

SECTION 03 49 00 (03490)

GLASS FIBER REINFORCED CONCRETE (GFRC)

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings, Conditions of the Contract and Division 1 Specifications sections, apply to work of this section.

1.02 SUMMARY

- A. Section Includes: Fiberglass reinforced concrete columns and moldings.

1.03 RELATED SECTIONS

- A. Section 03 30 00 (03300): Cast-in-Place Concrete: Building Structural Frame
- B. Section 04 80 00 (04800): Unit Masonry; Backup Masonry
- C. Section 05 12 13 (05120): Architecturally-Exposed Structural Steel Framing: Support framing for GFRC fabrications.
- D. Section 05 40 00 (05400): Cold-Formed Metal Framing: Structural stud Members
- E. Section 07 92 13 (07900): Elastomeric Joint Sealants.

1.04 REFERENCE STANDARDS

- A. ASTM A27/A 27M – Standard Specification for Steel Castings, Carbon for General Application
- B. ASTM A 123/A 153 - Standard Specification for Zinc (Hot-Dip) on Iron and Steel Hardware.
- C. ASTM E84: Test Method for Surface Burning Characteristics of Building Materials.
- D. ASTM C 33 – Aggregate
- E. ASTM C 979 – Concrete Pigment
- F. ASTM C 494 – Chemical Admixtures for Concrete
- G. ASTM C 260-86 – Admixtures for Concrete
- H. ASTM C 150-85a – Portland Cement

1.05 SUBMITTALS

- A. Shop Drawings: Dimensions, adjacent construction, materials, thicknesses, fabrications details, required clearances, field jointing, tolerances, colors, finishes, methods of support, integration of components and anchorages.
- B. Parts List: Complete list of parts with numbers.
- C. Product Data: Manufacturer's product data and installation and maintenance

instructions.

- D. Manufacturer's Instructions: Manufacturer's instructions and recommendations for product delivery, storage and handling.
- E. Product Samples: Minimum 6 inch x 6 inch sample representing manufacturer's full range of available colors and patterns for the exposed face of panels.
 - 1. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns for the exposed face of panels. Do not start fabrication until samples are approved.

1.06 QUALITY ASSURANCE

- A. Installer Qualifications: Regularly engaged and experienced in the installation of GFRC materials.

1.07 MANUFACTURER'S QUALIFICATIONS

- B. Provide panels and shapes only from a manufacturer who has demonstrated capability to produce products of the quality and scope required for this project, and with not less than 5 years of successful experience in manufacturing architectural glass-fiber reinforced shapes.

1.08 DELIVERY, STORAGE AND HANDLING

- A. Deliver units to the project site palletized, safely wrapped, packed and labeled and retain until erected.
- B. Store materials in a dry location off the ground, and in such a manner to prevent damage or intrusion of foreign matter.
- C. Handle and transport units in a position consistent with their shape and design in order to avoid excessive stresses or damage.
- D. Store units to protect them from contact with soil, staining, and from physical damage.
- E. Place stored units so that identification marks are easily readable.

1.09 WARRANTY

- A. Warrant fabrications to be free from defects due to materials and workmanship for one year.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Fibertech by Wilson Composites, LLC, 4110 Old Greenville Hwy, Central, SC (864) 646-3000 www.fibertech.net sales@wilsoncomposites.com

2.02 MATERIAL CHARACTERISTICS

- A. Aggregates:
1. Back-up Mix: Washed and dried silica sand or other sand having a history of successful use in glass-fiber-reinforced precast concrete panel construction; passing through a No. 20 sieve.
 2. Facing Mix: Fine and course aggregate for face mix shall conform to ASTM C 33 except for gradation. Aggregates shall be clean, hard, strong, durable, inert, and free of staining and deleterious materials. Provide aggregate in colors and sizes as required to achieve the panel finish texture and colors indicated on the Drawings.
- B. Portland Cement: ASTM C 150, Type I, II or III. Use the same type, brand and color of portland cement for all panels and shapes. Color shall be as required to obtain the panel facing color indicated.
- C. Admixtures:
1. Air-entraining admixtures, ASTM C 260. ASTM C260, ASTM C494, ASTM C618 or acrylic thermoplastic copolymer dispersion.
 2. Polymer Compound
- D. Coloring Agent: ASTM C 979; shall have no adverse effects to glass-fiber-reinforced precast concrete panel set and strength; shall be stable at high temperature; and shall be sunlight fast and alkali-resistant. Color shall be as required to obtain panel facing color selected.
- E. Water for Mixing Concrete: Use potable water.
- F. Glass Fiber: Specifically designed to be compatible with the aggressive alkaline environment of portland cement based composites or fibers with a history of successful use in portland cement based composites that has been modified to be compatible with the fiber. Glass content 5% to 6% by weight.
- G. Shell Thickness: ½” to 1” nominal
- H. Weight: 2.5 to 4lbs/sqft
- I. Surface Burning Characteristics: Flame spread index of 0, smoke developed index of 0 to 5; when tested in accordance with ASTM E 84. Fuel contribution of 0 to 3.
- J. Resistance to Weathering: No significant loss in strength or change in color/appearance when tested in accordance with ASTM G23
- K. Corner Radius: 1/16” to 1/8” as necessary
- L. Draft Angle: 2-3 degrees, minimum, on returns, closed ends, reveals, and grooves

2.03 AVERAGE MECHANICAL PROPERTIES:

PROPERTY	VALUE	TEST METHOD
Tensile strength	900 to 1,100 PSI	ASTM D638
Flexural strength	1,500 to 2,500 PSI	ASTM C947
Modulus of Elasticity	1.4×10^6 to 2.9×10^6 PSI	ASTM D638
Compressive strength	Over 5000 PSI	ASTM C109
Thermal expansion	$.6 \times 10^{-6}$ (degrees F)	ASTM D696

2.04 FINISH

- A. Color as selected by the Architect from manufacturer's range of colors.
- B. Surface Texture as selected by the Architect from manufacturer's range of textures.

2.05 TOLERANCES

- A. Part Thickness: + or - 1/4 to 3/8 inch.
- B. Skin Thickness: + or - 1/16 .
- C. Length: + or - 1/8 inch.
- D. Variation from Square: 1/8 inch.
- E. Hardware Location Variation: + or - 1/4 inch.
- F. Variation from Plane: + or - 1/16" per LF

2.06 IDENTIFICATION

- A. Identify each part with a permanent serial number.
- B. Number parts to coordinate with shop drawings.

2.07 CURING AND CLEANING

- A. Cure and clean components prior to shipment.

2.08 ANCHORS AND FASTENERS

- A. The installer will provide anchors, fasteners and other accessories required for proper installation of fabrications as recommended and approved by GFRC fabrication manufacturer.

PART 3 - EXECUTION

3.01 PRE-INSTALLATION EXAMINATION

- A. Observe field conditions and verify that substrates are ready for installation of GFRC fabrications.
- B. Check field dimensions affecting the installation of GFRC fabrications.
- C. Verify that bearing surfaces are true and level.
- D. Verify that support framing has been constructed to allow accurate placement, alignment and connection of fabrication to structure.
- E. Report discrepancies between design dimensions and field dimensions, which could adversely affect installation, to the Architect.
- F. Do not proceed with installation until discrepancies are corrected, or until installation requirements are modified and approved by the Architect.
- G. Beginning of installation means acceptance of existing conditions.

3.02 INSTALLATION

- A. Installation Contractor to have at completed at least 2 similar installations of architectural Glass Fiber Reinforced Concrete materials within the previous 12 months. Experience should be documented for approval by material manufacturer and references of completed work available for review.
- B. Install fabrications in accordance with manufacturer's instructions and approved shop drawings.

3.03 ALLOWABLE TOLERANCES FOR INSTALLED UNITS

- A. Maximum Offset from True Alignment: 1/8 inch in 20 feet.
- B. Maximum Variation from True Position: 1/4 inch in 20 feet.

3.04 CLEANING

- A. Clean installed GFRC fabrications using cleaning methods and materials approved by manufacturer.

3.05 PROTECTION OF INSTALLED FABRICATIONS

- A. Comply with manufacturer's recommendations and instructions for protecting installed fabrications during construction activities.

END OF SECTION