

PRODUCT DATA SHEET

LEED® info
Page 2

Trade Name

Formglas® GFRC-L

Common Name

Glass Fiber Reinforced Concrete | GFRC

Manufacturer

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Storefront Facade Brooks Brothers Glendale, CA

Summary

Formglas GFRC-L is a composite material made using Portland cement, sand, aggregate and glass fiber that has good flexural strength properties. Parts are factory molded in a hand lay-up process to make architectural elements in a variety of shapes, surface patterns, textures and choice of color. After demolding, the exposed face of the parts is finely sandblasted to impart a uniform surface finish. Formglas GFRC-L parts have a nominal shell thickness of 5/8" [19mm] with perimeter edges increased to a minimum thickness of 1" [25mm] to provide added strength. GFRC-L does not incorporate a factory attached steel panel frame for support commonly used with larger GFRC panels. Formglas GFRC-L is used for applications where smaller panel and part sizes can be utilized and generally offers appreciable cost advantages compared to conventional GFRC, or natural stone.

Detailed Description

Glass Fiber Reinforced Concrete (GFRC) is a designation used to refer to a broad category of cementitious products manufactured using Portland cement, silica sand, aggregate, alkali resistant glass fiber and admixtures in different proportions to meet

different performance and aesthetic requirements. In architectural applications, GFRC is most commonly associated with the large decorative panels used on building facades and cladding. These large heavy panels require a structural steel panel frame to be bonded to the inside of the molded GFRC composite material for support, which is also used to attach the GFRC panel to the building structure. Cranes are typically used in the installation of these GFRC parts.

Formglas® GFRC-L however is used in applications where the attributes of a molded GFRC product are desired for use on smaller panels and parts that do NOT require a steel panel frame support system. In these applications, GFRC-L is lighter, quicker and easier to install and more cost effective than conventional GFRC. Typically, the maximum GFRC-L panel size is 3' x 4' [900mm x 1200mm] weighing approximately 7 lbs/ft² [34 kg/m²]. The cross sectional profile of a part can add strength in and of itself. This can marginally increase the overall part dimensions that can be made. For example, parts with curved or stepped profiles are stronger than parts with flat profiles and parts totaling 15 sq ft surface area can be made. Overall part weight (maximum 100 lbs) is used as a limiting factor to

maintain ease of handling and installation. GFRC-L uses white cement and color pigments to provide uniform color consistency throughout the material thickness – not just the face mix. Some variation in color between parts will occur consistent with that of natural stone.

Some typical architectural applications of GFRC-L include low-rise exterior facade veneer panels and decorative elements such as cornices; pediments, window and door frames; columns; friezes; and interior elements where a hard non-combustible impact resistant material is desired.

Most molded parts are secured to the building structural framing and substrate with concealed fasteners. Parts are supplied with pre-made corners to minimize field cutting. 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 complex design elements or projects, Formglas will work with Architects and Designers to develop 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. Formglas has provided GFRC-L parts for numerous world class architectural buildings around the globe.

Technical Data

APPLICABLE STANDARDS

ASTM International (ASTM)

- E84 Standard Test Method for Surface Burning Characteristics of Building Materials
- C947 Standard Test Method for Flexural Properties of Thin-Section Glass Fiber Reinforced Concrete
- C944 Standard Test Method for Abrasion Resistance of Concrete or Mortar Surfaces
- C140 Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units
- C518 Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus

Physical and Mechanical Properties

GFRC-L is a single skin GFRC composite panel made with white Portland cement, silica sand, aggregate, and alkali resistant glass fiber with a high Zirconia content – minimum 16%. The composite consists of a 1/8" face mix without glass fiber, and 1/2" backing mix with the glass fiber interspersed throughout it.

Matrix:	Portland cement, sand, and polymer
Color:	Seattle Sand, Boise Buff Custom color matching available
Texture:	Lightly sandblasted
Density:	134 lbs/ft. ³ [2145 kg/m ³]
Weight:	6.5-7.5 lbs/ft. ² [32-37 kg/m ²]*
Shell thickness:	5/8" [16 mm] nominal
Edge thickness:	1" [25mm] minimum
Glass Fiber:	4% minimum
Max. length moldings	4' [1.2m]
Max. size veneer panels	48" x 36" [1200 x 900mm]
Max. size molded panels	15 ft ² [1.4m ²]

*Typical weights – parts with deep surface relief etc. may have higher weights – submit drawings for a more accurate estimate

ASTM and ISO TEST RESULTS

Flame Spread:	0
Smoke Development:	0
Flexural Strength:	1860 psi [12.8 Mpa]
Tensile Strength:	1260 psi [8.7 Mpa]
Compressive Strength:	4000 psi [27.6 Mpa]
Coefficient of Linear Thermal Expansion:	7.6 x 10 ⁻⁶ in/in/°F [13.6 x 10 ⁻⁶ mm/mm/°C]
Hardness (Abrasion):	0.37%
Thermal Conductivity	4.3 Btu·in/h·ft ² ·°F [0.62 W/m·K]

Tolerances

Dimensional (all directions):	± 3/16" [5mm]
Thickness:	± 1/8" [3mm]
Variation from square:	± 1/8" [3mm]
Bowing, out of plane:	1/8"/ft [3mm / 300mm]

LEED Information

Any parts needing to contribute to LEED MR credits must be indicated as such at the time of ordering – additional costs may apply.

MR Credit 4: Recycled Content

GFRC-L parts can be supplied with a minimum of 5-10% recycled content. The actual amount varies depending on the individual part design and type of reinforcement used. For more information, visit the [LEED® link](#) on the formglas.com website.

Delivery, Storage and Handling

GFRC-L 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 immediately of any damage. Place non-staining resilient spacers between panels and support panels during storage and handling. Protect panels from dirt and damage during handling, transport and storage. Store panels indoors on firm, level and smooth surfaces with part identification labels clearly visible.

Preparatory Work

Site Conditions: Site conditions must be reviewed for compliance with Formglas' requirements, installation tolerances and any other conditions that may affect the installation and performance of GFRC-L 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 GFRC-L 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.

Substrates: The substrates to accept GFRC-L 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 GFRC-L 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 GFRC-L parts.

Installation

General: Install GFRC-L parts as indicated on the approved shop drawings, instructions and the contract documents. The installing contractor is to supply and install all brackets and shims as required for the installation and proper alignment of the GFRC-L parts with adjacent parts and materials. Part thicknesses may vary. Allow for shim spaces between the GFRC-L and the substrate. GFRC-L parts are to be attached to the framing members or substrate 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. If circumstances allow, cut parts outdoors or in a well ventilated area. Always wear goggles and a respirator (or dust mask).

- A miter or table saw with diamond blade for masonry use – dry cut only.
- For small cuts or cut-outs, use a mini grinder with 4" (100mm) diamond blade

Attachment: GFRC-L parts are to be installed with concealed fastening methods. Face fastening will always be visible and should be avoided. Typically, metal mounting plates are factory attached to the backs of panels which extend marginally beyond the part edges into joint spaces where the screws will subsequently be concealed with caulked joints. In some instances where fastening is along a top edge of a panel, flashing materials (installed by others afterward) can conceal fasteners. Use joint spacers to maintain uniform joint spacing as indicated on the drawings. When directed, use a Formglas recommended brand adhesive to prevent bleed-through (e.g. PL400 marketed under Loctite and LePage brand names.)

Joint Treatments:

- Joints must be caulked
- Formglas does not supply caulk for joints but can recommend a brand and color of caulk for use with specific GFRC-L colors.
- Use spacers (min 3/16") to maintain a uniform gap and apply masking tape on each side of the joint.
- Avoid smearing caulk beyond the joint - remove any excess immediately with a damp cloth or flexible scraper.
- Caulk between GFRC-L and different materials.
- Do NOT attempt a monolithic look - joints can not be hidden.

Hole Filling and Patching:

- Patch screw holes and chips carefully with matching GFRC-L patching compound. Take precautions to avoid smearing it beyond the hole. Remove excess patching compound immediately with a flexible plastic scraper and a damp cloth. Follow detailed instructions supplied with the patching compound.

Always use patching compound sparingly

Avoid smearing it beyond the holes

Always remove excess compound immediately

Cleaning and Maintenance

- Clean soiled GFRC-L surfaces with water, using clean, soft fiber brushes and/or sponges. If initial cleaning with water is not sufficient to remove the soiled area, use a mild soap with water and clean soft fiber brushes and/or sponges.
- A power washer could be used to clean large or hard to reach soiled areas, but it should be tested first on a small, inconspicuous area and allowed to dry completely. To prevent damage to the surface (texture), adjust the power washer pressure accordingly. It is suggested that power washing is done during warm and dry weather so that the parts can dry quickly and completely.
- Always take precautions to prevent staining of adjacent materials when cleaning.

Applications

To view photos of Formglas® GFRC-L applications, or to contact a local Formglas representative, visit www.formglas.com



"Wishbone" Column Cladding Joey Restaurant, Toronto
(Photo shows installation in progress)



Moldings and Veneer Panels Burberry, Kansas City
(Photo shows installation in progress)

Samples Available

Below are two color samples Formglas offers as our standard GFRC-L colors and texture. We maintain an inventory of these, and samples can be requested by email to either your local Formglas representative, or directly to samples@formglas.com

Formglas is able to **custom formulate** GFRC-L material to match an array of colors, textures or finishes. Please contact your local sales representative to learn more or discuss custom requirements for a specific project.

Formglas GFRC-L

Color: Seattle Sand

Texture: SB

Sample Size: 8" x 10"

Sample Code: FP0810 SS SB GFRC-L



Formglas GFRC-L

Color: Boise Buff

Texture: SB

Sample Size: 8" x 10"

Sample Code: FP0810 BB SB GFRC-L



Please note that colors shown on your display or printer output may NOT be an accurate representation of the actual product.