

# *Fiber Glass Systems* **F-Chem® Piping Systems**

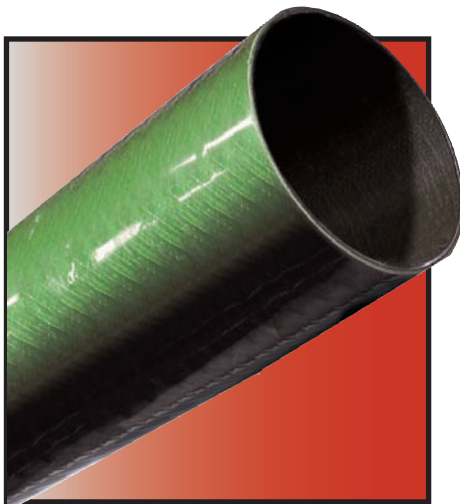


# F-Chem Piping Systems

## 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. 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 large diameter pipe and fittings can meet the requirements of your applications.

- Epoxy, vinyl ester or polyester resins
- 14"-72" diameters in 40' nominal lengths
- Pressure ratings to 150 psig
- Temperature ratings to 250°F
- UV inhibitor for added protection



## FITTINGS

Fittings for use with F-CHEM pipe are available in a variety of configurations. The fittings are manufactured by contact molding, filament winding and/or mitered construction.

## JOINING METHODS

Several joining methods are available including bell & spigot, flanged, "O" ring 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

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.



**18-20 inch diameter recirculation water application in Salt Lake City power plant**

## PRODUCT FEATURES

When selecting a fiberglass piping system, operating temperature and chemical resistance usually dictate the appropriate resin system.

- Epoxy resins perform best in the presence of caustics, solvents, brines, petroleum products, and certain acids
- Vinyl ester resin systems provide outstanding performance in acid, chlorine, oxidizing-agent applications
- Isophthalic (or polyester) resins offer a cost-effective option for lower temperature, less aggressive applications
- Premium and fire retardant resins are available for speciality applications
- Corrosion barriers range from 20 mil to 250+ mil



*Power plant condenser water return lines*

*60-inch diameter lines for cooling, recirculating water and condensed geothermal steam*



*14-36 inch odor control duct for Trinity River Authority in Grand Prairie, Texas*

# F-Chem Piping Systems

## 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>	1.50E+06	10,342	-	-
<b>Poisson's Ratio V</b>	0.33			
<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	1.40E+06	9,653	9.00E+05	6,205
<b>Beam Bending - ASTM D2925</b>				
Ultimate Stress	14,500	100	8,000	55.2
Design Stress	1,800	12.5	1,000	6.9
Modulus of Elasticity (Long Term)	1.99E+06	13,721	1.14E+06	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	-	-
<b>Coefficient of Linear Thermal Expansion - ASTM D696</b>	9.2 x 10 <sup>-5</sup> in/in/°F (Insulated Pipe)		16.6 x 10 <sup>-5</sup> mm/mm/°C (Insulated Pipe)	
<b>Thermal Conductivity</b>	0.11 BTU/hr-ft-°F		0.06 W/m-°C	
<b>Specific Gravity - ASTM D792</b>	1.86 (0.067 lb/in <sup>3</sup> )			
<b>Flow Factor - SF / Hazen-Williams Coefficient</b>	C-150			
<b>Surface Roughness</b>	1.7 x 10 <sup>-5</sup> Feet			
<b>Manning's "n"</b>	0.009 Inch			

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

<sup>(2)</sup> Consult the factory for design recommendations above 175°F.

### ASTM D2996 DESIGNATION CODES\*

14"-24" RTRP-12EU-3111

The scope of ASTM D2996 is limited to 24" and smaller.

### ASTM D2310 DESIGNATION CODES\*

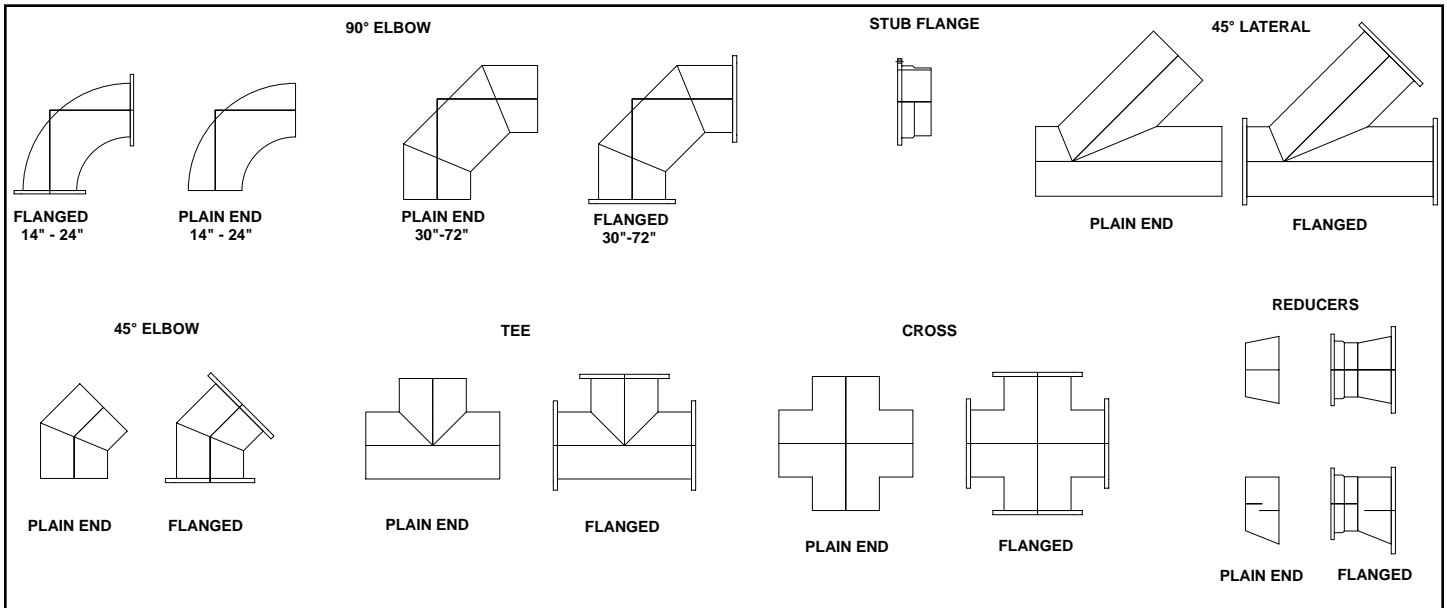
30"-72" RTRP-12EU

\* Mechanical properties cell classifications shown are minimum. Actual classifications may be higher for some sizes.



*16-72 inch diameter cooling water piping installed at Fuji Electric, Philippines*

## F-CHEM LARGE DIAMETER FITTINGS

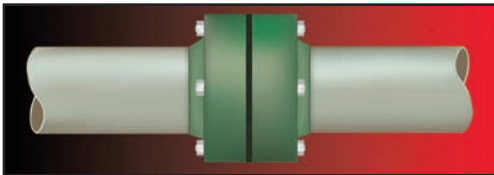
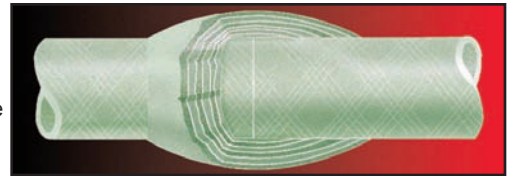


## JOINING SYSTEMS



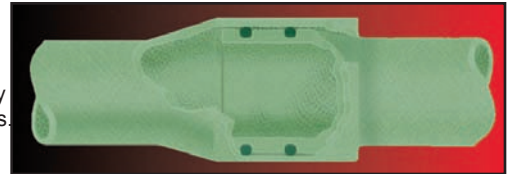
**Bell & Spigot**  
A matched taper joint secured with adhesive. Resists movement, facilitating long runs of pipe without waiting for the adhesive to cure.

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



**Flanged**  
Factory assembled or shipped for loose assembly in the field.

**O-Ring Bell & Spigot**  
Mechanical, O-ring sealed joint especially for buried applications. Choice of single or double O-rings.



## FABRICATION SERVICES

Fiber Glass Systems can fabricate special fittings to meet project requirements and offers a worldwide network of distributors and certified fabricators.



# F-Chem Piping Systems

## EXPERIENCE AND QUALIFICATIONS

With over 100 years combined experience, Fiber Glass Systems has developed fiberglass piping systems to meet the industry's needs in a multitude of applications.

To that end, we meet or exceed the following certifications and qualifications:

- **ASME/ANSI B31.3 Process Piping Code**  
Manufactured in compliance with ASTM D2996, installed in compliance with ASME/ANSI B31.3.
- **AMERICAN WATER WORKS ASSOCIATION (AWWA)**  
Designed in compliance with AWWA M45 for use as pressure pipes for water distribution (including services) and transmission systems for both above and below ground installations, Specify AWWA M45.
- **ASTM**  
Manufactured and tested in accordance with ASTM D2310, D2992 and D2996. Fittings meeting ASTM D6041 available upon request.
- **NATIONAL SANITATION FOUNDATION (NSF)**  
Can be manufactured to meet ANSI/NSF Standard No. 61 for potable water usage.

**Sand Springs, Oklahoma Facility**  
172,000 sq. ft. manufacturing space



**Little Rock, Arkansas Facility**  
223,000 sq. ft. manufacturing space



**60-inch cooling  
water recirculation  
lines**

## TYPICAL F-CHEM APPLICATIONS BY INDUSTRY

Applications	Industry				
	Chemical Process	Food Processing	Power Plant	Pulp & Paper	Water & Wastewater
Aeration Lines		X			X
Brine	X	X			
Chlorine, Wet & Chlorinated Water	X			X	X
Cooling Water	X	X	X	X	
Oily Wastewater			X		X
Odor Control Duct		X		X	X
Process Fluids	X			X	
Scrubber Supply & Return	X		X	X	X
Seawater & Saltwater			X		
Sludge & Slurry	X		X	X	X
Vent Lines	X	X		X	X
Water Service	X		X	X	X
Waste Drain & Treatment	X	X	X	X	X

**VENEZUELA: 60-INCH EPOXY RESIN PIPE FOR PROCESS WASTE AT A REFINERY**





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