



# *Industrial Fiberglass Specialties, Inc.*

521 Kiser Street  
Dayton, Ohio 45404-1641  
Tel: (937) 222-9000 - Fax: (937) 222-9020

## **Series 9750-135 Filament Wound FRP Composite, Pipe, Duct, & Fittings**

**For high temperature corrosive industrial service, where good impact and "toughness" are also important.**

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### **Uses and Applications:**

Chemical process and plant piping  
Fume duct and stacks for aggressive service environments  
Acid drains and sewers  
Severe service chemical applications  
Organic chemicals  
Oxidizing chemicals and acids  
Phos-Acid based process streams  
Excellent physical properties to 200<sup>o</sup> F.  
Piping for handling combinations of certain solvents, acids & bases  
An alternative to costly alloys and specialty metals

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### **Description: Composition:**

Filament-wound fiberglass reinforced methacrylate modified epoxy (vinylester) composite pipe. ASTM D-2996, Classification Type 1, Grade 2, Class E.

Nominal 10 to 20 mil veil reinforced inner corrosion barrier, followed by a nominal 125 mil corrosion liner reinforced with fiberglass chopped strands, followed by a fiberglass filament wound structural wall laminate. Heavier (thicker) corrosion barrier/liners are available (i.e. 150, 200, and 250 mil, etc.). The exterior of the pipe will be post-coated after fabrication with a UV resistant polymer coating.

A premium grade high-temperature high-performance high-elongation vinylester resin (Ashland Chemical's Derakane 470, or equal), is used for the inner corrosion barrier/liner. A tough premium grade high-impact resistant vinylester resin (Ashland Chemical's Derakane 411, or equal), pigmented gray for UV inhibition, is used for the filament wound structural laminate.

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### **Pipe Sizes: Pipe Lengths:**

175+ different diameters, ranging from a tiny 3/8" diameter up to a mammoth 168" diameter. Pipe available built to iron pipe outside diameters (ASTM D-2996, Table 3), as well as pipe built to chemical process piping inside diameter standards (ASTM D-2996, Table #4). A current list of pipe sizes is available upon request. New sizes are being added regularly.

3/8" and 1/2" diameter pipe and duct are built in 5 ft. lengths.  
3/4" & 7/8" diameter pipe and duct are built in 7 ft. lengths.  
1" through 1-1/2" diameter pipe and duct are built in 10 ft. lengths.  
2" through 24" diameter pipe and duct is available in 20 ft. lengths.  
8" through 144" diameter pipe and duct is available in 40 ft. lengths.

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**Performance:**

Good corrosion resistance over a wide temperature range.  
Temperatures from sub-zero to 225°F.

**Advantages:**

Working pressures from NBS-PS-15-69 duct to 450 psi+, depending upon size and wall thickness.

Vacuum to -14.7 psig for all sizes, by selection of wall thicknesses, ribs and filament wind angle.

Available for earth burial, all depths, with selection of wall thicknesses, ribs and filament wind angle.

Weighs 1/6 as much as steel. Thus, lower installed costs.

Series 9750-135 pipe can be provided using resins that meet the requirements of F.D.A. regulations 21-CFR-175.105 and 21-CFR 177.242.

Smooth inner surface produces very low frictional loss for reduced pumping and fan blower costs. Hazen-Williams flow coefficient of 150.

Recommended for a wide range of corrosion applications. Consult with Industrial Fiberglass, or the resin manufacturer, for specific project recommendations.

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**Joining Systems:**

Bell (socket) and spigot structural adhesive weld bonded joints. Adhesive bonded joints are available as your choice of straight/straight, straight/taper and taper/taper.

Threaded joints (NPT) through 12" diameter Other thread configurations available upon special order.

Flanges, all sizes through 84" diameter ANSI 150 lb., 300 lb. and 600 lb. all available as standard. Any pressure rating and drilling pattern available on order.

Van Stone, loose ring style, flanges.

Flange Spacers - all diameters, bolt hole patterns and thicknesses, built to order.

Bell and spigot O-Ring joints, thru 84" diameter

Bell and spigot O-Ring joints with locking key for restrained ends.

Mechanical Couplings, including Victaulic and Taylor-Kerr.

Repair (maintenance) couplings.

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**Physical Properties:****Mechanical Properties:**

See Table 1 for typical physical properties of Series 9750-135 filament wound FRP pipe and duct. These are conservative properties that can be used for the design of FRP pipe and duct for pressure, vacuum, supported span and burial conditions. Contact Industrial Fiberglass for recommendations on the appropriate design formulas to be used for FRP composite pipe and duct.

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**Burial Installations:**

As a custom manufacturer of pipe and fittings, we can design and build pipe to handle burial conditions ranging from live loads due to highway and rail traffic - to earth loads of 100 ft. or greater. We even have experience with underwater installations. Our engineers will welcome the opportunity to work with you on a pipe design, backfill selection and installation methods to meet your specific requirements. The result will be your lowest cost per year of service life (installed basis).

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**Supported Span Installations:**

Again, we can design and build pipe to provide you the lowest cost for supported span installed pipe. Since we are not limited to just a few pipe wall thicknesses and filament winding angles - we can select and choose the combination of pipe design and support design and cost that will provide your "best buy". Consult with our engineers for help with your specific requirements.

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**Fittings:**

Elbows, standard are 22-1/2°, 30°, 45°, and 90°. Any angle elbow available on special order. Elbows through 48" diameter are available as smooth radius. Mitered elbows are available in all sizes.

Reducing elbows

Tees

Reducing tees

Concentric taper body reducers

Eccentric taper body reducers

Saddles, with FRP and stainless steel threaded outlets, bell outlets, spigot outlets and flanged outlets

Wear pads (blank saddles)

Crosses

Reducing Crosses

Laterals

Reducing Laterals

True wyes.

P-Traps and 180° U-Bends

Floor drains

Expansion joints

Pipe couplings

Threaded (NPT) couplings

Adapters, bell by NPT thread (male or female threads available)

Adapters, spigot by NPT thread (male or female threads available)

Pipe nipples

Threaded nipples

Reducing bushings and threaded adapter bushings

Fitting and pipe plugs and pipe caps

Blind flanges

Threaded flanges

Reducing flanges

Orifice flanges

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All fittings are available as adhesive socket, plain end, flanged end, bell and spigot O-Ring; or any combination. See full Industrial Fiberglass' catalog for sizes, dimensions and tolerances. Fittings and flanges are available from 3/8" diameter through 144" diameter. We welcome the opportunity to work with our customers on special fittings.

Table 1

***Industrial Fiberglass Specialties, Inc.***

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**Properties of Series 9750-135 Filament Wound FRP Composite Pipe & Duct**

Corrosion Barrier..... 10 to 20 mil veil reinforced  
Corrosion Liner..... 125 mil chopped strand fiberglass reinforced  
Resin (Barrier/Liner).... High-temp & high-performance vinylester  
Structural Wall..... Filament wound overwrap  
Resin (FW Overwrap)..... Premium grade high-impact vinylester

**Elastic and Strength Properties of Glass Filament Reinforced Wall**

**Hoop Tensile: (Based on loading of pipe hydrostatically)**

Ultimate (porosity)..... 20,000 psi  
Yield..... 12,800 psi  
Allowable..... 6,700 psi  
Modulus of Elasticity..... 3,600,000 psi

**Tensile: (Based on loading of pipe as a tension member)**

Ultimate (rupture)..... 12,200 psi  
Yield..... 5,000 psi  
Allowable..... 3,300 psi  
Modulus of Elasticity..... 1,800,000 psi

**Flexural: (Based on loading of pipe as a beam)**

Ultimate (rupture)..... 15,700 psi  
Yield..... 6,100 psi  
Allowable..... 4,000 psi  
Modulus of Elasticity..... 1,700,000 psi

**Torsion: (Based on loading of pipe as a shaft in torsion)**

Ultimate (rupture)..... 16,200 psi  
Allowable Shear..... 5,500 psi  
Shear Modulus..... 750,000 psi

**Compression: (Based on loading of pipe as a "short" column)**

Ultimate (rupture)..... 11,200 psi  
Yield..... 7,000 psi  
Allowable..... 3,700 psi  
Modulus of Elasticity..... 1,400,000 psi

**Thermal Properties:**

Coefficient of Thermal Expansion..... 0.0000085 in./in./deg. F  
Thermal Conductivity..... 2.3 BTU/hr./sq. ft./deg. F/in. thick.