**Designation: ~~F3202 – 19~~ F3202 – 19a**

# Standard Specification for Solid Wall Poly (Vinyl Chloride) PVC Fittings for Joining Corrugated Wall High Density Polyethylene (PE) and Polypropylene (PP) Piping[1]

This standard is issued under the fixed designation F3202; 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~~ Scope*

1.1 This specification covers requirements and test methods for 6 in. (150 mm) through 60 in. (1500 mm) fabricated or molded solid wall poly(vinyl chloride) (PVC) gasketed sanitary sewer fittings to be used with piping manufactured to Specifications F2763, F2764, or F2947. Fabricated fittings may be manufactured from pipe, or from a combination of pipe and injection molded parts with PVC base stock.

1.2 The requirements of this specification are to provide fabricated or molded solid wall PVC gasketed fittings for nonpressure drainage of sewage.

1.3 Fittings produced to this specification are intended to be installed with pipe, in accordance with Practice D2321.

1.4 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.

1.5 *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.*

1.6 *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]



D618 Practice for Conditioning Plastics for Testing
D1600 Terminology for Abbreviated Terms Relating to Plastics
D1784 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
D2321 Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications
D2564 Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems
D3034 Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings
D3212 Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals
D4396 Specification for Rigid Poly(Vinyl Chloride) (PVC) and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds for Plastic Pipe and Fittings Used in Nonpressure Applications
F412 Terminology Relating to Plastic Piping Systems
F477 Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe
F656 Specification for Primers for Use in Solvent Cement Joints of Poly(Vinyl Chloride) (PVC) Plastic Pipe and Fittings
F679 Specification for Poly(Vinyl Chloride) (PVC) Large-Diameter Plastic Gravity Sewer Pipe and Fittings
F1336 Specification for Poly(Vinyl Chloride) (PVC) Gasketed Sewer Fittings

[1] This test method is under the jurisdiction of ASTM Committee F17 on Plastic Piping Systems and is the direct responsibility of Subcommittee F17.10 on Fittings.
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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**

F2763 Specification for 12 to 60 in. [300 to 1500 mm] Dual and Triple Profile-Wall Polyethylene (PE) Pipe and Fittings for Sanitary Sewer Applications
F2764 Specification for 6 to 60 in. [150 to 1500 mm] Polypropylene (PP) Corrugated Double and Triple Wall Pipe and Fittings for Non-Pressure Sanitary Sewer Applications
F2947 Specification for 150 to 1500 mm [6 to 60 in.] Annular Corrugated Profile-Wall Polyethylene (PE) Pipe and Fittings for Sanitary Sewer Applications

2.2 *Federal Standard:*[3]
Fed. Std. No. 123 Marking for Shipment (Civil Agencies)

2.3 *Military Standard:*[3]
MIL-STD-129 Marking for Shipment and Storage

## 3. Terminology

3.1 Definitions are in accordance with Terminology F412 unless otherwise specified.

3.2 Abbreviations are in accordance with Terminology D1600, unless otherwise indicated. The abbreviations for poly(vinyl chloride) plastic, polypropylene plastic and polyethylene plastic are PVC, PP and PE, respectively. The abbreviation for plastic sewer main is PSM.

## 4. Significance and Use

4.1 Many corrugated wall PE and PP pipe do not have injection molded fittings in their related standards. This standard provides watertight, solid wall PVC fittings to accommodate the geometries of these various profile wall pipe. They do not replace those fittings already covered under the referenced standards, but are intended to provide an additional option for the designer and manufacturer.

4.2 Designs of these products are intended for underground applications where soil provides support to their flexible walls. Their major use is to provide connections to adjoining sections of pipe which collect or convey sewage.

4.3 *Exclusions from Recommended Use:*

4.3.1 Permanent exposure to sunlight or weathering, or both, and

4.3.2 Exposure to chemicals, other than those normally found in sanitary, whose compatibility with the referenced standards and fittings is not known.



## 5. Materials

5.1 *Basic Materials*—The pipe components for fabricated fittings shall be made from PVC compounds meeting the cell classifications of 12364 or 12454 as defined in Specification D1784. Homopolymer PVC compounds must equal or exceed the performance requirements of the above listed minimum cell classification number.

5.1.1 Molded components or fittings shall be made from virgin or rework PVC compound having a cell classification of 11432 or 12321 as prescribed in Specification D4396 or 12454 or 13343 as prescribed in Specification D1784. Virgin or rework compounds that have different cell classifications because one or more properties exceed the minimum performance requirements of those specified compounds are also acceptable.

5.1.2 *Rework Material*—Clean rework material generated from the manufacturer's own pipe, molded components, or fittings production may be used by the same manufacturer providing the rework material is blended with the same cell classification and meets the requirements of 5.1 and that the pipe, molded components, or fittings produced meet all the requirements of this specification.

5.2 *Fabrication Joint Material*—The fabrication joint material or reinforcing overlays shall be of that type, strength, and properties suitable for the intended fabrication. It is the decision of the manufacturer as to what material will be used. The PVC primer shall meet the requirements of Specification F656. The PVC solvent cement shall meet the requirements of Specification D2564.

5.3 *Gaskets*—Gaskets provided as part of the joining system shall comply with the requirements of Specification F477.

5.3.1 *Lubricant*—The lubricant used for field assembly shall be the type recommended by the manufacturer of the gasketed joint or elastomeric seal.

## 6. Miscellaneous Requirements

6.1 *Gasketed Joining System:*

6.1.1 The assembled joint shall display no leakage when tested in accordance with the requirements of Specification D3212.

6.1.2 The gasket shall be designed to accommodate the outside dimension tolerances on the pipe with respect to the bell dimensions of the fitting.

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

6.1.3 *Bells*—The dimensions shall be in accordance with the manufacturer's standard design dimensions and tolerances.

6.1.4 *Gaskets*—The gasket shall comply with the requirements of Specification F477.

6.1.5 The joint assembly shall be in accordance with the manufacturer's recommendations. All surfaces of the joint that make contact with the gasket shall be smooth and free of imperfections, ridges, fractures, or cracks that could adversely affect the seal.

6.1.6 The wall of the bell or barrel of the fitting shall not fracture or crack in conjunction with the compression of a pipe gasket.

6.2 *Waterway*—Fabricated bell fittings shall be constructed so that pipe ends do not project into the waterway of the fitting or pipe body.

## 7. Dimensions and Permissible Variations

7.1 *Diameter*—The average outside diameter of molded fitting spigots or of spigot pipe components for fabricated fittings shall meet the dimensional requirements given in Specifications F679 or D3034 when measured in accordance with 11.1.

7.2 *Wall Thickness:*

7.2.1 *Fabricated Fittings*—Fabricated fittings shall have a wall thickness meeting the requirements of Specifications D3034, F679, or F1336 when measured in accordance with Test Method D2122 and 10.2.3. In the case of bells and branches for fittings fabricated from pipe sections, the thickness of the wall in the bell and the branch area shall meet the requirements of the standard to which the pipe was produced. ~~In the case of fittings fabricated from pipe sections, the thickness of the wall in the bell and the branch area shall be considered satisfactory if it maintains the minimum wall thickness for the stated requirement according to Specifications D3034 or F679 and was formed from pipe meeting the requirements of the standard to which the pipe was produced.~~

7.2.2 *Molded Fittings or Components*—The wall thickness of the waterway and socket or bell of molded fittings or components shall be no less than the respective minimum thickness indicated in Specifications D3034, F679, or F1336 for the respective pipe diameter. For reducing fittings or those with smaller inlets, the minimum wall thickness of each inlet shall be no less than the minimum wall thickness indicated for that nominal pipe size. The thickness shall be determined in accordance with Test Method D2122 and 10.2.3.

NOTE 1—Refer to Fig. 1 for geometric configurations as illustrations of some of the fittings being produced. Consult the individual manufacturer for laying lengths.

7.3 ~~*Socket*~~*Spigot Length*—If a socket bell is fabricated into a fitting, the ~~socket~~spigot shall be sufficient in length to seal the joint in accordance with 6.1.1 for gasketed jointing systems. The minimum distance from the spigot end to the area where the bell diameter changes due to a socket, branch, or change in angle shall comply with the manufacturer's requirements.

7.4 *Socket Diameter*—The ~~inside diameter of the socket shall comply with the dimensions to accommodate the outside diameter for the corrugated~~dimensions shall be in accordance with the manufacturer's standard design and tolerances to meet the testing requirements of Specification D3212 ~~HDPE or PP pipe.~~for watertight.

7.5 *Socket Depth*—The ~~socket depth~~ dimensions shall ~~not be less than that shown in Specifications~~be in accordance ~~D3034,~~with ~~F679, or~~the manufacturer's ~~F1336 for the respective nominal diameter when measured in accordance with~~standard design and tolerances to meet the testing requirements of Specification ~~10.2.2~~D3212~~.~~ for watertight.

## 8. Workmanship, Finish, and Appearance

8.1 The fittings shall be homogeneous throughout and free from visible cracks, holes, foreign inclusions, or other injurious defects. The fittings shall be as uniform as commercially practical in color, opacity, density, and other physical properties. A fabrication fusion bead which projects into the waterway is not a cause for rejection.

## 9. Sampling and Conditioning

9.1 *Sampling*—The selection of fitting samples shall be as agreed upon between the purchaser and the seller. In case of no prior agreement, samples selected by the testing laboratory shall be deemed adequate.

9.2 *Conditioning:*

9.2.1 *Referee Testing*—The specimen shall be conditioned in accordance with Procedure A of Practice D618 at 73.4 ± 3.6 °F (23 ± 2 °C) and 50 ± 5 % relative humidity for not less than 40 h prior to test. Tests shall be conducted at the same conditions of temperature and humidity, unless otherwise specified.

9.2.2 *Quality Control Tests*—For production floor quality control tests, the specimens shall be conditioned for a minimum of 4 h in air or 1 h in water at 73.4 ± 3.6 °F (23 ± 2 °C). The specimen shall be tested at 73.4 ± 3.6 °F (23 ± 2 °C) without regard to relative humidity.

## 10. Test Methods

10.1 *Dimensions and Tolerances:*

10.1.1 *Diameter*—The average outside diameter of a pipe or spigot component shall be measured in accordance with Test Method D2122. A measurement device accurate to 0.001 in. (0.02 mm) shall be used.

10.2 *Fittings Dimensions:*