



Industrial Fiberglass Specialties, Inc.

521 Kiser Street

Dayton, Ohio 45404-1641

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

Series 11000 Contact Molded FRP Composite Pipe, Duct, and Fittings

**For corrosive industrial and environmental service.
Including dual containment clamshell fittings**

Uses and Applications:

Corrosion resistant fume duct and stacks
Chemical process piping
Acid Drains
Dual containment pipe and fittings, including clamshell fittings
Floor collection drains
Organic chemicals
Process plant piping
Oxidizing chemicals and acids
Excellent physical properties to 230° F.
An alternative to costly alloys and specialty metals
General industrial service for corrosive liquids and gases

Description: Composition:

Contact molded fiberglass reinforced vinyl polyester composite pipe and duct. NBS PS-15-69 Classification Nominal 10 mil C-Veil and/or Nexus reinforced inner corrosion barrier, followed by a nominal 86 mil corrosion liner reinforced with fiberglass chopped strand reinforcement, followed by a structural laminate reinforced with fiberglass woven roving and/or fiberglass chopped strand reinforcement. The exterior of the pipe, duct, and clamshell fittings will be post-coated, after fabrication, with a UV resistant polymer coating.

A premium grade vinyl, isophthalic, or terephthalic polyester resin (Reichhold Chemical's Dion 7100, or equal), is used for the corrosion barrier/liner. The same premium grade polyester resin, pigmented light gray for UV inhibition, is used for the pipe and duct structural wall laminate, and for the clamshell fittings.

Pipe and Duct Sizes:

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.

Pipe and Duct Lengths:

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 available in 10 ft. lengths.
2" thru 24" diameter pipe and duct is available in 20 ft. lengths.
8" thru 144" diameter pipe and duct is available in 40 ft. lengths.

Performance: Good corrosion resistance over a wide temperature range. Temperatures from sub-zero to 230°F.

Advantages: Working pressures from NBS-PS-15-69 duct to 150 psi+, depending upon size and wall thickness.

Vacuum to -14.7 psig for all sizes, by selection of wall thicknesses and/or stiffening ribs.

Available for earth burial, all depths, with selection of wall thicknesses, ribs and glass content.

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

Series 11000 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 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" diameter. Other thread configurations available upon special order.

Flanges, including superior filament wound construction, available in 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.

Physical Properties: See Table 1 for typical physical, and thermal properties of Series 11000 contact molded FRP composite 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.

Mechanical Properties:

Burial Installations:

As a custom manufacturer of pipe and fittings, we can design and build pipe and duct 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 and duct to provide you the lowest cost for supported span installations. Since we are not limited to just a few pipe wall thicknesses and laminate constructions - we can select and choose the combination of pipe and duct design, and support designs, that will provide your "best buy" costs. Consult with our engineers for help with your specific requirements.

**Fittings:
Including
Clamshell
Fittings:**

Elbows, standard are 22-1/2^o, 30^o, 45^o, and 90^o. 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

Round to Rectangular Transitions

P-Traps and 180^o 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 and 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 11000 Contact Molded FRP Composite Pipe & Duct
Including Dual Containment Clamshell Couplings and Fittings**

Corrosion Barrier..... 10 to 20 mil veil reinforced
Corrosion Liner..... 86 mil fiberglass chopped strand mat
Resin (barrier/Liner)..... Premium grade polyester resin
Structural Wall..... Alternating glass mat & woven roving
Resin (FW Overwrap)..... Premium grade polyester resin

**Laminate Elastic and Strength Properties
Per ASTM D3299 (40% glass content)**

Flexural Strength 31,700 psi
Flexural Modulus 1,530,000 psi
Tensile Strength 26,600 psi
Tensile Modulus 2,160,000 psi
Tensile Elongation 1.9%

**Thermal, Fire, and Smoke Properties
For Typical Contact Molded Laminates**

Thermal Conductivity - 1.5 BTU/hr./sq. ft./deg. F/in. thick.
Coefficient of Thermal Expansion 0.0000219/in/in/deg. C
Flame Spread Value (ASTM E-84) greater than 350
Smoke Generation Value (ASTM E-84) >750
Autoignition Temperature approx 800 deg. F.

Typical Clear Casting Properties

Tensile Elongation (at break) greater than 4.0%
Barcol Hardness 35 to 40
Heat Distortion Temperature (HDT) 230 deg. F
Specific Gravity 1.26
Volumetric Shrinkage 7.7%
Average Dielectric Constant (ASTM D150) 3.39
Electrical Dissipation Factor (ASTM D150) 0.011