

## **Formglas<sup>®</sup> GFRC-L**

### **SECTION 06 20 13**

#### **EXTERIOR FINISH CARPENTRY (Factory-molded GFRC fabrications)**

##### **PART 1 - GENERAL**

###### 1.1 SUMMARY

- A. This section includes furnishing all materials, labor, equipment, and related services necessary to supply and install molded glass fiber reinforced concrete (GFRC) fabrications as indicated in the contract documents, and in compliance with applicable codes.

###### 1.2 RELATED SECTIONS

- A. Section 03 49 00 Glass Fiber Reinforced Concrete
- B. Section 06 10 00 Rough Carpentry – for connection attachment to structural steel framing.
- C. Section 05 12 00 Structural Steel – for connection attachment to structural steel framing.
- D. Section 07 90 00 Joint Protection – for joint sealants and expansion control

###### 1.3 REFERENCES

- A. ASTM International (ASTM)
  - 1. C947 Standard Test Method for Flexural Properties of Thin Section Glass Fiber Reinforced Concrete.
  - 2. E84 Standard Test Method for Surface Burning Characteristics of Building materials.

###### 1.4 ACTION SUBMITTALS

- A. Product Data: Submit product data sheets for each specified product.
- B. Past Projects: Submit a minimum of 3 previously completed installations of similar materials and complexity. Include contact name, e-mail address and phone number for each project.
- C. Shop Drawings: Submit drawings for approval showing plans, sections, details, joint treatment, reinforcing, fastening devices and the relation of the GFRC parts to the surrounding construction.

- D. Samples: Submit a minimum of 3 flat samples of GFRC material for each color and texture indicated.

## 1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications:
  - a. Manufacturer shall have a minimum of 10 years' experience having successfully supplied GRFC parts for other projects similar in scope and complexity for the work of this Contract.
  - b. Manufacturer shall have a minimum of 10 years' experience using 3D modelling software and CNC machines for the creation of master patterns used to make molds for fabricated GFRC components.
- B. Installer Qualifications: Installer shall have a minimum of 5 years' experience having successfully completed projects similar in scope and complexity for the work of this Contract.
- C. All GFRC parts to be provided by the same manufacturer using the same source of materials for the project.
- D. Substrates to accept GFRC parts shall be installed straight and true within 1/8 in. in 8 linear ft. (3mm in 2500mm) and shall be free of obstructions and interference that prohibits the correct alignment and attachment of the GFRC parts.
- E. Where the work schedule permits, confirm dimensions and site conditions prior to manufacturing materials specified in this section. Any deviations from the design conditions or dimensions to be provided to the manufacturer for inclusion in the shop drawings.

## 1.6 DELIVERY, STORAGE AND HANDLING

- A. Handle and transport GFRC parts to avoid damage. Place non-staining resilient spacers between parts and support parts during shipment.
- B. Parts shall be kept clean and dry and stored to prevent distortion, warping, and other physical damage in accordance with the manufacturer's recommendations.
- C. Place stored panels so part identification labels are clearly visible.

## 1.7 WARRANTY

- A. Manufacturer Warranty: Provide manufacturer's standard product warranty.

## **PART 2 – PRODUCTS**

### 2.1 MANUFACTURERS

- A. Formglas Products Ltd. – Tel: +1.416.635.8030 | +1.866.635.8030  
Contact your local Formglas representative – [www.formglas.com/contact](http://www.formglas.com/contact)  
or send requests for quotations directly to [estimating@formglas.com](mailto:estimating@formglas.com)

## 2.2 GLASS FIBER REINFORCED CONCRETE (GFRC) PARTS

- A. Fabrications: Molded GFRC parts are to be made without a steel panel frame backing in accordance with the approved samples, contract documents and shop drawings.
- B. Part Thickness: GFRC parts to have a nominal shell thickness of 5/8" (16mm) with the perimeter edges a minimum of 1" (25mm) nominal thickness as detailed on the shop drawings.
- C. All GFRC parts to have labels affixed to the back individually indentifying them with the same part numbers used on the shop drawings.
- D. Materials:
  - i. For all GFRC parts with integral color, use white Portland cement from the same source throughout the project.
  - ii. Alkali resistant glass fiber with a minimum Zirconium content of 16%.
  - iii. Silica sand washed and dried, complying with composition requirements of ASTM C144.
  - iv. Aggregate selected for hardness and durability, free of material that reacts with cement or causes staining.
  - v. Polymer curing admixture to impart specific properties to the GFRC.
  - vi. Color pigments and/or admixtures to provide integral color throughout the material thickness to match the selected sample.
- E. Face Mix: Proportion the Portland cement, silica sand, aggregates and admixtures to comply with the face mix design requirements.
- F. Backing Mix: Proportion the Portland cement, glass fibers, silica sand, aggregates and admixtures to comply with the backing mix design requirements. Glass fiber content to be a minimum of 4% by weight of the total mix.
- G. Connection Hardware: Structural brackets or shapes used to support or attach GFRC panels to the structure to be fabricated from corrosion resistant metal of appropriate type and gauge for the application.

## 2.3 PHYSICAL PROPERTIES

- A. Matrix: Portland cement, sand, and polymer
  - Shell thickness: 5/8" (16 mm) nominal
  - Edge thickness: 5/8" (16 mm) minimum
  - Density: ~134 lb/ft<sup>3</sup> (2145 kg/m<sup>3</sup>)
  - Weight: 6½ - 7½ lb/ft<sup>2</sup> (32-37 kg/m<sup>2</sup>)
  - Glass fiber: 4% minimum
  - Color: As specified
  - Surface: Lightly sandblasted or smooth if paint ready
  - Flexural Strength: 1,860 psi (12.8 MPa)
  - Tensile Strength: 1260 psi (8.7 MPa)
  - Compressive Strength: 4,000 psi (27.6 MPa)
  - Coefficient of Linear Thermal Expansion (ASTM D696): 7.6 x 10<sup>-6</sup> in/in/°F  
(13.6 x 10<sup>-6</sup> mm/mm/°C)
  - Hardness (Abrasion): 0.37%
  - Thermal Conductivity: 4.3 Btu in/h/ft<sup>2</sup>/°F (0.62 W/m<sup>2</sup>)
  - Surface Burning Characteristics (ASTM E84):
    - Flame Spread: 0
    - Smoke Development: 0

## **PART 3 – EXECUTION**

### **3.1 EXAMINATION**

- A. Site Conditions: Verify the conditions for compliance with the requirements including environmental conditions, installation tolerances and other conditions affecting the installation and performance of GFRC parts. Any unsatisfactory conditions to be corrected prior to installation.
- B. Field Dimensions: Field dimensions are to be verified including those not shown on the drawings. Any discrepancies are to be brought to the attention of the Architect with resolutions to the discrepancies to be mutually agreed upon by all parties involved. Details of any changes required must be incorporated into the manufacturer's shop drawings prior to commencing the manufacture of the GFRC parts.

### **3.2 PREPARATION**

- A. Substrate: Substrates to accept GFRC parts, provided by others, shall be installed straight and true within 1/8 in. in 8 ft. (3mm in 2500mm) and shall be free of obstructions and interference that prohibits correct attachment of GFRC parts.
- B. Structural framing members, provided by others, shall be of the proper size and design for the intended use and shall be sufficient to properly support the installed GFRC parts.

### **3.3 INSTALLATION**

- A. Install in accordance with the manufacturer's instructions, contract documents and shop drawings.
- B. It is the Installer's responsibility to verify scope and to order the correct quantities of parts (including a waste allowance).
- C. Supply and install all clips, hangers and other accessories required for work in this section and to ensure a solid and secure installation of the GFRC parts.
- D. Provide temporary supports or bracing as required to maintain position, stability and alignment in accordance to the shop drawings.
- E. Provide joint spacing between parts as detailed for expansion and the application of joint treatment materials.
- F. Complete joint treatment, patching and cleaning in accordance to the manufacturer's recommendations. Plan in advance to secure Architect approval of any use of color matching caulk (to be supplied by installer).

### **3.4 CLEANING AND PROTECTION**

- A. Perform cleaning procedures, if necessary, according to GFRC manufacturer's written instructions. Take precautions to prevent damage to GFRC surfaces and staining of adjacent materials.

**END OF SECTION**