Trade Name
Formglas® GFRC-L

Common Name(s)
Glass Fiber Reinforced Concrete | GFRC

Manufacturer
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BRANDED ENTRY PEDIMENT BROOKS BROTHERS, USA

Summary

Formglas GFRC-L is a Class A fire and smoke rated 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, patterns, textures and choices of color; or, are available unfinished for on-site painting. After de-molding, unless specified as paint ready, 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" ⇆ 19 mm with perimeter edges increased to a minimum thickness of 1" ⇆ 25 mm 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' ⇆ 900 mm x 1200 mm 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. Overall part weight (maximum 100 lbs) is used as a limiting factor to maintain ease of handling and installation. GFRC-L uses white Portland cement and color pigments to provide uniform color consistency throughout the material thickness – not just the face mix. As a result of the natural properties of concrete and aggregates, and the touch-up and fine-finishing process post production, minor variation in color and texture within and between parts should be expected.

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 can be supplied with factory molded 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

Refer to the following standards:

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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 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 – min. 16%. The composite consists of a 1/8" face mix without glass fiber, and ½" backing mix with the glass fiber interspersed.

Matrix:	Portland cement, sand, and polymer
Finish:	Six standard colors Custom color matching available
Surface:	Lightly sandblasted or smooth if paint ready
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:	5/8" ⇆ 16 mm minimum
Glass Fiber:	4% minimum
Max. length moldings:	4' ⇆ 1.2 m
Max. size veneer panels:	48" x 36" ⇆ 1200 x 900 mm
Max. size molded parts:	15 ft^2 ⇆ 1.4 m^2

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

** Subject to manufacturing tolerances. Weight and measurement conversions may be rounded.

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/ºF ⇆ 13.6 x 10-6 mm/mm/ºC
Hardness (Abrasion):	0.37%
Thermal Conductivity	4.3 Btu in/h ft² ºF ⇆ 0.62 W/m K

Manufacturing 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®

Any parts needing to contribute to LEED® MR credits must be indicated as such at the time of bid request.

MR Credit 4: Recycled Content

To ensure that physical and aesthetic properties are not compromised, recycled content is not introduced into GFRC-L. However, other LEED® credits may be available. For more information, visit the LEED® information page on the formglas.com website.

Other credits may be available including:

LEED® MR Credit 2.1 and 2.2: Construction Waste Management
LEED® MR Credit 5.1 and 5.2: Regional Materials

Delivery, Storage and Handling

GFRC-L parts shall be transported and handled in a manner that avoids damage or excessive stress. 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. GFRC-L parts shall be protected from rain, snow, sunlight, excessive weather conditions, high levels of humidity, and job site 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 on firm, level and smooth surfaces with part identification labels clearly visible, and ideally protected from harsh conditions around the job site.

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 Formglas shop drawings prior to it commencing the manufacture of custom molds and GFRC-L parts. Formglas will produce parts in accordance with the approved shop drawings

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only, and is NOT responsible for any deviations between the site conditions and the approved drawings.

Substrates:

In the case of flat veneer surface cladding solutions only, the substrates to accept GFRC-L parts shall be surfaced with suitable materials (e.g. exterior-grade plywood) and weather barrier as applicable and installed straight and true within 1/8" in 8 linear ft. ⇆ 3 mm in 2500 mm. This is not required for columns, cornices, trims or other such applications. The substrate shall be free of obstruction 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.

Installer Safety

Installers are to wear appropriate personal protection equipment when handling or installing Formglas materials. This should include eye protection, gloves and dust masks. Please adhere to local regulations and rules established at the job site. Before handling and installing Formglas materials, installers are responsible for reviewing MSDS information which is readily available at www.formglas.com, or included with the crate(s) used to ship Formglas materials, or by calling Formglas at 1.866.635.8030.

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. Always wear goggles and a 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" ⇆ 100 mm 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 face 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 cannot 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

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

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 clean 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.

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Applications

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

PERIMETER BASE — RBC BANK BRANCH, ONTARIO

PATTERNED WALL PANELS — BURBERRY, CALIFORNIA

DECORATIVE V-COLUMNS & BASE PANELS — JOEY RESTAURANT, ONTARIO

VENEER PANELS & TRIM ELEMENTS — BROOKS BROTHERS, ONTARIO

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Samples Available

Below are seven samples Formglas offers as our standard GFRC-L colors and textures. 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.

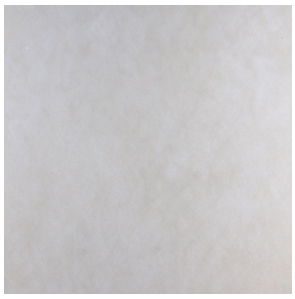
Formglas is able to **custom formulate** GFRC-L material to match an array of colors, textures or finishes, or additionally as a paint-ready finish where components are specified to be field painted.

Please contact your local sales representative to learn more or discuss custom requirements for a specific project.

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

Formglas GFRC-L
Finish: White Sandstone
Surface: Standard
Sample Size: 4" x 5"
Sample Code: 98026

Formglas GFRC-L
Finish: Buff
Surface: Standard
Sample Size: 4" x 5"
Sample Code: 98027

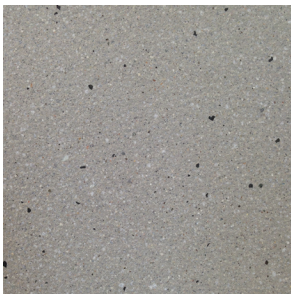


Formglas GFRC-L
Finish: Paint ready
Surface: Standard
Sample Size: 4" x 5"
Sample Code: 98124

Formglas GFRC-L
Finish: Tan
Surface: Standard
Sample Size: 4" x 5"
Sample Code: 98028

Formglas GFRC-L
Finish: Desert Sand
Surface: Standard
Sample Size: 4" x 5"
Sample Code: 98029

Formglas GFRC-L
Finish: Canyon Clay
Surface: Standard
Sample Size: 4" x 5"
Sample Code: 98140



Formglas GFRC-L
Finish: Mountain Grey
Surface: Standard
Sample Size: 4" x 5"
Sample Code: 98143

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