



# *Industrial Fiberglass Specialties, Inc.*

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

## **Series 5000 Filament Wound FRP Composite Pipe and Fittings**

**For severely corrosive industrial service**

---

### **Uses and applications:**

Chemical process piping  
Organic chemicals  
Acid drains  
Corrosive and abrasive slurries  
Waste water and sewage systems  
Process plant piping  
Bleach Processing  
Chlorine and chlorinated water  
Food processing plant piping  
Water treatment piping  
Brine and brackish water  
Potable water  
Piping systems for oxidizing chemicals and acids  
Piping systems for alkalies and non-oxidizing acids  
Industrial service for severely corrosive liquids

---

### **Description:**

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

### **Composition:**

Nominal 10 to 20 mil glass veil and/or Nexus reinforced inner corrosion barrier, followed by a nominal 43 to 50 mil corrosion liner reinforced with fiberglass chopped strand reinforcement, followed by a fiberglass filament wound structural overwrap.

A premium grade vinylester resin, (Hetron 922, Derakane 411, Reichhold 9100, or equal; at our option), pigmented dark grey for UV inhibition, is used in the corrosion liner/barrier and for the filament wound structural overwrap portion of the laminate.

Operating temperatures up to 225° F.

---

### **Pipe Sizes:**

137+ different diameters, ranging from a teeny 3/8" dia. up to a mammoth 168" dia. 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. A current list of pipe sizes is available upon request. New sizes are being added regularly.

### **Pipe Lengths:**

1/2" dia. pipe and smaller is built in 5 ft. lengths.

3/4" & 7/8" dia. pipe is built in 7 ft. lengths.

1" through 1-1/2" dia. pipe is built in 10 ft. lengths.

2" through 6" dia. pipe is available in 20 ft. lengths.

6" dia through 168" dia. pipe is available in 40 ft. lengths. For selected pipe sizes 60 foot lengths are available. Longer lengths mean fewer field joints.

---

**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.

The resins used in Series 5000 pipe meet the requirements of F.D.A. regulations 21-CFR-175.105 and 21CFR 177.2420.

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

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

---

**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" dia. Other thread configurations available upon special order.

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

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

Mechanical Couplings, including Victaulic and Taylor-Kerr.

Expansion Joints, including triple O-Ring style for fly ash lines

Speed-Seal O-Ring true unions

Repair (maintenance) couplings.

---

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

See Table 1 for typical physical properties of Series 5000 FW FRP Pipe. These are conservative properties that can be used for the design of FW pipe for pressure, vacuum, supported span and burial conditions. Contact Industrial Fiberglass Specialties, Inc. for recommendations on the appropriate design formulas to be used for FRP composite pipe.

---

**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).

---

**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.

---

**Fittings:**

Elbows, standard are 22-1/2<sup>o</sup>, 30<sup>o</sup>, 45<sup>o</sup>, and 90<sup>o</sup>. Any angle elbow available on special order. Elbows through 48" dia. 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<sup>o</sup> 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. 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 Specialties' catalog for sizes, dimensions and tolerances. Fittings are available from 1/2" dia. through 84" dia. We welcome the opportunity to work with our customers on special fittings.

Table 1

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

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

**Properties of Series 5000 Pipe**

Corrosion Barrier....., 10 mil C-Veil and/or Nexus Reinforced  
Corrosion Liner..... 43 mil Fiberglass Chopped Strand Mat  
Resin (Liner)..... Premium Grade Vinylester Resin  
Structural Wall..... Filament Wound Overwrap  
Resin (FW Overwrap)..... Premium Grade 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.