



# *Industrial Fiberglass Specialties, Inc.*

521 Kiser Street

Dayton, Ohio 45404-1641

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

## **Series 1500-20 Filament Wound FRP Composite Pipe, Duct, and Fittings**

**For corrosive and general industrial service**

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### **Uses and Applications:**

Power plant penstocks  
Waste water and sewage systems  
Fume and odor control ducting for water & waste treatment plants  
HVAC ventilation above and below ground ducting  
Cooling water piping  
Process and chemical plant piping  
Down well casing pipe  
Roof and floor drains  
Water treatment piping  
Sewer lines and sewer force mains  
Brine and brackish water  
General industrial service for mildly corrosive liquids & gases

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### **Description: Composition:**

Filament-wound fiberglass reinforced vinylester and/or polyester composite pipe. ASTM D-2996 Classification Type I, Grade 2, Class E.

Pipe and fittings will have a minimum 20 mil inner corrosion barrier/liner, reinforced with glass or Nexus veil; followed by a fiberglass filament wound structural pipe wall laminate.

A premium grade epoxy vinylester resin (Reichhold Chemical's Dion 9100, or equal) is used for the inner corrosion barrier/liner.

A premium grade vinyl-polyester or isophthalic polyester resin (Reichhold's Dion 7100, or equal), pigmented light grey for UV inhibition, is used for the filament wound structural overwrap laminate of the pipe.

Operating temperatures up to 225<sup>o</sup> F, depending upon specific service environment and resin formulation.

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

137+ different diameters, ranging from a teeny 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.

1/2" & 3/8" 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" thru 1-1/2" diameter pipe and duct is built in 10 ft. lengths.

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

8" thru 144" diameter pipe 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 500 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.

Fire-retardant pipe and duct systems available. ASTM E-84 flame spreads under 25.

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 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.

Plain ends for butt and strap welding.

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

Flanges, all sizes through 84" diameter Including the superior filament wound socket flanges for sizes through 1/2" diameter through 36" 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.

Speed-Seal O-Ring true unions

Repair (maintenance) couplings.

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

See Table 1 for typical physical properties of Series 1500-20 filament wound FRP composite pipe and duct. These are conservative properties that can be used for the design of filament wound 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

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. 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 "Reinforced Fiberglass Pipe Fittings & Accessories" for sizes, dimensions and tolerances. Fittings are available from 1/2" 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 1500-20 Filament Wound FRP Composite Pipe & Duct**

Inner Corrosion Barrier/Liner..... 20 mil veil reinforced  
Resin (Barrier/Liner)..... Premium grade epoxy vinyl ester  
Structural Wall..... Filament wound overwrap  
Resin (FW Overwrap)..... Premium grade vinyl polyester

**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.