Designation: F1970 – 22

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 F1970; 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 D1785, D2241, D2846/D2846M, F441/F441M or F442/F442M, 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 The products covered by this specification are intended for use with the distribution of pressurized liquids only, which are chemically compatible with the piping materials. Due to inherent hazards associated with testing components and systems with compressed air or other compressed gases some manufacturers do not allow pneumatic testing of their products. Consult with specific product/component manufacturers for their specific testing procedures prior to pneumatic testing.

NOTE 1—**Warning:** Pressurized (compressed) air or other compressed gases contain large amounts of stored energy which present serious safety which present serious safety hazards should a system fail for any reason.

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

1.6 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]

1.7 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.

1.8 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.

1.9 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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.10 *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:*[3]

D1598 Test Method for Time-to-Failure of Plastic Pipe Under Constant Internal Pressure

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

Current edition approved Sept. 1, 2022. Published October 2022. Originally approved in 1999. Last previous edition approved in 2019 as F1970–19. DOI: 10.1520/F1970-22.

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

[3] 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**

D1599 Test Method for Resistance to Short-Time Hydraulic Pressure of Plastic Pipe, Tubing, and Fittings
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
D1785 Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120
D1898 Practice for Sampling of Plastics (Withdrawn 1998)[4]
D2000 Classification System for Rubber Products in Automotive Applications
D2122 Test Method for Determining Dimensions of Thermoplastic Pipe and Fittings
D2241 Specification for Poly(Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series)
D2466 Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40
D2467 Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80
D2846/D2846M Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Hot- and Cold-Water Distribution Systems
F412 Terminology Relating to Plastic Piping Systems
F438 Specification for Socket-Type Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 40
F439 Specification for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80
F441/F441M Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe, Schedules 40 and 80
F442/F442M Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe (SDR–PR)
F477 Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe
F1498 Specification for Taper Pipe Threads 60° for Thermoplastic Pipe and Fittings

2.2 *ASME Standards:*
B1.20.1 Pipe Threads, General Purpose (Inch)[5]
B16.5 Pipe Flanges and Flanged Fittings[5]

2.3 *NSF Standards:*
NSF 14 Plastics Piping Components and Related Materials[6]
NSF 61 Drinking Water System Components - Health Effects[6]

2.4 *ISA Standard:*
ISA S75.02 Control Valve Capacity Test Procedure[7]

2.5 *ASQ Standard:*
ANSI/ASQ Z1.4 Sampling Procedures and Tables for Inspection by Attributes[8]

[4] The last approved version of this historical standard is referenced on www.astm.org.
[5] Available from American Society of Mechanical Engineers (ASME), ASME International Headquarters, Two Park Ave., New York, NY 10016-5990, http://www.asme.org.
[6] Available from NSF International, P.O. Box 130140, 789 N. Dixboro Rd., Ann Arbor, MI 48105, http://www.nsf.org.
[7] Available from International Society of Automation (ISA), 67 T.W. Alexander Drive, PO Box 12277, Research Triangle Park, NC 27709, https://www.isa.org.
[8] Available from American Society for Quality (ASQ), 600 N. Plankinton Ave., Milwaukee, WI 53203, http://www.asq.org.

3. Terminology

3.1 *General*—Definitions are in accordance with the Definitions in F412 and abbreviations are in accordance with D1600 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 D2846/D2846M.

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 D1785 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 F477, 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 D2000.

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, or 4.4.

NOTE 2—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 D1784.

4.3.2 CPVC materials shall meet the minimum requirements for a cell-classification of 23447 or 23448 as defined in Specification D1784.

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.