

Suggested specification for *SMITH FIBERCAST* **GREEN THREAD® Piping System**

GENERAL SPECIFICATIONS

SECTION 1 – Scope

This section covers the use of fiberglass reinforced plastic (FRP) pipe for acid, caustic, and mild solvent services up to 225°F and 450 psig steady pressure.

The piping system shall be furnished and installed complete with all fittings, joining materials, supports, specials, and other necessary appurtenances.

SECTION 2 – General Conditions

2.01 Coordination. Material furnished and work performed under this section shall be coordinated with related work and equipment specified under other sections.

Valves	Section	_____
Supports	Section	_____
Equipment	Section	_____

2.02 Governing Standards. Except as modified or supplemented herein, all materials and construction methods shall comply with the applicable provisions of the following specifications and be tested using the following standards:

Standard Specifications

- ASTM D2996 - Standard Specification for Filament-Wound "Fiberglass" (Glass-Fiber-Reinforced-Thermosetting Resin) Pipe
- ASTM D4024 - Standard Specification for Reinforced Thermosetting Resin (RTR) Flanges
- ASTM D5685 - Standard Specification for "Fiberglass" (Glass-Fiber-Reinforced-Thermosetting-Resin) Pressure Pipe Fittings

Standard Test Methods

- ASTM D2992 - Standard Practice for Obtaining Hydrostatic or Pressure Design Basis for "Fiberglass" (Glass-Fiber-Reinforced-Thermosetting Resin) Pipe and Fittings
- ASTM D1599 - Standard Test Method for Short-Time Hydraulic Failure Pressure of Plastic Pipe, Tubing and Fittings
- ASTM D2105 - Standard Test Method for Longitudinal Tensile Properties of "Fiberglass" (Glass-Fiber-Reinforced-Thermosetting Resin) Pipe and Tube
- ASTM D2412 - Standard Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading

2.03 Operating Conditions. In addition to the above listed minimum design requirements, the system shall meet the following minimum operating conditions:

- a. Operating Pressure _____
- b. Operating Temperature _____
- c. Fluid Conveyed _____
- d. Test Pressure _____

2.04 Quality Assurance. Pipe manufacturer's quality program shall be in compliance with ISO 9001 and/or API Q1.

2.05 Delivery, Storage, and Handling. Pipe and fittings shall be protected from damage due to impact and point loading. Pipe shall be properly supported to avoid damage due to flexural strains. The contractor shall not allow dirt, debris, or other extraneous materials to get into pipe and fittings. All factory machined areas shall be protected from sunlight until installed.

2.06 Acceptable Manufacturers. FGS Smith FiberCast, 501-568-4010, or approved equal.

SECTION 3 – Materials and Construction

3.01 1"-16" Pipe. The pipe shall be manufactured by the filament winding process using an amine cured epoxy thermosetting resin to impregnate strands of continuous glass filaments, which are wound around a mandrel at a 54¾° winding angle under controlled tension. Pipe shall be heat cured and the cure shall be confirmed using a Differential Scanning Calorimeter.

All pipe shall have a resin-rich corrosion barrier reinforced with surfacing veil. The corrosion barrier shall have a minimum resin content of 90%. The minimum acceptable cured thickness of the corrosion barrier shall be as follows:

1" - 1½"	15 mil nominal
2" - 3"	25 mil nominal
4" - 16"	30 mil nominal

Pipe shall be supplied with a matching tapered bell and a matching tapered spigot.

Pipe shall have a minimum continuous steady pressure rating of 150 psig at 225°F in accordance with ASTM D2992 Procedure A.

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3.02 Flanges and Fittings. All fittings shall be manufactured using the same type materials as the pipe. Fittings may be manufactured either by compression molding or spray-up/contact molding methods.

Fittings shall be adhesive bonded matched tapered bell and spigot or flanged.

Flanges shall have ANSI B16.5 Class 150 bolt hole patterns.

3.03 Adhesive. Adhesive shall be manufacturer's standard for the piping system specified.

3.04 Gaskets. Gaskets shall be 1/8" thick, 60-70 durometer full-face type suitable for the service shown on the drawings and as recommended in the manufacturer's standard installation procedures.

3.05 Bolts, Nuts, and Washers. ASTM F593, 304 stainless steel hex head bolts shall be supplied. Washers shall be supplied on all nuts and bolts.

3.06 Acceptable Products. GREEN THREAD as manufactured by FGS Smith Fibercast, or approved equal.

SECTION 4 – Installation and Testing

4.01 Training and Certification. All joints installed or constructed in the field shall be assembled by employees of the contractor who have been trained by the pipe manufacturer. The pipe manufacturer or their authorized representative shall train the contractor's employees in the proper joining and assembly procedures required for the project, including hands-on participation by the contractor's employees. Each bonder shall fabricate one pipe-to-pipe and one pipe-to-fitting joint that shall pass the minimum pressure test for the application as stated in section 2.03.d without leaking.

Only bonders who have successfully completed the pressure test shall bond pipe and fittings.

4.02 Pipe Installation. Pipe shall be installed as specified and indicated on the drawings.

The piping system shall be installed in accordance with the manufacturer's current published installation procedures.

4.03 Testing. A cyclic hydrostatic pressure test shall be conducted on the completed piping system. The piping system shall be subjected to 10 pressurization cycles from 0 psig to 1½ times the design operating pressure as stated in section 2.03.d. After the 10 cycles, the pressure shall be held on the system for a minimum of 1 hour and the line inspected for leaks.

Test pressure shall not exceed 1½ times the maximum rated pressure of the lowest rated element in the system.

Lines that are subjected to severe temperature cycles shall be tested at 1½ times the cyclic pressure rating of the lowest rated component, even if the system shall operate at low pressure.

The system shall be filled with water at the lowest point and air bled off from the highest point. Systems shall be brought up to test pressure slowly to prevent water hammer or overpressurization.

All pipe joints shall be water tight. All joints that are found to leak by observation or during testing shall be repaired by the contractor and retested.

This suggested specification is being provided only as a general reference for specifying FGS Smith Fibercast piping products. It is not intended to be all-inclusive or to address all of the specific applications or requirements for your particular project.

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