



# *Industrial Fiberglass Specialties, Inc.*

521 Kiser Street

Dayton, Ohio 45404-1641

Telephone (937) 222-9000 - Fax (937) 222 9020

## **Series 9900 Filament Wound FRP Composite Fire Retardant Pipe, Duct, & Fittings**

**For corrosive industrial service, where both excellent  
corrosion resistance and fire retardancy are important.**

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### **Uses and Applications:**

Corrosion resistant fume and odor control duct  
Chemical process piping  
Acid and floor collection drains  
Severe service chemical applications  
Organic chemicals  
Process plant piping  
Oxidizing chemicals and acids  
Phos-Acid based process streams  
Excellent physical properties to 200° F+.  
Piping for handling combinations of certain solvents, acids & bases  
An alternative to costly alloys and specialty metals  
General industrial service for corrosive liquids and fumes

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### **Description: Composition:**

Filament wound fiberglass reinforced epoxy vinylester composite pipe and duct. ASTM D-2996, Classification Type 1, Grade 2, Class E. Nominal 10 to 20 mil C-Veil and/or Nexus reinforced corrosion barrier, followed by a nominal 86 mil corrosion liner reinforced with fiberglass chopped strand reinforcements, followed by a fiberglass filament wound structural laminate. The exterior of the pipe and duct will be post-coated after fabrication with a UV resistant polymer coating. A premium-grade fire-retardant vinylester resin (Dow Chemical's Derakane 510-C, Ashland Chemical's Hetron 992, Reichhold Chemical's Dion 9300, or equal), is used for the corrosion barrier/liner. The same premium-grade fire-retardant vinylester resin, pigmented gray for UV inhibition, is used for the filament wound structural laminate. Antimony trioxide is added, as required, to the resin to achieve an ASTM E-84 Class I flame spread rating of 25, or less.

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### **Pipe & Duct Sizes: Pipe & Duct Lengths:**

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

3/8" and 1/2" diameter pipe & duct are built in 5 ft. lengths

3/4" & 7/8" diameter pipe & duct are built in 7 ft. lengths

1" thru 1-1/2" diameter pipe & duct is built in 10 ft. lengths.

2" thru 24" diameter pipe & duct is available in 20 ft. lengths

8" thru 168" diameter pipe & 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 9900 pipe and duct 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 9900 filament  
wound FRP composite pipe and duct. These are conservative  
properties that can be used for the design of filament wound 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 and duct to provide you the lowest cost for supported span installed pipe or duct. Since we are not limited to just a few pipe and duct wall thicknesses and filament winding angles - we can select and choose the combination of pipe and duct 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

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 84" 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 9900 Fire-Retardant Filament Wound FRP Pipe & Duct**

Corrosion Barrier..... 10 to 20 mil veil reinforced  
Corrosion Liner..... 86 mil fiberglass chopped strand reinforcement  
Resin (barrier/Liner..... Fire-retardant vinylester resin  
Structural Wall..... Filament wound laminate  
Resin (FW Overwrap)..... Fire-retardant vinylester resin

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

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

Ultimate (porosity)..... 20,400 psi  
Yield..... 9,300 psi  
Allowable..... 6,800 psi  
Modulus of Elasticity..... 3,300,000 psi

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

Ultimate (rupture)..... 12,400 psi  
Yield..... 5,000 psi  
Allowable..... 3,400 psi  
Modulus of Elasticity..... 1,700,000 psi

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

Ultimate (rupture)..... 13,300 psi  
Yield..... 4,000 psi  
Allowable..... 2,700 psi  
Modulus of Elasticity..... 1,200,000 psi

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

Ultimate (rupture)..... 16,500 psi  
Allowable Shear..... 5,600 psi  
Shear Modulus..... 680,000 psi

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

Ultimate (rupture)..... 9,500 psi  
Yield..... 6,000 psi  
Allowable..... 3,200 psi  
Modulus of Elasticity..... 1,200,000 psi

**Thermal Properties:**

Coefficient of Thermal Expansion..... 0.0000088 in./in./deg. F  
Thermal Conductivity..... 2.3 BTU/hr./sq. ft./deg. F/in. thick.