



Standard Specification for Poly(Vinylidene Fluoride) (PVDF) Plastic-Lined Ferrous Metal Pipe and Fittings¹

This standard is issued under the fixed designation F 491; 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 factory-made poly(vinylidene fluoride) (PVDF) plastic-lined ferrous metal pipe and fittings, primarily intended for conveying corrosive liquids and gases. Requirements for materials, workmanship, dimensions, design, construction, working pressures and temperatures, test methods, and markings are included.

NOTE 1—This specification does not include products *coated* with PVDF nor does it define the suitability of PVDF-lined components in chemical environments.

1.2 The ferrous piping products shall meet the requirements of the relevant specification listed in 1.2.1. Nominal sizes from 1 through 10 in. in 150 and 300-psi ratings are covered.

1.2.1 For Ferrous Pipe:

Title of Specification	ASTM Designation
Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless (Types E and S)	A 53
Seamless Carbon Steel Pipe for High-Temperature Service	A 106
Electric-Resistance Welded Steel Pipe	A 135
Electric-Welded Low-Carbon Steel Pipe for the Chemical Industry	A 587
Seamless and Welded Austenitic Stainless Steel Pipe	A 312
Electric-Resistance Welded Carbon and Alloy Steel Mechanical Tubing	A 513

1.2.2 For Ferrous Flanges:

Title of Specification	ASTM Designation
Forgings, Carbon Steel, for Piping Components	A 105
Forged or Rolled Steel Pipe Flanges, Forged Fittings and Valves and Parts for General Service	A 181
Forged or Rolled Alloy-Steel Pipe Flanges, Forged Fittings, and Valves and Parts for High-Temperature Service	A 182
Carbon-Steel Castings Suitable for Fusion Welding for High-Temperature Service (Grade WCB)	A 216
Ferritic Ductile Iron Pressure Retaining Castings for Use at Elevated Temperatures (60-40-18)	A 395
Ductile Iron Castings (60-40-18, 64-45-12, 80-55-06)	A 536

1.2.3 For Ferrous Fittings:

Title of Specification	ASTM Designation
------------------------	------------------

Forgings, Carbon Steel, for Piping Components	A 105
Forged or Rolled Steel Pipe Flanges, Forged Fittings, and Valves and Parts for General Service	A 181
Carbon Steel Castings Suitable for Fusion Welding for High-Temperature Service (Grade WCB)	A 216
Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and Elevated Temperatures	A 234
Austenitic Steel Castings for High-Temperature Service	A 351
Alloy Steel Castings Specially Heat-Treated for Pressure-Containing Parts Suitable for High-Temperature Service	A 389
Ductile Iron Castings (60-40-18, 64-45-12, 80-55-06)	A 536
Ferritic Ductile Iron Pressure Retaining Castings for Use at Elevated Temperatures (60-40-18)	A 395
Wrought Austenitic Stainless Steel Piping Fittings	A 403

NOTE 2—The PVDF sealing faces may prevent achievement of the full pressure rating of the ferrous housings. For pressure limitations, the manufacturer should be consulted.

1.3 The PVDF-lined flanged pipe and fitting assemblies are limited to use from –18 to 135°C (0 to 275°F). For use below –18°C (0°F) consult the manufacturer. Use in specific aggressive environments may alter the above temperature range. The operating temperature limits shall be established by mutual agreement between the purchaser and the seller.

2. Referenced Documents

2.1 ASTM Standards:

- D 1600 Terminology for Abbreviated Terms Relating to Plastics²
- D 3222 Specification for Unmodified Poly(Vinylidene Fluoride) (PVDF) Molding, Extrusion and Coating Materials³
- F 412 Terminology Relating to Plastic Piping Systems⁴

2.2 ANSI Standard:

- B 16.5 Steel Pipe Flanges and Flanged Fittings⁵

3. Terminology

3.1 Definitions—Definitions are in accordance with Terminology F 412, and abbreviations are in accordance with Terminology D 1600, unless otherwise specified. The abbreviation for poly(vinylidene fluoride) is PVDF.

4. Materials

4.1 Lining:

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

Current edition approved Sept. 10, 1995. Published November 1995. Originally published as F 491 – 77. Last previous edition F 491 – 93a.

² *Annual Book of ASTM Standards*, Vol 08.01.

³ *Annual Book of ASTM Standards*, Vol 08.03.

⁴ *Annual Book of ASTM Standards*, Vol 08.04.

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