

# CERAM CORE<sup>®</sup> Piping System

## Specification Guide

### SECTION 1 – Scope

This section covers the use of fiberglass reinforced plastic (FRP) pipe for severe abrasion conditions caused by sharp angular particles in high flow streams services up to 210°F and 225 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

#### 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.

**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 6"-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 54<sup>1</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.

All pipe shall have a liner consisting of ceramic beads suspended in an epoxy matrix. The minimum liner thickness shall be 130 mil nominal.

Pipe shall be supplied with self-aligning flanges to assure the inside diameters of the liners are properly aligned.

Pipe shall have a continuous steady pressure rating at 200°F as follows 6"-12" at 225 psig and 14"-16" at 100 psig in accordance with ASTM D2992 Procedure B.

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

**3.02 Flanges and Fittings** - Abrasion resistant elbows shall be three diameter sweep radius and have self-aligning flanged ends. They shall be glass reinforced thermosetting resin with abrasion resistant ceramic tile liner.

Flanges shall have ANSI B16.5 Class 150 bolt hole patterns. It is recommended that a protective coating be used on the bolts to facilitate removal for rotation.

**3.04 O-Ring Seals** - O-Rings shall be 60-70 durometer Shore A hardness elastomeric material. O-rings for the self-aligning flanged joints will be supplied by manufacturer.

**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** - Ceram Core 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.

**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 hydrostatic pressure test shall be conducted on the completed piping system. The piping system should be pressurized to 1½ times the operating design pressure, and inspected. Then the pressurization should be maintained for 1-8 hours and the line inspected for leaks.

Field test pressures are limited to 1½ times the maximum cyclic rating of the lowest rated component in the system. The maximum test pressure should not exceed 338 psig. 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.

*North America*  
17115 San Pedro Ave. Suite 200  
San Antonio, Texas 78232 USA  
Phone: 210 477 7500

*South America*  
Avenida Fernando Simoes  
Recife, Brazil 51020-390  
Phone: 55 31 3501 0023

*Europe*  
P.O. Box 6, 4190 CA  
Geldermalsen, The Netherlands  
Phone: 31 345 587 587

*Asia Pacific*  
No. 7A, Tuas Avenue 3  
Jurong, Singapore 639407  
Phone: 65 6861 6118

*Middle East*  
P.O. Box 17324  
Dubai, UAE  
Phone: 971 4881 3566