



## **ARCHITECTURAL FIBERGLASS REINFORCED POLYESTER SPECIFICATIONS**

### **SECTION 06610 – ARCHITECTURAL FIBERGLASS DOMES**

#### **PART 1 – GENERAL**

##### **1.01 SUMMARY**

- A. Section Includes:
  - 1. Fabrication of fiberglass reinforced polyester domes.
- B. Related Documents and Sections:
  - 1. General Conditions, Supplementary Conditions and Division 1 General Requirements apply to the work of this section.
  - 2. Section 05120 “Structural Steel Support Framing”
  - 3. Section 06100, “Rough Carpentry”, for blocking.
  - 4. Section 07901, “Joint Sealants”.

##### **1.02 QUALITY ASSURANCE**

- A. The fiberglass manufacturer shall be one who is currently in the business of manufacturing and supplying architectural fiberglass components for the building construction industry and who can demonstrate the capability to provide needed domes.
- B. The fiberglass manufacturer shall have been engaged in the fiberglass industry for at least 10 years doing work with projects comparable in size, scope, detail, and complexity to that shown and specified.
- C. Submit a list of comparable projects, locations, and owner contacts with bid documents.
- D. Submit manufacturer’s current valid certification with The Certified Composites Technician (CCT) program created by the American Composites Manufacturer’s Association (ACMA).
- E. Submit manufacturer’s internal Quality Control & Assurance Procedures based on provisions published in the “Guidelines and Recommended Practices for Fiberglass Reinforced Plastic Architectural Products”.
- F. Single Source Responsibility for Architectural Fiberglass: Obtain architectural fiberglass from a single source with resources to provide products complying with requirements indicated without delaying the work.
- G. Fire Test Response Characteristics: Provide architectural fiberglass and related materials with fire test response characteristics as specified elsewhere in this section as determined by testing identical products per test method ASTM E-84 or other testing and inspecting agency acceptable to authorities having jurisdiction. Provide written certification that supplied architectural fiberglass components meet or exceed the criteria.

- H. Manufacturer's Vendor Approved Manufacturing Program (VAMP). Vendor shall have certified documentation regarding manufacturing processes and materials from a recognized vendor in the composites industry.

### **1.03 SUBMITTALS**

#### **A. Qualification Data**

For firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

#### **B. Product Data**

For products of standard or similar manufacturing submit manufacturer's catalog, illustrations, specifications, anchor details and installation instructions.

#### **C. Color Selection**

Submit custom color sample selection chips of actual material showing color, texture and sheen available for initial review.

1. Architect may supply custom paint color sample for matching.

#### **D. Shop Drawings:**

Submit CAD shop drawings for fabrication and erection. Include plans, elevations, sections, profiles, and details of attachment and assembly. Indicate dimensions of components. Include for comparison a dimensioned drawing showing plan elevation section and details of existing used for model purposes if applicable. Include details for dome, anchorage to substructure and all miscellaneous accessories.

Professional Engineering, if required, shall include calculations and sealed drawings by a P.E. registered in the State of the dome installation, to meet all State and Local codes.

#### **E. Samples:**

Provide sample representing dome vital components as requested. Submit samples of either standard white or custom colored gelcoat as specified by Architect.

- F. Submit detailed maintenance instructions for inclusion in final operation and maintenance manuals.

- G. Submit warranty on completed fiberglass components in writing against defects of materials and workmanship and to meet the specified requirements of this Section for a period of one (1) year from delivery to site.

- H. Submit documentation showing bond ability, client references, trade references, evidence of insurance coverage, LEED information, product testing results, VAMP documentation, CCT Certification.

## **1.04 PERFORMANCE CRITERIA**

### **A. Structural Properties**

The fiberglass reinforced polyester components shall be engineered, fabricated and erected to conform to the specifications and applicable requirements as specified by local codes to fit the building structure and to conform to the Architect's design criteria. Provide Professional Engineer's stamped drawings and calculations if design warrants.

## **1.05 WARRANTY**

- A. In addition to the guarantee referenced in the Agreement between the Owner and the Contractor (the Contract), the work of this Section shall be guaranteed in writing against defects of materials and workmanship and to meet the specified requirements of this Section for a period of one (1) year from delivery to site. Additionally, all manufacturers guarantee for materials will be passed on to customer.

## **PART 2 – PRODUCTS**

### **2.01 ACCEPTABLE MANUFACTURES**

Subject to compliance with requirements, fiberglass manufacturer offering products that may be incorporated in work include:

### **2.02 PATTERNS, MOCK-UPS AND MOLDS**

- A. Upon approval by the Architect of the shop drawings, inspection of the patterns, mock-ups, and/or molds shall be approved by the Architect on-site or at the facilities of the fiberglass manufacturer.
- B. Patterns and mock-ups shall be hand carved and machined by skilled craftsmen who have a minimum of ten (10) years experience in fabrication of Architectural Exterior and Interior Trim and Facade components and/or related design projects.
- C. Molds shall be constructed of from 10-12 layers of glass fibers with tooling gel-coat and/or rubber molds and shall be fabricated by skilled craftsmen with a minimum of ten to twelve (10-12) years experience in fabricating of architectural components for similar projects.

### **2.03 FIBERGLASS AND RESIN MATERIALS**

- A. General: The fiberglass reinforced polyester plastic components shall be designed, fabricated and erected to conform to the state of Building Code, Local Codes and to the Architect's design criteria.
- B. Glass cloth, mat and "Chop" shall be equal to the products of PPG-Owens Corning.
- C. Polyester resins shall be Class A, EDON spec. 67. The resin will be a flame retardant, promoted thixotropic polyester resin designed for use in hand lay-up and sprayup processes. The resin shall be specifically formulated for use in applications that require an

ASTM E-84, Class 1 flame spread rating, without the use of fillers or antimony trioxide, with an ASTM E-84 flame spread rating of less than 25 unfilled and smoke density under 450.

- D. Gel Coat: The gel coat shall be a high-performance product with ultraviolet inhibitors as recommended by the gel coat and fiberglass dome manufacturer.

Acceptable products are:

1. LHM2900 Low Hap HydroShield Lite NPG ISO Marine Gelcoat by HK Research, 908 Lenoir Road, Hickory, NC 28603, (800) 334-5975
2. "951-Armorcote IMC" by Cook Composites and Polymers Co., P. O. Box 419389, Kansas City, MO 64141-6389, (816) 391-6000.
3. "Max-Guard" Series by Ashland Inc., 2 Joy Drive, Budd Lake, NJ 07828, (908) 850-3046
4. "Ultra Shield-NPG" by Ferro Corporation, 6060 Parkland Blvd., Mayfield Heights, OH 44124 (216) 875-5600

- E. Gel coat thickness shall be 0.015" minimum to 0.025" maximum.

## **2.04 FABRICATION**

- A. Fiberglass-reinforced polyester domes shall be manufactured using the specified resins, reinforced with chopped glass fibers. All exposed surfaces shall be finished with custom colored gel-coat with UV inhibitor.
- B. Internal metal reinforcement, anchorage clips, brackets and all other "built-in" accessories shall be captured and additionally reinforced with additional glass fiber and mat of sufficient thickness as required by the manufacturers design.
- C. Final ratio of materials shall be 25% fiber, 75% resin for body of components.
- D. Any foam reinforcing equal to Divinycel H-60.
- E. All metal hardware, both loose and embedded, shall be stainless steel or aluminum as designed by manufacturer. All fasteners to be stainless steel.
- F. Dome thickness shall be 3/16" minimum or as engineered for non-sandwich core construction, 7/16" minimum for sandwich core construction.
- G. Production molds shall be constructed from successive layers of glass fiber with tooling gel coat. Molds shall be constructed with sufficient thickness and rigidity to prevent deflection, warp age and defects during panel production.
- H. Form panels with bolt flanges. Use flanges with sufficient depth to accommodate support, mating and alignment of panel surfaces and panel-to-panel sealant components.
- I. Provide all components necessary for a complete, visually continuous, weather tight installation.

- J. All domes shall be factory fitted and predrilled for later field assembly. All dome sections shall be labeled and numbered for reassembly.
- K. Components shall have a finish approved by architect.

## **PART 3 – EXECUTION**

### **3.01 HANDLING AND SHIPMENT**

- A. Provide shipping crates of sufficient size and strength to protect fiberglass domes during shipping or ship components in padded dedicated moving van.
- B. Provide additional protection as may be necessary to prevent soiling of surfaces and marring of finish.

### **3.02 INSTALLATION**

- A. Select installer who can demonstrate their experience in working with FRP. Provide installer with FRP manufacturer's final approved shop drawings, installation video / DVD, and written installation instructions.
- B. Prior to commencement of work installer shall review the job site for conformity to shop drawings. Identify and resolve detail conflicts in advance and identify such condition and resolutions on the shop drawings.
- C. Dome may be pre-assembled and raised into place or assembled in place.
- D. Re-assemble dome as marked from factory. Fully caulk all flanges with installer provided EDON SD-37 silicon sealant as flanges are bolted together.
- E. FRP component assembly hardware to be provided by FRP manufacturer. Internal metal reinforcement anchorage clips, brackets, fasteners and stainless steel hardware to be supplied by contractor or installer.
- F. Coordinate required blocking for attachment of dome to substructure. Provide additional wood preservative treated or metal stud framing as may be required to attached and reinforce dome for a solid installation.
- G. Erect components plumb, square and true to line and level and/or elevations shown on the drawings. Follow manufacturer's recommendations with regard to installation clearances.
- H. Carefully monitor ambient temperatures at time of component installation and observe all part-to-part clearances recommended by the fiberglass manufacturer.
- I. Do not cut or abrade FRP gelcoat finish, which cannot be completely restored in the field. Installer to make small inconspicuous finish repairs using manufacturer's color matching gel fill finish (patch kit). If too large of a repair is needed, return to fiberglass manufacturer for alterations or new units.

- J. Use only stainless steel connectors approved by the FRP manufacturer and which will develop the strength required by manufacturer's calculations. The installer shall supply these connectors.
- K. Clean installed dome to remove all dirt, smudges, and construction dirt. Use only those cleaning products and procedures recommended by the fiberglass manufacturer.
- L. For components requiring field painting after installation, use quality primer and paint as recommended by paint manufacturer.

**FIBERGLASS REINFORCED POLYESTER (F. R. P.)**

FLAME RETARDANT RESINS, Class 1. Offers a wide variety of flame retardant properties.

Engineered specifically for building products and a myriad of other interior and outdoor applications. Meets the most exacting requirements of local fire codes, BOCA, DOT and other, government specifications.

**TYPICAL PHYSICAL PROPERTIES**

Properties	1/8" Unfilled Casting	1/8" Glass Laminate
Flexural Strength, psi 77°F	16,000	30,000
Flexural Modulus, psi x 10 <sup>6</sup> , 77°F	0.48	1.3
Tensile Strength, psi 77°F	8,700	18,000
Elongation, %	2.2	-
Barcol Hardness	45	50-55
Glass Content, %	-	29.8

**FLAMMABILITY PROPERTIES\***

(1/8- Glass Mat Laminate)

ASTME-84 (tunnel test) flame spread less than 25 (unfilled)	
smoke density.....less than 450 (unfilled)	
H LT- 1 5 Rating.....	100
ASTM D-635-74 .....	AEB<1.0 CM
.....	ATB<5 sec.
ASTM D-2863-74 (Oxygen Index) .....	36.5