

**PRODUCT DATA SHEET**

**LEED® info**  
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**Trade Name**

Formglas® FRP

**Common Name**

Fiberglass Reinforced Plastic | FRP  
Glass Fiber Reinforced Plastic | GFRP

**Manufacturer**

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**Summary**

Formglas FRP is a plastic composite that is lightweight, high strength, corrosion resistant, and durable. This fiberglass composite has a Class 1 (or A) fire rating making it suitable for use in a broad range of architectural applications. It can be produced in virtually any shape and with smooth, textured or patterned surfaces providing architects with abundant design flexibility. Formglas FRP is commonly supplied unfinished for on-site painting, but can be supplied pre-finished with paint or integral cast in color, depending on the application.

**Detailed Description**

Formglas FRP is a glass fiber reinforced plastic used to make architectural elements. It is a catalyzed thermoset plastic composite that is durable, chemical resistant and has excellent weathering, flexural and tensile physical properties. This makes it a versatile material that provides cost effective solutions for the construction of buildings, particularly with respect to exterior applications. It is also a lightweight material, weighing approximately 2 lb/ft<sup>2</sup> [10 kg/m<sup>2</sup>] which reduces transportation, handling and installation costs.



Contoured Sign Backdrop Bayview Village Mall, Toronto

The standard FRP surface consists of a UV stabilized Isophthalic neopentylglycol (NPG) polyester gelcoat which is provided in a white color for field finishing. The back-up laminate consists of layers of glass fiber and polyester resin. The Formglas FRP composite material has a Class 1 (or A) fire rating. When FRP is molded into shapes, the geometry of the shape imparts physical properties to the parts, such as strength and stiffness. For example, the design profiles of FRP parts that include recesses, projections, grooves, curves or ornamentation, become stronger. The nominal shell thickness of parts is 3/16". However, areas of parts that have flat regions are cast thicker by encapsulating core materials into the laminate that provide added strength and stiffness.

FRP offers some unique advantages for Architects and Designers in providing the capability to make large parts in any shape and size that would otherwise require more costly support structures and increased installation costs (as compared to other materials such as precast concrete). The boat building industry has taken this to extremes where single piece boat hulls have been fabricated in excess of 150' in length (over 45m). But it is of course more practical in most building applications to utilize much more modest sized components in consideration of

the initial mold costs, shipping, handling, and installation methods to optimize project costs.

In most cases, FRP molded parts are secured to the building structural framing and substrate with concealed fasteners. Joints between parts should be minimized and advantageously positioned in consideration of part size and design, overall appearance, and installation. FRP parts are typically supplied with pre-made corners to minimize field mitering.

Some typical architectural applications of FRP include facade panels, columns, cornices, pediments, storefront entries, cupolas and other decorative elements such as friezes and signage. FRP is also used in interior or exterior applications, where a high impact resistant and lightweight material is desired. Molded FRP products can replicate many common materials such as slate, cast iron, and wood grained surfaces to name just a few.

Most items are custom made to project design requirements and specifications. Formglas uses 5-axis CNC technology to machine precision patterns from which molds are produced to make the required parts. In situations involving complicated design elements or projects, Formglas will work with Architects and Designers to create a practical plan for the parts and assemblies they envision through 3D modeling and/or scaled or full size mock-ups. Detailed shop drawings and material samples are prepared for approval prior to manufacture.

## Technical Data

### APPLICABLE STANDARDS

#### ASTM International (ASTM)

- E84 Standard Test Method for Surface Burning Characteristics of Building Materials
- D790 Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics
- D638 - Standard Test Method for Tensile Properties of Plastics
- D256 - Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics
- D2583 - Standard Test Method for Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor

- D648 Standard Test Method for Deflection Temperature of Plastics Under Flexural Load in the Edgewise Position
- D696 - Standard Test Method for Coefficient of Linear Thermal Expansion of Plastics
- D570 - Standard Test Method for Water Absorption of Plastics
- D4060 - Standard Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser

## Physical and Mechanical Properties

FRP is a fiberglass reinforced polyester resin plastic composite with a nominal thickness of 3/16". It has 25 to 30% glass fiber content (by weight) in the form of multiple layers of chopped strand mat.

Matrix:	ISO/PNG Polyester Resin
Color:	White, ready for field paint standard. Custom colored gel coat matching available
Texture:	Smooth is standard. Molded textures available
Density:	110 lbs/ft <sup>3</sup> [1760 kg/m <sup>3</sup> ]
Weight:	1.75-2.25 lbs/ft <sup>2</sup> [8.5-11 kg/m <sup>2</sup> ]*
Shell thickness:	3/16" [4.5 mm] nominal
Embedments:	Core mat or other reinforcement as profile, shape or design requires
Glass Fiber:	25-30% typical
Reveals/setbacks:	3° draft minimum
All outside corners	1/16"-1/8" [1.5-3mm] radius
Max. length moldings	16' [4.8m]
Max. size molded panels	70 ft <sup>2</sup> [6.5m <sup>2</sup> ]

\* Typical weights – parts with deep surface relief, etc. may weigh more. Submit drawings for a more accurate estimate

## ASTM and ISO TEST RESULTS

Flame Spread:	≤25 (Class A)
Smoke Development:	≤450 (Class A)
Flexural Strength:	32,000 psi [221 Mpa]
Tensile Strength:	15,000 psi [110 Mpa]
Modulus of Elasticity:	1,080,000 PSI (10.5 Gpa)
Impact Resistance:	12 ft-lb/in [643 J/m]
Barcol Hardness:	44
Heat Deflection:	> 513°F [285°C]
Coefficient of Linear Thermal Expansion:	2.73 x 10 <sup>-5</sup> in/in/°F [1.5 x 10 <sup>-6</sup> in/in/°C]
Water Absorption:	0.3%
Abrasion Resistance:	85 mg
Nail push-through:	1050 lb force [4,670 N]

**Tolerances**

Dimensional (all directions):	± 1/8", 0-10ft. [3mm in 3m]
Thickness:	± 1/8". [3mm]
Variation from square:	± 1/8", 0-10ft. [3mm in 3m]
Bowing, out of plane	± 1/8"/ft. [3mm/300mm]

**LEED Information**

To ensure that a Class 1 fire rating is maintained, only pure resins are used. Accordingly, Formglas FRP parts do not contain recycled materials. However, other LEED credits may be available. Please visit the [LEED® link](#) on the formglas.com website.

**Delivery, Storage and Handling**

FRP parts shall be transported and handled in a manner that avoids excessive stresses or damage. Packaging or components showing signs of damage should be marked as such on freight documents, inspected immediately and claimed for any damage due to shipping with the freight carrier. Advise the carrier and Formglas of any damage immediately. Place non-staining resilient spacers between parts and support parts during shipment and subsequent unloading and storage. Protect parts from dirt and damage during handling, transport and storage. Store unpackaged parts indoors on firm, level and smooth surfaces with part identification labels clearly visible.

**Preparatory Work**

Site Conditions: The site conditions are to be reviewed for compliance with Formglas' requirements relating to installation tolerances and any other conditions that may affect the installation and performance of FRP parts. Any unsatisfactory conditions are to be corrected prior to installation. Field measurements are to be taken to verify the dimensions, including those not shown on the drawings, and provide specific details of any changes for inclusion into the manufacturer's shop drawings prior to Formglas commencing the manufacture of FRP parts. Formglas will produce parts in accordance to the approved shop drawings only, and is NOT responsible for any deviations between the site conditions and the approved drawings. It is the Installing contractor's responsibility to order the

correct quantities of parts including a waste allowance, if applicable.

Substrates: The framing and/or substrates to accept FRP parts shall be surfaced with suitable materials (e.g. plywood) and weather barrier as applicable and installed straight and true within 1/8" in 8 linear ft. (3mm in 2500mm). The substrate shall be free of obstructions and interference that prevents the correct positioning and attachment of the FRP parts. Structural framing and substrate materials shall be of the proper size and design for the intended use and shall be sufficient to properly support the installed FRP parts.

**Installation**

General: Install FRP parts as indicated on the approved shop drawings, instructions and the contract documents. The installing contractor is to supply and install all brackets, shims, other hardware and adhesives as required for the installation and proper alignment of the FRP parts with adjacent parts and materials. Part thicknesses may vary. Allow for shim spaces between the FRP and the substrate. Attach the FRP parts using corrosion resistant screws, bolts or other fasteners as shown on the shop drawings. Additional bracing, fastening points etc. not shown on the drawings, may be required to ensure a proper installation.

Cutting: When cutting parts is required, use the most suitable cutting method listed below. Always wear goggles and a respirator (or dust mask).

- A reciprocating type saw with a medium grit composite type blade.
- A mini grinder with 4" (100mm) medium grit composite blade or diamond blade.
- A chop saw with a diamond blade for smaller moldings etc.

Attachment: Wherever possible, FRP parts are to be installed with concealed fastening methods such as beneath flashings or behind caulked joints. Parts should have pre-drilled oversize clearance holes for fasteners and neoprene shims (or equivalent) installed behind the panel edges being fastened to facilitate movement due to expansion and contraction. A bond breaker tape should be applied inside the joint

over the top of the fasteners prior to caulking the joint. When face fastening is required, pre-drill and counter-bore the parts to accept a #8 or #10 self-tapping screw with the length and thread style to suit the condition. Stainless steel fasteners are recommended. Screw holes (other than those at overlap joints) should be filled with a color matching gelcoat putty (supplied by Formglas) and sanded or polished to match the factory finish. A gelcoat top coat may be required to achieve a high gloss finish.

Monolithic joints used to make two or more parts appear as one continuous piece are generally NOT recommended except for specific applications as detailed on the drawings. One exception is for columns that can be installed securely and have been fabricated with overlapping parts with tapered joints that allow for the application of a fiber filled polyester patching compound. Mating parts are bonded together with polyester adhesive (supplied by Formglas) and countersunk fasteners.

#### Joint Treatments:

- All joints must be caulked
- Formglas does not supply caulk for joints but can recommend a type and specific brand for use with FRP.
- A paintable, one-compound elastomeric low modulus urethane sealant is recommended. (e.g. Sonolastic Ultra or equivalent)
- Use spacers to maintain a uniform gap between parts and install a bond breaker tape inside the joint over top of the fasteners.
- Apply low tack masking tape on either side of the joint and avoid smearing caulk beyond the joint - remove any excess immediately.
- Do NOT attempt a monolithic look - joints can not be hidden.

#### Hole Filling and Patching:

- Hole Filling: Sand only the immediate area to be patched. Clean the surface with acetone or methylene chloride. Mix only as much gelcoat putty as can be applied in 15-20 minutes.
- Apply the gelcoat putty to the hole or void. Overfill the hole above the surface as it will shrink

nominally as it cures. Allow 3-4 hours to cure before sanding.

- Wet sand the putty until the desired surface contour and finished is achieved. Start with sanding grit #180 and progress with #240; #320; #400; #600; and #1200. Polish with a polishing compound if a high gloss finish is required. Caution: Be careful not to sand through the surrounding gelcoat finish as this would necessitate a gelcoat Resurfacing Repair.
- Prior to curing, gelcoat putty can be removed using acetone or methylene chloride.

**Always use Gelcoat putty sparingly  
Avoid smearing it beyond the holes  
Always remove excess putty immediately**

**For more details, refer to the installation instructions and project drawings.**

#### Cleaning and Maintenance

- Clean soiled FRP surfaces with water and household liquid dishwasher detergent.
- Stubborn stains, minor burns or scratches can be removed by careful, localized wet sanding to remove the stain and renewing the Gelcoat finish with polishing. Start wet sanding with #240 grit and progressing with finer grits: #320; #400; #600; #1200 and then polish with a polishing compound.

#### Applications

To view photos of Formglas® FRP applications, or to contact a local Formglas representative, visit [www.formglas.com](http://www.formglas.com)



Cantilevered Cornice

Bank Branch, Alberta



Columns and Capitals

Hilton Hotels, Hawaii



Window Mullions

Toronto Police Division 11, Toronto



Wood Grain Slats, Profiled Sign Frame

Bank Branch, Alberta

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## Samples Available

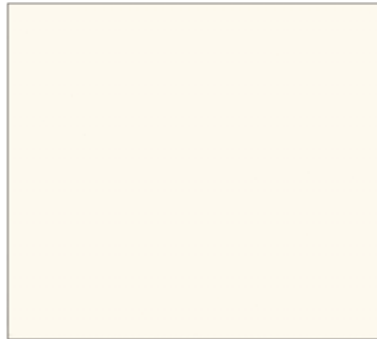
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Below are three samples Formglas offers to demonstrate FRP in a few colors and textures. We maintain an inventory of these, and samples can be requested by e-mail to either your local Formglas representative, or directly to [samples@formglas.com](mailto:samples@formglas.com).

Formglas is able to supply parts with a custom color matched factory gel coat eliminating the need to paint (thereby lowering maintenance costs) in field. Custom textures and patterns are also available. Please contact your local sales representative to learn more or discuss custom requirements for a specific project.

**Formglas FRP**

Color: White Gel Coat, Paint Ready  
Texture: Smooth  
Sample Size: 6" x 6"  
Sample Code: FP0606 FRP White



**Formglas FRP**

Color: Grey Gel Coat, Paint Ready  
Texture: Smooth  
Sample Size: 6" x 6"  
Sample Code: FP0606 FRP Grey



**Formglas FRP**

Color: Brown Gel Coat, Finish Coat  
Texture: Mahogany Grain  
Sample Size: 6" x 6"  
Sample Code: FP0606 FRP Brown

