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An American National Standard

Standard Specification for Special Engineered Fittings, Appurtenances or Valves for use in Poly (Vinyl Chloride) (PVC) or Chlorinated Poly (Vinyl Chloride) (CPVC) Systems[1]

This standard is issued under the fixed designation F 1970; 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 fittings, appurtenances and valves which are to be used with pipe and tubing complying with Specifications D 1785, D 2241, D 2846, F 441 or F 442, or other piping as specified by the fittings manufacturer. These products, such as unions, flanges or valves, are not included in the scope of existing ASTM specifications. This specification includes minimum requirements for testing, materials, dimensions, workmanship, marking, and in-plant quality control.

1.2 Fittings or appurtenances covered by this specification are generally either molded, fabricated, or assembled from molded or machined components. The materials used in components include rigid thermoplastics, thermoplastic elastomers, elastomerics, and metals. The body or main portion of the fitting, appurtenance or valve is typically PVC, CPVC, PE or PA (nylon). All products covered by this standard are intended to be used in PVC or CPVC plastic piping systems, or as a transition from these to metal systems.

1.3 The application of these products to gas service is beyond the scope of this specification.

1.4 Fittings which rely on heat fusion welding for connection to the piping system are outside the scope of this specification.

1.5 Check valves (including foot valves) covered by this specification shall not be considered backflow prevention devices and shall not be used for the protection of a potable water supply. For definitions and requirements of backflow prevention devices, consult model plumbing codes and ASSE.[2]

1.6 Due to the complex and installation-specific concerns surrounding chemical resistance and corrosion, this specification does not address the compatibility of the products with all possible end-use environments. Additional testing specific to the end-use environment is recommended if the system is conveying liquids other than potable water.

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

1.8 The following safety caveat applies only to the test methods and in-plant quality control portions, section 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:*

D 1598 Test Method for Time-to-Failure of Plastic Pipe Under Constant Internal Load[3]

D 1599 Test Method for Short-Time Hydraulic Failure Pressure of Plastic Pipe, Tubing, and Fittings[3]

D 1600 Terminology for Abbreviated Terms Relating to Plastics[4]

D 1784 Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds[4]

D 1785 Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120[3]

D 1898 Practice for Sampling of Plastics[4]

D 2000 Classification System for Rubber Products in Automotive Applications[5]

D 2122 Test Method for Determining Dimensions of Thermoplastic Pipe and Fittings[3]

D 2241 Specification for Poly(Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series)[3]

D 2466 Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40[3]

D 2467 Specification for Socket-type Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80[3]

D 2846 Specification for Chlorinated Poly(Vinyl Chloride)

[1] This specification is under the jurisdiction of ASTM Committee F-17 on Plastic Piping Systems and is the direct responsibility of Subcommittee F17.10 on Fittings.

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[2] American Society of Sanitary Engineering, 28901 Clemens Rd., Suite 100, Westlake, OH 44145.

[3] *Annual Book of ASTM Standards*, Vol 08.04.

[4] *Annual Book of ASTM Standards*, Vol 08.01.

[5] *Annual Book of ASTM Standards*, Vol 09.02.

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(CPVC) Plastic Hot-and-Cold-Water Distribution Systems[3]

D 3350 Specification for Polyethylene Plastics Pipe and Fittings Materials[6]

D 4066 Classification System for Nylon Injection and Extrusion Materials (PA)[6]

F 412 Terminology Relating to Plastic Piping Systems[3]

F 438 Specification for Socket-Type Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 40[3]

F 439 Specification for Socket-Type Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80[3]

F 441/F 441M Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe, Schedules 40 and 80[3]

F 442/F 442M Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe (SDR-PR)[3]

F 477 Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe[3]

F 1498 Specification for Taper Pipe Threads 60° for Thermoplastic Pipe and Fittings[3]

2.2 *ASME Standards:*

B1.20.1 Pipe Threads, General Purpose (Inch)[7]

B16.5 Pipe Flanges and Flanged Fittings[7]

2.3 *NSF Standards:*

NSF 14 Plastics Piping Components and Related Materials[8]

NSF 61 Drinking Water System Components - Health Effects[8]

2.4 *ISA Standard:*

ISA S75.02 Control Valve Capacity Test Procedure[9]

2.5 *ASQ Standard:*

ANSI/ASQ Z1.4 Sampling Procedures and Tables for Inspection by Attributes[10]

3. Terminology

3.1 *General*—Definitions are in accordance with the Definitions in F 412 and abbreviations are in accordance with D 1600 unless otherwise specified.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *activation pressure*—the activation pressure of a check valve is that inlet pressure, exceeding the outlet pressure, required to open the check valve and allow water to flow.

3.2.2 *appurtenances*—accessories of a plastic piping system designed for special applications or end-uses. Appurtenances may include, but are not limited to pipes, fittings, valves, storage tanks, mechanical devices and expansion tanks.

3.2.3 *connections*—the portion of the fitting intended to join the fitting with the rest of the piping system (see 5.1).

3.2.4 *CTS*—abbreviation for "copper tube size", indicating an outside-diameter controlled tubing with outside diameter dimensions meeting the tube specifications given in Specification D 2846.

3.2.5 *IPS*—abbreviation for "iron pipe size", indicating an outside-diameter controlled tubing with outside diameter dimensions meeting the requirements of schedule 40 pipe (see Specification D 1785 for dimensions of schedule 40 pipe).

3.2.6 *lot size*—the total number of completely finished fittings or appurtenances that are manufactured under conditions of production that are considered uniform.

3.2.7 *referee test*—testing conducted to compare performance of the product against all requirements of this specification. In-plant QC testing is not considered referee testing.

4. Materials and Manufacture

4.1 The elastomeric seals designed for push-on joints, which require no internal or external pressure to effect the initial seal, shall comply with the requirements of Specification F 477, Table 1 for thermoset, Table 2 for thermoplastic.

4.2 All other elastomeric seals shall be designed to meet the product performance requirements stated within this document and be specified in accordance with Classification D 2000.

4.3 Materials used in components which provide structural integrity of the fitting or appurtenance shall meet the requirements of 4.3.1, 4.3.2, 4.3.3 or 4.4.

NOTE 1—Components which provide structural integrity include the body; connections such as sockets, compression joint components, saddles, and flanges.

4.3.1 PVC materials shall meet the minimum requirements for a cell-classification of 12454, 13354, 11443 or 14333 as defined by Specification D 1784.

4.3.2 CPVC materials shall meet the minimum requirements for a cell-classification of 23447 or 23448 as defined in Specification D 1784.

4.3.3 Polyamide (nylon) materials shall meet the minimum requirements for a cell-classification of PA0110, PA0120, PA0210 or PA0220 and shall meet the detail requirements given in Table A or B for classifications A2242 or B4544, as defined in Classification D 4066.

4.3.4 Polyethylene (PE) materials shall meet the minimum requirements for a cell classification of 213333 (PE2406, PE3406 or PE3408) as defined in Specification D 3350.

4.4 *Rework Material*—The manufacturers shall use only their own clean rework fitting material and the fittings produced shall meet the requirements of this specification. Materials containing contaminants from other base materials or elastomerics shall not be used in the manufacture of fittings or appurtenances under this specification.

5. Requirements

5.1 *Dimensions*:

5.1.1 *Seal Dimensions*—Seal dimensions shall be in accordance with the manufacturer's standard design dimensions and tolerances. The seal shall be designed to provide an adequate compressive force against the mating parts after assembly to effect a positive seal under all combinations of permitted fitting and seal tolerances.

5.1.2 *Solvent-Weld Connections*—Sockets shall comply with the fittings dimensions applicable to the size of pipe being joined. Dimensioning of sockets shall be conducted in accordance with 8.2.

[6] *Annual Book of ASTM Standards*, Vol 08.02.

[7] American Society of Mechanical Engineers, Three Park Ave., New York, NY 10016.

[8] NSF International, P.O. Box 130140, Ann Arbor, MI 48113-0140.

[9] Instrument Society of America, 67 Alexander Drive, Research Triangle Park, NC 27709.

[10] American Society for Quality, 611 East Wisconsin Ave., Milwaukee, WI 53201-3005.

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