

SECTION 06 82 00

GLASS FIBER REINFORCED PLASTIC

PART 1 - GENERAL

1.1 SUMMARY

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

1.2 RELATED SECTIONS

- A. Section 06 66 00 Plastic Fabrications
- B. Section 06 80 00 Composite Fabrications
- C. Section 06 10 00 Rough Carpentry - for connection attachment to structural wood framing.
- D. Section 05 12 00 Structural Steel - for connection attachment to structural steel framing.
- E. Section 07 90 00 Joint Protection - for joint sealants and expansion control.
- F. Section 07 60 00 Flashing and Sheet Metal - for flashing FRP fabrications.

1.3 REFERENCES

- A. ASTM International (ASTM)
 - 1. D790 - Standard Test Methods of Flexural Properties of Unreinforced and Reinforced Plastics
 - 2. D638 - Standard Test Method For Tensile Properties of Plastics
 - 3. D256 - Standard Test Methods For Determining the Izod Pendulum Impact Resistance of Plastics.
 - 4. D570 - Standard Test Method For Water Absorption of Plastics
 - 5. D2583 - Standard Test Method for Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor
 - 6. 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 FRP parts to the surrounding construction.
- D. Samples: Submit a minimum of 3 flat samples of FRP 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 FRP 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 FRP 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. Substrates to accept FRP 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 FRP parts.
- D. Where the work schedule permits, confirm dimensions and site conditions prior to manufacturing FRP parts 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 FRP 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.
- D. The installing contractor is responsible for damage to the FRP parts after delivery.

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
or send requests for quotations directly to estimating@formglas.com

2.2 GLASS FIBER REINFORCED PLASTIC (FRP) FABRICATIONS

- A. Fabrications: Molded FRP parts shall have a Class 1 (or A) fire rating with a Flame Spread Rating: ≤ 25 ; Smoke Development Index: ≤ 450 , when tested in accordance to ASTM E84 (See 1.3 References).
- B. Gelcoat: The FRP parts shall have an ultra violet stabilized polyester gelcoat with a minimum thickness of 15-20 mil.
- C. Back-up Laminate: Glass reinforcement shall consist of a glass fiber polyester composite with 25-30% glass fiber content.
- D. All reveals, set backs or returns to have a minimum of 3° draft angle.
- E. All outside corners to have a minimum 1/8" (3mm) radius.
- F. Identification: All FRP parts to have labels affixed to the back individually identifying them with the same part numbers used on the shop drawings.

2.3 PHYSICAL PROPERTIES

- A. Matrix: Polyester Resin
Shell thickness: 3/16" (4.5 mm) nominal
Edge thickness: 3/4" (19 mm) typical
Density: ~ 110 lb/ft³ (1675 kg/m³)
Weight: 1³/₄ - 2¹/₄ lb/ft² (8.5-11 kg/m²)
Glass Fiber: 25-30% typical
Embedments: Core mat, or other reinforcements as required
Color: As specified
Surface: Smooth, unless otherwise specified
Flexural Strength (ASTM D790): 32,000 psi (221 MPa)
Tensile Strength (ASTM D638): 15,950 psi (110 MPa)
Compressive Strength (ASTM D695): 33,100 psi (228 MPa)
Modulus of Elasticity (ASTM D790): 1,080,000 psi (10.5Gpa)
Impact Resistance (ASTM D256): 12 ft·lbf/in. (643 J/m)
Hardness (ASTM D2583): 44 Barcol
Coefficient of Linear Thermal Expansion (ASTM D696): 2.73×10^{-5} in/in/°F
(1.5×10^{-6} in/in/°C)
Heat Deflection: $> 513^\circ\text{F}$ (285°C)
Taber Abrasion (ASTM D4060): 0.87 mg weight loss after 500 cycles
Water Absorption (ASTM D570): 0.3%
Nail push-through: 1050 lbf (4,670 N)
Surface Burning Characteristics (ASTM E84):
Flame Spread: ≤ 25 (Class A)
Smoke Development: ≤ 450 (Class A)

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 FRP 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 FRP parts.
- C. Design Dimensions: Where field measurements can not be made without delaying the Work, the installing contractor is to confirm with the Architect whether to proceed with fabricating the FRP parts to the design dimensions with construction coordinated to ensure the actual dimensions correspond with the design dimensions.

3.2 PREPARATION

- A. Substrate: Substrates to accept FRP 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 FRP parts.
- B. Structural framing members and bearing surfaces, provided by others, shall be true and level, of the proper size, spacing and design for the intended use and shall be sufficient to properly support the installed FRP parts.

3.3 INSTALLATION

- A. Install in accordance with the manufacturer's instructions, contract documents and shop drawings.
- B. The Installing contractor to provide all support brackets, connection hardware, adhesives, and other accessories required for the proper installation of the FRP fabrications in accordance to the manufacturer's requirements and applicable building codes.
- C. Position and secure FRP parts carefully into place plumb, level and aligned with adjacent parts, shimmed where necessary.
- D. Anchors and fasteners to be type 304 stainless steel where exposed; hot dipped galvanized steel where unexposed.
- E. Provide temporary supports or bracing as required to maintain position, stability and alignment of parts until permanently secured.
- F. Installing contractor to repair and patch holes or defects to match the original work. Provide joint spacing between parts as detailed for expansion and the application of joint treatment materials.
- G. Provide joint spacing between parts as detailed in the approved drawings for expansion and the application of joint treatment materials.

3.4 JOINT PROTECTION

- A. Caulk all joints with a low modulus exterior elastomeric sealant recommended by the manufacturer. Color of caulk to be selected by the Architect. (If joint treatment follows under a separate section of this contract, this does not apply).

3.5 CLEANING AND PROTECTION

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

END OF SECTION