



# Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Schedule 40 Drainage and DWV Fabricated Fittings<sup>1</sup>

This standard is issued under the fixed designation F1866; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

## 1. Scope—Scope\*

1.1 This specification covers requirements and test methods for fabricated poly(vinyl chloride) (PVC) plastic schedule 40 drainage and DWV fittings to be used with piping manufactured in accordance with Specifications **D2665**; ~~**D1785**~~; or **F891**. These fabricated fittings are manufactured from pipe, or from a combination of pipe and injection molded parts.

1.2 The requirements of this specification are to provide fabricated PVC fittings suitable for drainage and venting of sanitary waste systems, storm water systems, and certain other liquid wastes. Fittings shall have solvent cement joints, gasket joints or a combination thereof.

1.3 The text of this specification references notes, footnotes, and appendixes that provide explanatory material. These notes and footnotes (excluding those in tables and figures) shall not be considered as requirements of the specification.

1.4 The values stated in inch-pound units are to be regarded as the standard. The values given in parentheses are provided for information only.

1.5 The following safety hazards 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.*

## 2. Referenced Documents

### 2.1 ASTM Standards:<sup>2</sup>

**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

**D1785** Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120

**D2122** Test Method for Determining Dimensions of Thermoplastic Pipe and Fittings

**D2564** Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems

**D2665** Specification for Poly(Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings

**D2855** Practice for Making Solvent-Cemented Joints with Poly(Vinyl Chloride) (PVC) Pipe and Fittings

**D3212** Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals

**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

**F891** Specification for Coextruded Poly(Vinyl Chloride) (PVC) Plastic Pipe With a Cellular Core

**F913** Specification for Thermoplastic Elastomeric Seals (Gaskets) for Joining Plastic Pipe

## 3. Terminology

3.1 *Definitions*—Definitions are in accordance with Terminology **F412**, and abbreviations are in accordance with Terminology **D1600**, unless otherwise specified.

<sup>1</sup> This standard is under the jurisdiction of Committee **F17** on Plastic Piping Systems and is the direct responsibility of Subcommittee **F17.63** on DWV.

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<sup>2</sup> 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

#### 4. Materials and Manufacture

4.1 *Basic Materials*—The molded components for fabricated fittings shall be made of virgin or rework PVC compounds meeting or exceeding the requirements of Class 12454 as defined in Specification **D1784**.

4.1.1 The pipe shall be made of PVC that meets the requirements of the Materials Section of Specification **D1785** or **D2665**.

4.2 *Gaskets*—Elastomeric seals (gaskets) shall comply with the requirements of Specification **F477** or **F913**.

4.3 *Lubricant*—The lubricant used for field assembly shall be the type recommended by the manufacturer of the fitting. Prolonged exposure to the lubricant shall not damage the gasket, pipe, or fitting.

#### 5. General Requirements

5.1 *Fabrication Joint Material* —The fabrication joint material or reinforcing overlays shall be of the type, strength, and properties suitable for 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**.

5.2 *Heat Fusion Welds*—Fittings assembled using the heat fusion welding process shall meet all of the requirements of this specification.

5.3 *Pipe Performance*—Pipe that is used to fabricate fittings shall meet all of the schedule 40 requirements of Specification **D1785** or **D2665**.

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

5.5 *Gasketed Joint System*—The joint shall display no leakage when tested in accordance with the requirements of Specification **D3212** when assembled in accordance with the fitting manufacturer’s recommendations. All surfaces of the joint that contact the gasket shall be smooth and free of imperfections, ridges, fractures or cracks that could affect the seal.

#### 6. Dimensions and Permissible Variations

6.1 *Spigot Diameter*—The outside diameter and out-of-roundness of the fitting spigot shall meet the requirements of **Table 1** when measured in accordance with **10.1.1**.

6.2 *Spigot Length*—The spigot length shall meet the requirements as given in **Table 1** when measured in accordance with **10.1.2**.

6.3 *Wall Thickness*—The minimum wall thickness of the fitting shall meet the requirements of **Table 1** when measured in accordance with **10.1.3**. In the case of fittings fabricated from pipe sections, the thickness of the wall in the bell and branch area shall be considered satisfactory if it was formed from pipe meeting those requirements.

6.4 *Solvent Cement Sockets:*

6.4.1 *Socket Diameter*—The inside diameter of the fitting socket shall meet the requirements as specified in **Table 2** when measured in accordance with **10.1.4**.

6.4.2 *Socket Depths*—The socket depth shall meet the requirements as given in **Table 2** when measured in accordance with **10.1.5**.

6.5 *Gasket Joint Sockets*—The minimum depth and maximum projection for gasket sockets, show in **Fig. 1**, shall meet the dimensional values given in **Table 3**. Measurements shall be made in accordance with Test Method **D2122**. All other dimensions shall be in accordance with the manufacturer’s specifications.

#### 7. Properties

7.1 *Resistance to Bending*—Fabricated fittings shall be tested in accordance with **10.2**. The bond shall not show any sign of cracking, splitting, or separation as seen by the naked eye.

**TABLE 1 Pipe/Fitting Dimensions**

Nominal Pipe Size	Average O.D.				
	Minimum in. (mm)	Maximum in. (mm)	Out-of-Roundness, in. (mm)	Min. Wall Thickness, in. (mm)	Min. Spigot Length, in. (mm)
4	4.491 (114.07)	4.509 (114.53)	0.030 (0.76)	0.237 (6.02)	4.000 (101.60)
6	6.614 (168.00)	6.636 (168.55)	0.050 (1.27)	0.280 (7.11)	6.000 (152.40)
8	8.610 (218.69)	8.640 (219.46)	0.150 (3.81)	0.322 (8.18)	6.000 (152.40)
10	10.735 (272.67)	10.765 (273.43)	0.150 (3.81)	0.365 (9.27)	7.500 (190.50)
12	12.735 (323.47)	12.765 (324.23)	0.150 (3.81)	0.406 (10.31)	8.500 (215.90)
14	13.985 (355.22)	14.015 (355.98)	0.200 (5.08)	0.437 (11.10)	9.000 (228.60)
16	15.981 (405.92)	16.019 (406.88)	0.320 (8.13)	0.500 (12.70)	10.000 (254.00)
18	17.981 (456.72)	18.019 (457.68)	0.360 (9.14)	0.562 (14.27)	12.000 (304.80)
20	19.977 (507.42)	20.023 (508.58)	0.400 (10.16)	0.593 (15.06)	12.000 (304.80)
24	23.969 (608.81)	24.031 (610.39)	0.480 (12.19)	0.687 (17.45)	14.000 (355.60)

TABLE 2 Socket Dimensions

Nominal Pipe Size	Avg. Entrance Diameter, A	Avg. Bottom Diameter, B	Minimum Socket Depth, C	Out-of-Roundness
4	4.518 +/-0.009 (114.76 +/-0.23)	4.491 +/-0.009 (114.07 +/-0.23)	2.000 (50.80)	0.048 (1.22)
6	6.647 +/-0.011 (168.83 +/-0.28)	6.614 +/-0.011 (168.00 +/-0.28)	3.000 (76.20)	0.082 (2.08)
8	8.655 +/-0.015 (219.84 +/-0.38)	8.610 +/-0.015 (218.69 +/-0.38)	4.000 (101.6)	0.120 (3.05)
10	10.776 +/-0.015 (273.71 +/-0.38)	10.737 +/-0.015 (272.72 +/-0.38)	5.000 (127.00)	0.130 (3.30)
12	12.778 +/-0.015 (324.56 +/-0.38)	12.736 +/-0.015 (323.49 +/-0.38)	6.000 (152.40)	0.150 (3.81)
14	14.035 +/-0.015 (356.49 +/-0.38)	13.985 +/-0.015 (355.22 +/-0.38)	7.000 (177.80)	0.150 (3.81)
16	16.045 +/-0.015 (410.08 +/-0.38)	15.980 +/-0.015 (405.89 +/-0.38)	8.000 (203.20)	0.160 (4.06)
18	18.055 +/-0.020 (458.60 +/-0.51)	17.980 +/-0.020 (456.69 +/-0.51)	9.000 (228.60)	0.180 (4.57)
20	20.065 +/-0.025 (509.65 +/-0.64)	19.980 +/-0.025 (507.49 +/-0.64)	10.000 (254.00)	0.200 (5.08)
24	24.075 +/-0.030 (611.51 +/-0.76)	23.970 +/-0.030 (608.84 +/-0.76)	12.000 (304.80)	0.240 (6.10)

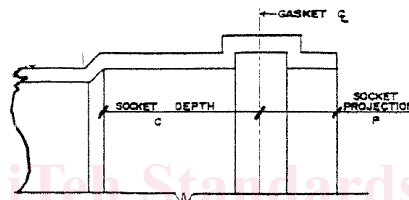


FIG. 1 Gasket-Joint Dimensions

TABLE 3 Gasket Joint —Dimensions

Nominal Pipe Size	Socket	
	Depth "C" Min in. (mm)	Projection "P" Max. in. (mm)
4	1.50 (38.1)	2.00 (50.8)
4	1.50 (38.1)	2.00 (50.8)
6	2.15 (54.6)	2.25 (57.2)
6	2.15 (54.6)	2.25 (57.2)
8	2.50 (63.5)	2.75 (69.0)
10	2.92 (74.2)	3.25 (82.6)
12	3.10 (78.7)	3.50 (88.9)
14	3.30 (83.8)	4.00 (101.6)
16	3.60 (91.4)	4.25 (108.0)
18	3.90 (99.1)	4.50 (114.3)
20	4.20 (106.7)	5.00 (127.0)
24	4.95 (125.7)	5.50 (139.7)

7.2 Leak Test—After completing the Resistance to Bending test, the fabrication joint shall be checked for leakage in accordance with 10.3. Fittings subjected to these tests shall be discarded.

7.3 Solvent Weld Bond Area—The bond area for the manufacturer’s solvent welds shall be in accordance with the manufacturer’s standard design dimensions and tolerances, and the insertion bond depth shall be not less than 0.75 in. all around the perimeter. Joints shall be made in accordance with Practice D2855.

8. Workmanship, Finish, and Appearance

8.1 The fittings shall be homogeneous throughout, and free from visible cracks, holes, foreign inclusions, or other defects. Scratches deeper than 10 % of the wall thickness shall be considered unacceptable. The fittings shall be uniform in color, opacity, density, and other physical properties.

9. Sample and Conditioning

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