Standard Specification for ASTM Liquid-in-Glass Thermometers
- E230/E230M, Standard Specification for Temperature–Electromotive Force (emf) Tables for Standardized Thermocouples
- E879, Standard Specification for Thermistor Sensors for General Purpose and Laboratory Temperature Measurements
- E1137/E1137M, Standard Specification for Industrial Platinum Resistance Thermometers
- E2877, Standard Guide for Digital Contact Thermometers
- F402, Standard Practice for Safe Handling of Solvent Cements, Primers, and Cleaners Used for Joining Thermoplastic Pipe and Fittings
- F412, Standard Terminology Relating to Plastic Piping Systems
- F477, Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe

2.3. *Federal Standard:*

- 29 CFR 1910.1200; see also Permissible Exposure Limits—Annotated Tables, available from <https://www.osha.gov/dsg/annotated-pels/>

2.4. *International Electrotechnical Commission Standards:*

- IEC 60584-1: 2013 Thermocouples - Part 1: EMF Specifications and Tolerances
- IEC 60751: 2008 Industrial Platinum Resistance Thermometers and Platinum Temperature Sensors

3. TERMINOLOGY

- 3.1. *General*—the nomenclature used in this specification is in accordance with the definitions given in Definitions ASTM D883 and Definitions ASTM F412, unless otherwise specified. The abbreviation for polyvinyl chloride is PVC.
- 3.2. *delamination*—the separation of the layers of PVC in a multilayer pipe.
- 3.3. *reworked PVC*—clean, regrind PVC taken from the manufacturer’s own production facility excluding multilayer pipe.
- 3.4. *external recycled PVC*—industrial rework material generated from a manufacturer manufacturing product to a standard other than this standard and used by the manufacturer manufacturing to this standard for the center layer of solid wall coextruded pipe.

4. CLASSIFICATION

- 4.1. *The smooth-wall PVC pipe covered by this specification is classified as follows:*

- 4.1.1. *Type S*—This pipe shall have a full circular cross section and solid wall constructed of virgin or reworked PVC compound complying with cell classification 12454 or 12364.
- 4.1.1.1. *Type SP*—This pipe shall be Type S with perforations.
- 4.1.2. *Type M*—This pipe shall have a full circular cross section and multilayer walls (middle wall of external recycled PVC and outer walls of virgin or reworked PVC). The inner and outer walls shall comply with cell classification 12454 or 12364. The center wall shall comply with cell classification 12224.
- 4.1.2.1. *Type MP*—This pipe shall be Type M with perforations.
- 4.2. Perforations are described in Section 8.2.5.

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. Name of material (polyvinyl chloride pipe);
 - 5.1.2. AASHTO designation, including year of issue;
 - 5.1.3. Type of pipe (Section 4.1);
 - 5.1.4. Diameter of pipe;
 - 5.1.5. Length, either total length or length of each piece and number of pieces;
 - 5.1.6. Perforations, when perforations are required;
 - 5.1.7. Number of couplings and fittings, when required;
 - 5.1.8. Certification, if desired (Section 13.1); and
 - 5.1.9. Any special requirements.

6. MATERIALS

- 6.1. Solid wall pipe and fittings shall be made from virgin or reworked PVC material with cell classification 12454 or 12364, as defined in ASTM D1784, and shall be a single compound procured from a single manufacturer. Solid wall coextruded pipe shall be made from virgin or reworked PVC for the inner and outer layers and external recycled PVC for the inner layer. The recycled PVC inner layer shall be cell classification 12224.
- 6.1.1. PVC compounds that have different cell classifications shall also be acceptable provided that (1) one or more properties are superior and (2) no properties are inferior to the compounds specified in Section 6.1.
- 6.2. *Reworked Material*—Reworked PVC material from the manufacturer's own production, not including multilayer pipe, may be used. Reworked PVC shall be clean; generated from the manufacturer's own production of pipe, fittings, or accessories and not used by any other manufacturer; and blended back into the same type of product.