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Standard Specification for Polytetrafluoroethylene (PTFE) Plastic-Lined Ferrous Metal Pipe, Fittings, and Flanges¹

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1. Scope

1.1 This specification covers factory-made polytetrafluoroethylene (PTFE) plastic-lined ferrous metal pipe, fittings, and flanges primarily intended for conveying corrosive fluids. Included are requirements for material, workmanship, dimensions, working pressure and temperature, design, fabrication, test methods, marking, as well as qualification requirements.

NOTE 1—This specification does not include products coated with PTFE.

1.2 This specification covers ANSI Class 150 and 300 PTFE-lined pipe, flanges, and fittings in nominal diameters of 1/2 to 24 in. Pressure limitations shall be those established by the manufacturer considering both pressure and temperature limitations of the ferrous metal housings and sealing ability of the liner at flanged joints.

1.3 The PTFE-lined flanged pipe and fitting assemblies are limited for use from -20 to 500°F (-29 to 260°C). For use below -20°F (-29°C) consult the manufacturer.

NOTE 2—The temperature limitations are based on noncorrosive test conditions. Use in specific aggressive environments may alter temperature limitations. In such instances, specific temperature limits shall be established by mutual agreement between the purchaser and manufacturer.

1.4 The values given in parentheses are provided for information purposes only.

2. Referenced Documents

2.1 ASTM Standards:

- A 536 Specification for Ductile Iron Castings²
- D 792 Test Methods for Specific Gravity (Relative Density) and Density of Plastics by Displacement³
- D 1457 Specification for Polytetrafluoroethylene (PTFE) Molding and Extrusion Materials³
- D 1505 Test Method for Density of Plastics by the Density-Gradient Technique³
- D 1600 Terminology for Abbreviated Terms Relating to Plastics^{3,4}
- F 412 Terminology Relating to Plastic Piping Systems⁴

2.2 ANSI/ASME Standards:

B16.5 Steel Pipe Flanges and Flanged Fittings⁵

B16.9 Factory-Made Wrought Steel Butt Welding Fittings⁵

B16.42 Ductile Iron Pipe Flanges and Flanged Fittings⁵

Section IX of the ASME Boiler and Pressure Vessel Code⁶

2.3 MSS Standards:

MSS SP-43 Wrought Stainless Steel Butt-Welding Fittings⁷

2.4 Federal Standard:

Fed. Std. No. 123 Marking for Shipment (Civil Agencies)⁸

2.5 Military Standard:

MIL-STD-129 Marking for Shipment and Storage⁸

3. Terminology

3.1 *Terminology*—Definitions are in accordance with Terminology F 412, and abbreviations are in accordance with Terminology D 1600, unless otherwise specified. The abbreviation for polytetrafluoroethylene is PTFE.

4. Materials

4.1 Lining:

4.1.1 *Material*—The lining shall be made from polytetrafluoroethylene resins conforming to the requirements of Specification D 1457, except that a maximum of 1 % by weight of additives or colorants, or both, is permissible for identification or other purposes. Organic additives or colorants, or both, if used, shall be identified in the manufacturer's specification.

4.1.2 The lining shall be made from virgin resin meeting Specification D 1457 or clean unsintered reworked resin capable of meeting the performance requirements of this specification.

4.1.3 *Mechanical Properties*—When tested in accordance with Specification D 1457 the minimum longitudinal tensile strength and elongation shall be 3000 psi (21 MPa) and 250 % respectively and the transverse minimum values 2500 psi (17 MPa) and 200 %.

4.1.4 *Specific Gravity*—The linings manufactured from PTFE resins meeting Specification D 1457, Types I and IV, shall have a specific gravity from 2.14 to 2.19, and those manufactured from Type III shall have a specific gravity

¹ This specification is under the jurisdiction of ASTM Committee F-17 on Plastic Piping Systems and the direct responsibility of Subcommittee F17.11 on Composite Pipe.

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² Annual Book of ASTM Standards, Vol 01.02.

³ Annual Book of ASTM Standards, Vol 08.01.

⁴ Annual Book of ASTM Standards, Vol 08.04.

⁵ Available from American National Standards Institute, 11 West 42nd St., 13th Floor, New York, NY 10036.

⁶ Available from American Society of Mechanical Engineers, 345 E. 47th St., New York, NY 10017.

⁷ Available from Manufacturer's Standardization Society of the Valve and Fittings Industry, 5203 Leesburg Pike, Suite 502, Falls Church, VA 22041.

⁸ Available from Standardization Documents Order Desk, Bldg. 4 Section D, 700 Robbins Ave., Philadelphia, PA 19111-5094, Attn: NPODS.