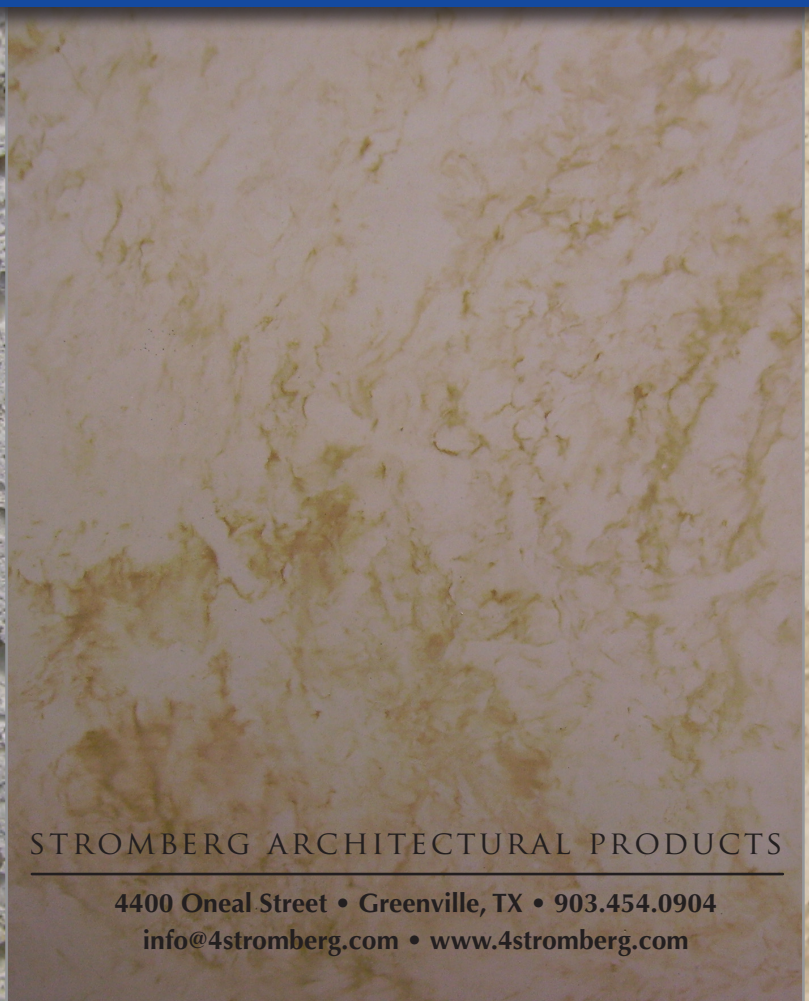
GFRC CLADDING PANELS



STROMBERG ARCHITECTURAL PRODUCTS

4400 Oneal Street • Greenville, TX • 903.454.0904

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Cladding, curtain walls and veneer in GFRC

- **Lightweight**
- **Strong**
- **Beautiful**
- **Durable**

Architectural GFRC panels have been used successfully for over 25 years on a variety of buildings. GFRC cladding offers numerous benefits to the architect, contractor and the owner over other types of cladding or curtain wall.

Benefits Include:

- **Reduced Structural Loads:** Reduce the load on the buildings structure and simplify connections
- **Faster Installation:** Cladding with GFRC panels can often eliminate the need for scaffolding because the panels are lifted by crane and then attached from inside the building.
- **Speed:** Meet fast track schedules by pre-fabricating the wall cladding panels in advance while foundation and structure is being built. This allows the contractor the ability to rapidly complete panel installation even in poor weather conditions.
- **Quality:** Provides a superior product thanks to the factory controlled manufacturing environment and quality process.
- **Quality Installation:** GFRC panels provide a smoother installation since they are pre made. The wall panels cover a larger area and reduce field work. Specific detailing issues can be resolved with the architect and contractor before fabrication work begins.

Panels in production

In order to get the most benefit from GFRC cladding, the advantages should be fully considered at an early stage. In addition to better quality, more efficient construction and reduced load on the buildings structure, GFRC panels allow for greater design freedom than alternative cladding methods.

Design Freedom

GFRC panels offer the architect freedom of design. A wide range of customized colors, textures, shapes and designs are able to be produced.

Since the cladding panels are made to order, the pieces are designed and cast to meet the requirements of individual projects and the designer's vision.

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Stone

Carved Stone

Brick

Coral

Terra Cotta

Panel Finishes and Facings

A wide range of cladding panel colors and textures are available.

GFRC cladding finish options include:

- cast stone or limestone
- smooth concrete
- exposed aggregate
- form liners
- wood grain texture
- terra cotta glazes
- brick or stone
- other textures

Wood Grain

Marble

Stucco

Panels may also include two or more textures and finishes on a single panel. Cast in colors are obtained with selected cements and aggregates or with mineral pigments. Cladding panels may also be painted.

Panel Shapes and Sizes

GFRC is an extremely moldable material and this allows complex shapes to be formed. Freeform curves, complex cornices and intricate details can be incorporated into the panels. Panels can include reveals, window sills, copings, soffits and special shapes.

Panel sizes are usually limited by transportation constraints. By using wide load or low trailers, larger panels can be transported. These can allow 1 story-high panels to be delivered vertically.

Thinner and Lighter Weight Panel Advantages

- The thinner walls with GFRC cladding panels. Can increase usable floor space for a given building "footprint". This can increase revenue.
- The thinner cladding allows more room for insulation for a more efficient building.
- Since they use less material they reduce the environmental impact. According to a government sponsored study, GFRC reduced environmental impact by over 40% when compared to precast concrete panels.
- The lighter GFRC cladding reduces the load on the buildings structure. This can save an enormous amount on foundations, slabs, structural steel and concrete.
- Simplified installation and attachment details with the light weight panels can speed up the cladding erection.
- Reduced transportation costs.

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Quality Logo
At Stromberg, GFRC panels are produced by skilled craftsmen, many who have been with us for decades, using specialized equipment. Laser guided cutting equipment and computer driven robotic carvers combine with our craftsmen's traditional skills to create a quality product. Each stage of production is subject to inspection. These inspections and tests are in accordance with an independently certified quality system. Dimensions, finish and accuracy are checked before delivery.

Sustainability
GFRC panel construction produces less waste than precast panels and uses fewer natural resources. Since the fabrication is done in the factory, less job site waste is produced. And at the end of the long economic life of a GFRC clad building, the GFRC panels may be refurbished for re-use or crushed for recycling. Government studies have shown a significantly reduced impact with GFRC vs. precast concrete or other curtain wall and cladding options.

Functional
GFRC cladding is durable and low maintenance. GFRC offers the owner superior weathering performance and a high level of corrosion resistance.

Wind Resistant
Stromberg GFRC panels can offer a high level of wind resistance and have proven themselves in category 5 hurricanes.

Fire Resistant
GFRC is made from non combustible material and offers a flame spread of 0.

Thermal Insulation
Insulation can be incorporated either as a lining to the internal face of a panel or as a core between two GFRC layers. Joints between GFRC panels are typically filled with silicone sealant.

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Construction
GFRC cladding panels are erected on site by teams trained in safe handling and installation. The lighter weight of the panels makes installation simpler and faster. Often, panel installation can take place without the need for an external scaffolding. With proper planning, the GFRC panels can be started while the foundations are underway and then delivered on a just-in-time basis, allowing large areas of the structure to be quickly enclosed. This can allow interior trades an early start.

Questions?
Contact us we are here to help.

GFRC Cladding Panel Applications

Healthcare
Healthcare facilities benefit from the durability, speed and design freedom that Stromberg GFRC cladding brings to designers, contractors and owners of healthcare facilities.

High-Tech
Fast construction, quality finish and flexibility allow GFRC to be an ideal cladding for high tech offices and facilities.

Hotels/Hospitality
Casinos, hotels and resorts benefit from Stromberg GFRC panels speed, design freedom and durability.

Housing
With a quality, durable and high end appearance, GFRC panels from Stromberg helps developers maximize the value of the development.

Public/Government
Government buildings benefit from the durable, substantial and quality look of Stromberg cladding panels and architectural elements.

Retail
High fashion GFRC cladding lends itself to unique, creative solutions and a custom, unique and high quality appearance.

Stadiums/Sports & Entertainment Venues
Sports and entertainment venues benefit from the speed and flexibility of the GFRC cladding system.

Custom Solutions
GFRC lends itself to a variety of custom solutions including recladding of existing buildings, restoration of historic buildings, parking structure cladding and artwork.

FAQ: GFRC Cladding Panels

What are GFRC panels?
GFRC cladding panels consist of a ½" to 1" thick concrete shell reinforced with glass fibers. The shell is attached to an integral 16 or 18 gauge galvanized steel stud frame. Typically the overall thickness of a panel is 6 ½" (including GFRC, airspace and stud frame). Studs are typically 24" on center. Closer stud spacing and larger studs may be necessary for longer spans. In some applications, tube steel or GFRC ribs may be used instead of the stud frame. Attachment of the GFRC shell or skin to the stud frame is through "flex anchors" these connectors are ¼" to 3/8" diameter stainless steel rods. Other anchors may also be used depending upon the specific application. The entire assembly weighs from 10 to 20 lbs per square foot.

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What is the maximum size of a cladding panel?
Technically the maximum size of a GFRC panel is 14′ by 45′. In practical use however, the maximum size for simple transport and handling is approximately 8′ by 14′ up to 12′ by 24′. If you need assistance with sizes, details or have other questions, please call or email.

What are the capabilities and design limits of GFRC panels?
There are few limits on the shapes, textures and colors that can be obtained in Stromberg Gfrc cladding panels. From sweeping curves to highly ornate historical recreations, GFRC allows designers a wide range of freedom. The thin shell of GFRC allows for deep sections to be used for projecting cornices or window surrounds without a weight penalty.

How durable is GFRC cladding?
Stromberg GFRC panels have held up to category 5 hurricanes and earthquakes. Stromberg GFRC's resistance to natural disasters has lead it to be selected for government emergency management professionals for their emergency command posts. GFRC is resistant to rot, termites, and most kinds of damage. GFRC will not rust or corrode when exposed to moisture or saltwater, and can withstand storms and harsh conditions better than many other cladding products.

What materials are in the GFRC panels?
GFRC is made from portland cement and aggregate and reinforced with alkali resistant glass fiber reinforcement. The glass fiber adds flexural, tensile and impact strength. In Gfrc cladding panels, the strength of the GFRC composite combined with the steel stud frame, allows the production of a strong—yet lightweight -architectural cladding. Cast in colors are determined by the aggregate, the cement and mineral pigments.

What is the purpose of the steel stud frame?
In most cases the GFRC panels are delivered to site with integral steel stud frames. The frames provide the structure of the panel and allow for simple connection by clips and mechanical fasteners. The frames allow a space for insulation. They can also provide the framework for attachment of furring and interior wall board.

What textures are available?
A wide variety of attractive patterns, surface textures, colors and decorative aggregates are available.

What about fire?
GFRC is made up of mineral components and will not burn. GFRC offers a flame spread of 0. These non-combustible panels can achieve 2-hour fire rating with UL listed assemblies.

What about quality?
Stromberg GFRC panels meet or exceed the requirements of PCI design manual MNL 128-01. A comprehensive quality control process is in place to help ensure quality is built into the product and to ensure customer satisfaction. After the panel is complete, each panel must pass a 50 point quality inspection.

What are GFRC sandwich panels?
GFRC sandwich panels consist of a GFRC skin and an insulating core. The core may be plastic foam such as expanded polystyrene, extruded polystyrene or polyurethane foam or a lightweight insulating concrete. Sandwich panels may be used where a GFRC outer wall and GFRC inner wall are desired.

What are GFRC flex anchors for?
Flex anchors are rods (usually bent stainless steel) that act as attachments to hold the GFRC skin to the metal stud frame and allow some minor movement between the GFRC face of the cladding and the steel frame.

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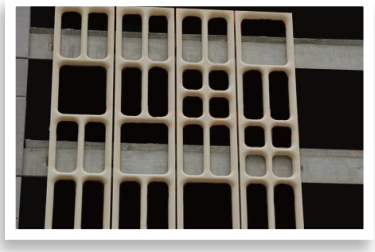
When are GFRC panels installed?
For metal framed wall cladding systems, the buildings structural frame is erected and then the cladding. On walls where there is a wall structure behind the panels, the walls are framed, sheathed and a water barrier is installed before the wall panels are erected.



How do I specify GFRC cladding?

See our downloadable specifications at:

GFRC SPECIFICATIONS

Who designs, builds and installs the GFRC panels?

GFRC panel design is a collaborative effort between the architect, the engineers and Stromberg. The process is typically as follows:

The Process

1. Challenge:
First we listen to your needs and wants and then we discuss possible solutions. Working together we identify the project requirements in terms of form, shape and function. Samples, sketches and possible options are reviewed and considered.

2. Development:
You benefit from the experience of our team of specialists. We rely on our 25+ years of experience and 1600 completed projects to addresses construction and detail requirements and submit initial solutions. We can then submit preliminary load to building calculations.

3. Detail Planning:
Once a solution has been accepted, we develop details of the GFRC panels, the panel connection to the building and interface with other materials.

4. Production:
Once submittals are approved production can begin. Our skilled craftsmen work with state-of-the-art technology and time honored skills to produce quality GFRC products.

5. Installation:
We offer various options for installation. If requested we can provide installation. Alternately a qualified local subcontractor can perform the installation.

6. After Sales Service:
While a project may end, our willingness to help does not. We offer continued support and advice if needed.

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