

# RED THREAD® II Piping System

## GENERAL SPECIFICATIONS

### SECTION 1 – Scope

This section covers the use of fiberglass reinforced plastic (FRP) pipe for mild chemical and water services up to 210°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 4024  | 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 D2925 | Standard Practice for Measuring Beam Deflection of Reinforced Thermosetting Plastic Pipe Under Full Bore Flow  |
| 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** - NOV Fiber Glass Systems, 501-568-4010, or approved equal.

### SECTION 3 – Materials and Construction

**3.01 2”-24” 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<sup>3</sup>/<sub>4</sub>° winding angle under controlled tension. Pipe shall be heat cured and the cure shall be confirmed using a Differential Scanning Calorimeter.

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

Pipe shall have a minimum continuous steady pressure rating of 225 psig at 210°F in accordance with ASTM D2992 Procedure A.

All pipe shall be 100% hydrotested at the factory before shipment at a minimum pressure of 300 psig.

**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, threaded or grooved adapters, or flanged. Fittings shall be certified to ASTM D5685.

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 A307, Grade B, hex head bolts shall be supplied. SAE washers shall be supplied on all nuts and bolts.

**3.06 Acceptable Products** - RED THREAD II 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 and certified to the Bonding Procedure Specification (BPS) provided by the pipe manufacturer. The BPS shall meet or exceed the requirements of ASME B31.3, Section A328.2.1. 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 in accordance with the BPS. Each bonder shall fabricate one pipe-to-pipe and one pipe-to-fitting joint for qualification testing. The pipe size and test pressure used in the qualification assembly shall meet or exceed the minimum requirements of ASME B31.3. Only bonders who have successfully completed the qualification 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.

Each pressure containing joint shall be clearly marked to identify the bonder in accordance with ASME B31.3, Section A328.5.1.

**4.03 Testing** - A 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 1 1/2 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 1 1/2 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 1 1/2 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 over-pressurization.

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.



National Oilwell Varco has produced this brochure for general information only, and it is not intended for design purposes. Although every effort has been made to maintain the accuracy and reliability of its contents, National Oilwell Varco in no way assumes responsibility for liability for any loss, damage or injury resulting from the use of information and data herein nor is any warranty expressed or implied. Always cross-reference the bulletin date with the most current version listed at the web site noted in this literature.

[www.fgspipe.com](http://www.fgspipe.com)

Oilfield: San Antonio/210-434-5043  
Chemical & Industrial: Little Rock/501-568-4010  
Marine/Offshore: Little Rock/501-568-4010  
Fuel Handling: Little Rock/501-568-4010

Little Rock/501-568-4010  
Sand Springs/918-245-6651

**NOV Fiber Glass Systems**

© Trademark of NATIONAL OILWELL VARCO  
© 2009, NATIONAL OILWELL VARCO  
A1201 November 2009