



Industrial Fiberglass Specialties, Inc.

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

Series 2000-M Filament Wound FRP Composite Pipe, Duct, and Fittings

For general industrial service

Uses and Applications:

Waste water and sewage systems
Hot water lines
Ventilation ducting and lines
Cooling water piping
Process plant piping
Steam condensate lines
Deionized water systems
Food processing plant piping
Air and fume ducting
Roof and floor drains
Plant piping
Water treatment piping
Sewer lines and sewer force mains
Brine and brackish water
Piping systems for alkalis and non-oxidizing acids
General industrial service for moderately corrosive liquids

Description: Composition:

Filament-wound fiberglass reinforced epoxy composite pipe.
ASTM D-2996 Classification Type I, Grade 1, Class F.
Nominal 20 mil glass veil and/or Nexus reinforced corrosion liner,
followed by a fiberglass filament wound structural pipe wall
laminate.
A premium-grade heat-cured amine-reacted epoxy resin, pigmented
black for UV inhibition, is used throughout all laminates.
Operating temperatures up to 250° F.

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. 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" 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 84" diameter pipe and duct is available in 40 ft. lengths.

Performance:

Good corrosion resistance over a wide temperature range. Temperatures from sub-zero to 250°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 2000-M pipe meet the requirements of F.D.A. regulations 21-CFR-175.300.

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 Specialties, or the resin manufacturer, for specific 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" 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.

Physical Properties:

See Table 1 for typical physical properties of Series 2000-M filament wound FRP composite pipe. These are conservative properties that can be used for the design of FRP pipe for pressure, vacuum, supported span and burial conditions. Contact

Mechanical Properties:

Industrial Fiberglass 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°, 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 2000-M Filament Wound FRP Composite Pipe & Duct

Corrosion Liner..... 20 mil C-veil and/or Nexus reinforced Resin (Liner)..... Premium grade heat cured epoxy Structural Wall..... Filament wound overwrap Resin (FW Overwrap)..... Premium grade heat cured epoxy

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 and Electrical Properties:

Coefficient of Thermal Expansion..... 0.0000085 in./in./deg. F
Thermal Conductivity..... 2.3 BTU/hr./sq. ft./deg. F/in. thick.
Dielectric Constant for Resin (ASTM 150 Average)..... 3.50
Dissipation Factor..... 0.003 to 0.012