Green Thread™ HP16 Piping System

(Specification Guide)

CHEMICAL & INDUSTRIAL

Section 1 - Scope

This section covers the use of fiberglass reinforced plastic (FRP) pipe for dilute acid, caustic, and mild solvent services up to 230°F and 435 psig steady pressure.

The piping 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

Standard Test Methods

ASTM D2992	Standard Test Method 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
ASTM D2925	Standard Test Method for Beam Deflection of "Fiberglass" (Glass-Fiber-Reinforced Thermosetting Resin) Pipe Under Bore Flow

2.04 Operating Conditions - In addition to the above minimum design requirements, the system shall meet the following minimum operating conditions:

a. Operating Pressure _____

b. Operating Temperature _____

c. Fluid Conveyed _____

d. Test Pressure _____

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

2.06 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.

2.07 Acceptable Manufacturers - NOV Fiber Glass Systems, (501) 568-4010, or approved equal.

Section 3 - Materials and Construction

3.01 2"-42" 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 54 ¾° 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 80%. The minimum acceptable cured thickness of the corrosion barrier shall be as follows:

1" - 1½"	12 mil minimum
2" - 42"	20 mil minimum

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

Pipe shall have a minimum continuous steady pressure rating of 232 psig at 200°F in accordance with ASTM D2992 Procedure B.

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, spray-up/ contact molding, or filament winding 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. SAE washers shall be supplied on all nuts and bolts.

3.06 Acceptable Products - Green Thread HP16 as manufactured by NOV Fiber Glass Systems, 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.

Certification by the manufacturer shall be in compliance with ASME B31.3, Section A328.2 for the type of joint being made.

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 - Hydrostatic testing is recommended to evaluate the integrity of all new piping installations. For systems operating below the system rating, a test pressure of 1.5 times the system operating pressure is recommended; however, the maximum test pressure must not exceed 1.3 times the lowest pressure rated fiberglass component in the piping system.

The hydro test pressure should be repeated up to ten cycles from 0 psig to the test pressure to provide a high degree of confidence in the piping system. The final pressurization cycle should be allowed to stabilize for 15-30 minutes, then inspected for leaks. Do not attempt to repair leaks while system is pressurized. The hydro test should be repeated after any re-work is performed.

When hydro testing, open high-point vents (if used) to prevent entrapment of air in the lines as the system is slowly filled with water, then close the vents and slowly pressurize to the test pressure. Upon completion of hydro test, relieve the pressure on the system slowly, open vents and any drains to allow for complete drainage of the system.

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