

# F-CHEM<sup>®</sup> PIPING SYSTEMS



One Company Unlimited Solutions

**NOV** Fiber Glass Systems

**NOV Fiber Glass Systems** is the combination of the **Star® Fiberglass** product line and the **Smith Fibercast®** product lines bringing over 60 years of “Time-Tested” composite pipe experience to the Oilfield, Chemical/Industrial, Petroleum Marketing, Marine and Offshore markets.

## PRODUCT

**F-Chem** custom filament wound piping systems offer the economics of a highly corrosion and abrasion resistant pipe that can be designed to incorporate specific physical and mechanical properties. NOV Fiber Glass Systems can custom tailor corrosion resistant barriers, resin systems, reinforced structural walls, joining techniques and even ribbed wall construction for high vacuum or burial conditions. **F-Chem** pipe and fittings are available in **14” through 72”** diameters.

## FITTINGS

Compatible fittings are manufactured with the same **chemical/temperature** capabilities as the pipe and are available in a variety of configurations. The fittings are manufactured by contact molding, filament winding or mitered construction.

## JOINING METHODS

Several joining methods are available including bell & spigot, flanged, or butt & wrap.

## RECOMMENDED SERVICES

**F-Chem** pipe is the appropriate choice for water and wastewater, chemical plants and power plants. **Refer to Bulletin E5615 “Chemical Resistance Guide” for proper application.**

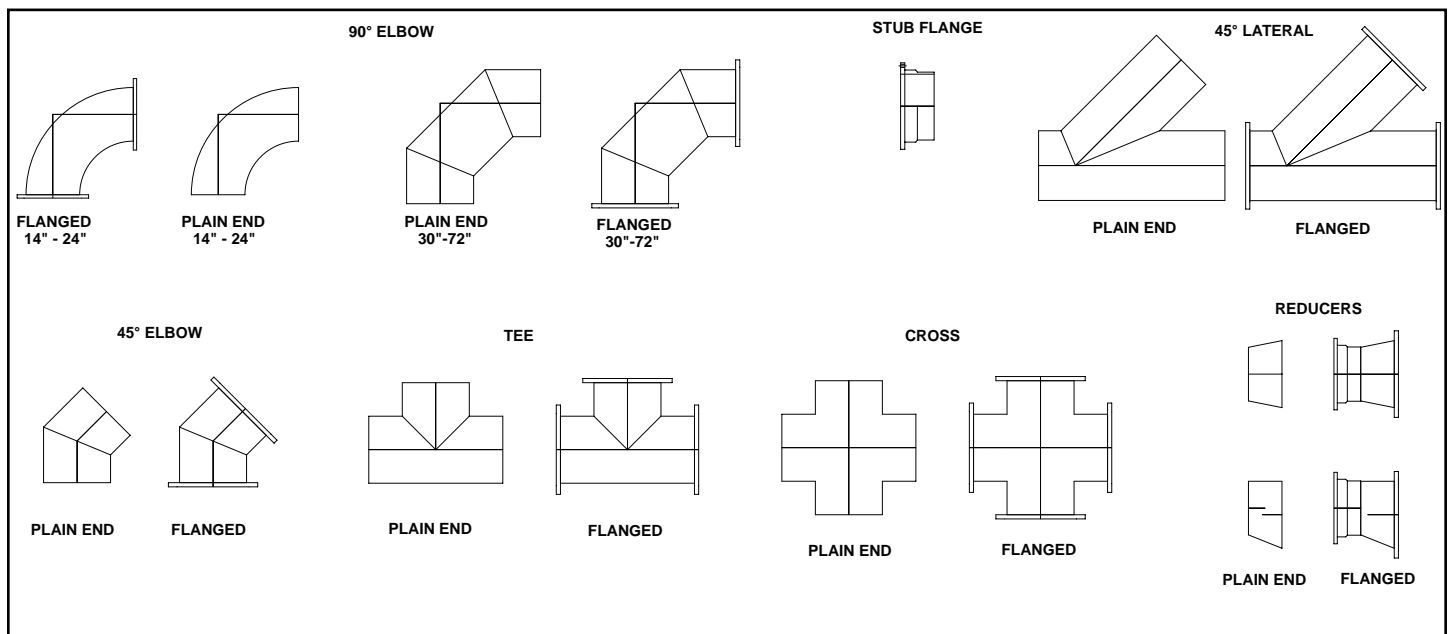
## BENEFITS

**F-Chem** pipe is light weight for ease of installation, offers superior corrosion resistance for long service life, provides high flow and low friction ratios, lowest total cost of ownership and ease of repair, modification and maintenance.

## DISTRIBUTION

NOV Fiber Glass Systems has a network of stocking distributors across the U.S. as well as representatives and distributors in many other parts of the world. These distributors are supported by a staff of experienced technical personnel at the home office and by highly trained, strategically located field personnel.

## F-CHEM LARGE DIAMETER FITTINGS



## Average Physical Properties

Property	75°F psi	24°C MPa	175°F psi	79°C MPa
<b>Axial Tensile - ASTM D2105</b>				
Ultimate Stress	9,300	64.1	5,500	37.9
Design Stress	2,325	16.0	1,375	9.5
Modulus of Elasticity <sup>(1)</sup>	1.50 x 10 <sup>6</sup>	10,342	-	-
<b>Poisson's Ratio <math>V_{a/h}</math> (<math>V_{h/a}</math>)</b>		0.33 (0.73)		
<b>Axial Compression - ASTM D695</b>				
Ultimate Stress	17,900	123.0	14,700	101
Design Stress	4,475	30.9	3,675	25.3
Modulus of Elasticity	1.40 x 10 <sup>6</sup>	9,653	9.00 x 10 <sup>6</sup>	6,205
<b>Beam Bending - ASTM D2925</b>				
Ultimate Stress	14,500	158.6	8,000	55.2
Design Stress <sup>(2)</sup>	1,800	19.8	1,000	6.9
Modulus of Elasticity (Long Term)	1.99 x 10 <sup>6</sup>	13,721	1.14 x 10 <sup>6</sup>	7,860
<b>Hydrostatic Burst - ASTM D1599</b>				
Ultimate Hoop Tensile Stress	40,000	276	40,000	276
<b>Hydrostatic Design - ASTM D2992, Procedure B - Hoop Tensile Stress</b>				
Static 50 Year Life	14,000	96.5	-	-

<sup>(1)</sup>Consult the factory for Modulus of Elasticity values between 75°F and 175°F.

<sup>(2)</sup>Design stress if one-eighth of ultimate to allow for combined stresses.

<b>Thermal Expansion Coefficient - ASTM D696 (Insulated Pipe)</b>	10.5 x 10 <sup>-6</sup> in/in/°F	18.9 x 10 <sup>-6</sup> mm/mm/°C
<b>Thermal Conductivity</b>	0.11 BTU/hr-ft-°F	0.06 W/m-°C
<b>Specific Gravity - ASTM D792</b>	1.8	
<b>Hazen-Williams Coefficient</b>	150	
<b>Absolute Surface Roughness</b>	0.00021 Inch	0.0053 mm
<b>Manning's "n"</b>	0.009	

### ASTM D2996 Designation Codes:

14"-24"	RTRP-112EU-3111
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The scope of ASTM D2996 is limited to 24" and smaller

### ASTM D2310 Designation Codes

30"-72"	RTRP-12EU
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Mechanical properties cell classifications shown are minimum. Actual classifications may be higher for some sizes.

### National Specification Compliance:

Pipe is manufactured in compliance with ASTM D2996, ASTM D2310 and ASTM D2992.

The following national specifications are met or exceeded when specified:

AWWA M45

Can be manufactured with ANSI/NSF Std. No. 61 approved resin system for potable water usage.

ASTM D6041 fittings

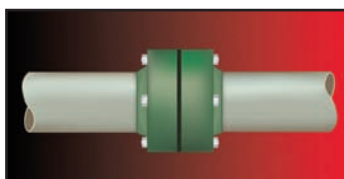
ASME/ANSI B31.3 compliant installation and training.

## JOINING SYSTEMS



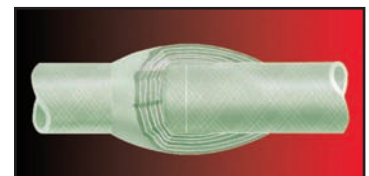
### Bell & Spigot

A matched taper joint secured with adhesive. Resists movement, facilitating long runs of pipe without waiting for the adhesive to cure.



### Flanged

Factory assembled or shipped for loose assembly in the field.



### Butt & Wrap

Plain end pipes or pipe and fittings butted together and wrapped with multiple layers of resin-saturated mat or woven roving.

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