



Designation: F679 – 21

Standard Specification for Poly(Vinyl Chloride) (PVC) Large-Diameter Plastic Gravity Sewer Pipe and Fittings¹

This standard is issued under the fixed designation F679; 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 materials, dimensions, workmanship, flattening resistance, impact resistance, pipe stiffness, extrusion quality, joining system, and a form of marking for large diameters, 18 to 60 in. poly(vinyl chloride) (PVC) sewer pipe and fittings with integral bell elastomeric seal joints or solvent cemented sockets.

1.2 The requirements of this specification are intended to provide pipe and fittings suitable for nonpressure drainage of sewage and surface water. Pipe and fittings produced to this specification should be installed in accordance with Practice [D2321](#).

NOTE 1—Industrial waste disposal lines should be installed only with the specific approval of the governing code authority since temperatures in excess of 140 °F (60 °C) and chemicals not commonly found in drains and sewers may be encountered.

1.3 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.

1.4 The following precautionary caveat pertains only to the test method portion, Section 8, 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.*

1.5 *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.*

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. Referenced Documents

2.1 ASTM Standards:²

- [D618 Practice for Conditioning Plastics for Testing](#)
- [D1600 Terminology for Abbreviated Terms Relating to Plastics](#)
- [D1784 Classification System and Basis for Specification for Rigid Poly\(Vinyl Chloride\) \(PVC\) Compounds and Chlorinated Poly\(Vinyl Chloride\) \(CPVC\) Compounds](#)
- [D2122 Test Method for Determining Dimensions of Thermoplastic Pipe and Fittings](#)
- [D2152 Test Method for Adequacy of Fusion of Extruded Poly\(Vinyl Chloride\) \(PVC\) Pipe and Molded Fittings by Acetone Immersion](#)
- [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 \(Falling Weight\)](#)
- [D2564 Specification for Solvent Cements for Poly\(Vinyl Chloride\) \(PVC\) Plastic Piping Systems](#)
- [D2855 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](#)
- [D3212 Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals](#)
- [F402 Practice for Safe Handling of Solvent Cements, Primers, and Cleaners Used for Joining Thermoplastic Pipe and Fittings](#)
- [F412 Terminology Relating to Plastic Piping Systems](#)
- [F477 Specification for Elastomeric Seals \(Gaskets\) for Joining Plastic Pipe](#)

2.2 Federal Standard:

- [Fed. Std. No. 123 Marking for Shipment \(Civil Agencies\)³](#)

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 Available from DLA Document Services, Building 4/D, 700 Robbins Ave., Philadelphia, PA 19111-5094, <http://quicksearch.dla.mil>.

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

2.3 Military Standard:

MIL-STD-129 Marking for Shipment and Storage³

3. Terminology

3.1 Definitions:

3.1.1 *General*—Definitions used in the specification are in accordance with Terminology F412, unless otherwise indicated. The abbreviation for poly(vinyl chloride) pipe is PVC, in accordance with Terminology D1600.

4. Materials

4.1 *Basic Materials*—The pipe shall be made of PVC plastic having a minimum cell classification of 12364 or 12454 as defined in Specification D1784. Homopolymer PVC compounds must equal or exceed the requirements of the above listed minimum cell classification number.

4.2 *Rework Material*—Clean rework material generated from the manufacturer's own pipe or fittings production may be used by the same manufacturer provided that the rework material meets the requirements of 4.1 and that the pipe or fittings produced meet all the requirements of this specification.

4.3 *Gaskets*—Rubber gaskets shall be in compliance with Specification F477.

4.4 *Lubricant*—The lubricant used for assembly shall have no detrimental effect on the gasket or pipe.

4.5 *Primer*.

4.6 *Solvent Cement*.

5. Joining System

5.1 *Integral Bell Gasketed Joint*—The joint shall be designed so that when assembled, the gasket inside the bell will be compressed radially on the pipe spigot to form a water-tight seal.

5.1.1 The joint shall be designed to avoid displacement of the gasket when installed in accordance with the manufacturer's recommendations.

5.1.2 The assembly of joints shall be in accordance with the pipe manufacturer's recommendations.

5.2 *Solvent cement joints for pipe and fittings*—In the solvent cement joint, the pipe spigot wedges into the tapered socket and the surfaces fuse together. The tapered socket may be a portion of a molded fitting or it may be a belled end of the pipe section. Formed bells shall be concentric with pipe axis.

5.2.1 The assembly of the joints shall be in accordance with Practice D2855.

5.2.2 *Joint Tightness*—Joints made with pipe and fittings or with belled-end pipe shall show no signs of leakage when tested in accordance with 7.5.

6. Requirements

6.1 *Workmanship*—The pipe and fittings shall be homogeneous throughout and free from visible cracks, holes, foreign inclusions, or other injurious defects. The pipe shall be as uniform as commercially practical in color, opacity, density, and other physical properties.

6.2 Pipe Dimensions:

6.2.1 *Pipe Diameter*—The average outside diameter of the pipe shall meet the requirements given in Table 1, when measured in accordance with Test Method D2122.

6.2.2 *Wall Thickness*—Pipe wall thicknesses shall meet the requirements of Table 1, when measured in accordance with Test Method D2122. In the case of belled pipe and fittings fabricated from pipe sections, the thickness of the wall in the bell shall be considered satisfactory if it was formed from pipe meeting the above requirements.

NOTE 2—The wall thickness variability in any cross section of the pipe is normally $\pm 12\%$ or less from minimum.

6.3 *Pipe Flattening*—There shall be no evidence of splitting, cracking, or breaking, when pipe is tested in accordance with 8.4.

6.4 *Wall Thickness of Fittings*—The minimum wall thicknesses of the fittings shall be the same as the minimum wall thickness of the equivalent size of pipe as specified in Table 1. For reducing fittings or those with smaller inlets, the minimum wall thickness of each inlet shall be no less than the minimum wall thickness for that size pipe. The thickness shall be determined in accordance with Test Method D2122.

NOTE 3—Owing to the present state of technology in the industry, all fittings are fabricated fittings. Fabricated fittings with solvent-cemented components should be made in accordance with Practice D2855 and taking cognizance of Practice F402.

6.5 *Pipe Impact Strength*—The impact strength of the pipe shall be not less than 220 ft-lbf (298.3 J), when tested in accordance with 8.5.

NOTE 4—This requirement is intended only for use as a quality control test, not as a simulated service test. As aged impact data is developed, the applicable aged impact values will be included to reflect long-term performance needs.

6.6 *Pipe Stiffness*—Pipe stiffness values for the pipe shall comply with Table 1, when tested in accordance with 8.6.

6.6.1 The wall thickness must be increased to meet the pipe stiffness requirement PS46 or PS115 listed in Table 1 when material with modulus lower than 500,000 psi (3447 MPa) is used.

6.7 Gaskets:

6.7.1 All gaskets shall meet the requirements of Specification F477 and be molded into a circular form or extruded to the proper section and then spliced into circular form. Gaskets shall be made of a properly vulcanized high-grade elastomeric compound.

6.7.2 The basic polymer shall be natural rubber, synthetic elastomer, or a blend of both.

6.7.3 The gasket shall be designed with an adequate compressive force so as to effect a positive seal under all combinations of joint tolerances. The gasket shall be the only element depended upon to make the joint flexible and watertight.

6.8 *Joint Tightness*—Joints made with pipe and fittings shall show no sign of leakage, when tested in accordance with Specification D3212. All surfaces of the joint upon which the gasket may bear shall be smooth and free of imperfections, ridges, fractures, or cracks that could adversely affect sealability.