

SECTION 13140  
FIBERGLASS REINFORCED PLASTIC DOMES

**PART 1 - GENERAL**

1.01 SUMMARY

A. Section Includes:

1. Freestanding, shop fabricated field erected fiberglass reinforced plastic (FRP) composite dome.
2. Include fasteners, anchors, doors and frames, and gasketing.

1.02 SYSTEM DESCRIPTION

A. Design Requirements:

1. Dome shall have outside dimensions 24 ft diameter and 12 ft overall height.
2. Dome shall be completely waterproof, air and watertight, corrosion and chemical resistant, lightweight, and environmentally aesthetic.
3. Design to sustain superimposed loads for load combinations in accordance with ASCE 7-98.

a. Design loads:

- (1) Dead load of dome.
  - (2) Live (snow) load, 50 psf.
  - (3) Wind load, 75 psf.
  - (4) Mechanical equipment.
4. Stresses produced by specified load conditions shall be determined consistent with recognized methods of analysis.

1.03 SUBMITTALS

A. Product Data:

1. Resin and glass manufacturers material specifications.

B. Shop Drawings:

1. Include plans and elevations, fabrication details indicating laminate thickness and section depths and widths, location of openings and equipment supports, size and location of anchor bolts, and gasketing details.

C. Submit in accordance with Section 01330.

1.04 QUALITY ASSURANCE

- A. Domes provided shall be end product of one manufacturer to achieve standardization for appearance.

- B. Manufacturer Qualifications: Dome shall be manufactured and erected by firm with minimum of 5 yrs experience in structures of size and character specified.

#### 1.05 DELIVERY, STORAGE, AND HANDLING

- A. Store and protect on manufacturer's site, project site and during shipment and installation to prevent warping and fracturing.
- B. Shrink-wrap the dome components with protective plastic for shipment and storage at the job site.

### **PART 2 - PRODUCTS**

#### 2.01 MANUFACTURER

- A. MEKCO Manufacturing, Inc., 1063 W Washington Ave., P. O. Box 126, Cleveland, WI 53015  
phone: 920-693-8163, fax: 920-693-8444, e-mail: [build@mekco.com](mailto:build@mekco.com), website: [www.mekco.com](http://www.mekco.com).

#### 2.02 LAMINATE MATERIALS

##### A. Resins:

1. Resins used shall be orthophthalic polyesters.
2. Resins shall be suitable for service in temperature range from -30°F to +140°F.

- B. Gel Coat: Isophthalic NPG, UV- stable, chalk resistant, high gloss, color per manufacturers standard or as selected by the OWNER.

- C. Glass Reinforcing: Glass fiber reinforcement shall be Type E glass and shall be treated with a finish compatible to the resin being used. The glass fiber reinforcement shall be of the following compositions:

1. Chopped Roving: Glass fiber roving manufactured by PPG, Owens Corning, or equal and shall be used for the purposes of making random fibers 1 1/4" in length.
2. Stitch Mat: Type CM-2415 or CDM-2415 manufactured by BTI, Knytex, or equal.

##### D. Fiberglass Reinforced Plastic (FRP) Composition:

1. Dome Panels: Wall and roof panels shall be high gloss molded of the following composition:
  - a. F.R.P. laminate, 3/16" thick, consisting of// 18 mils minimum isophthalic NPG exterior gel coat, 1 1/4-in. random fiber - chopped roving (minimum glass content to be 35% by weight), and polyester structural laminating resin molded to the desired structural and architectural shape.
  - b. Panel Flanges: Minimum 1/4-in. FRP laminate.
  - c. Perimeter Anchoring Flanges: The anchoring flanges shall be minimum 1/4-in. thick FRP laminates. In addition one layer of stitch mat shall be used. The stitch mat shall be laminated within the anchoring flange.
2. Physical Properties: Fiberglass reinforced plastic shall have a minimum Barcol Hardness of 35.
3. Mechanical Properties: Fiberglass reinforced plastic shall have the following properties:
  - a. For laminates with stitch mat and random chopped fibers warp direction:

	Strength (psi)	Modulus (msi)
Minimum tensile properties	61,400	2.98
Minimum compressive properties	44,500	2.28
Minimum flexural properties	73,700	2.35

b. For laminates with random chopped fibers only:

	Strength (psi)	Modulus (msi)
Minimum tensile properties	12,500	1.10
Minimum compressive properties	22,700	1.04
Minimum flexural properties	23,800	0.97

## 2.03 MISCELLANEOUS MATERIALS

- A. Concrete Anchors: Anchor bolts shall be minimum 3/8-in. diameter stainless steel conforming to requirements of Section 05500, with oversized stainless steel plate washers to prevent localized stressing of the base flange.
- B. Dome Panel Connectors: Stainless steel hex bolts, flat washers, and hex nuts of size as determined by manufacturer's structural analysis, minimum 5/16-in.
- C. Metals: Any structural steel used on composite FRP structure shall conform to ASTM A36.
- D. Doors:
  - 1. Optional
- E. Base Gasket:
  - 1. Soft, closed cell, neoprene foam gasket material.
  - 2. Suitable for exposure to exterior.
  - 3. Thickness shall be as indicated, but not less than 3/8-in.
- F. Segment Gasketing:
  - 1. Soft PVC.
  - 2. Suitable for exposure to exterior.
  - 3. Thickness shall be as indicated, but not less than 1/4-in.

## 2.04 FABRICATION

- A. Form individual segments on high gloss molds ensuring consistent dimensions of finished parts. Cast each segment in one piece.
- B. Laminate shall consist of alternating layers of stitch mat and/or chopped roving impregnated with resin.
- C. Form panel flanges and perimeter anchoring flanges to the interior of the dome.
- D. The interior finish shall be white corrosion resistant FRP.
- E. The exterior finish shall be high gloss molded gel coat. Color as selected by the OWNER.

## 2.05 ASSEMBLY

- A. Fit and bond appurtenances, formed separately, into openings cut in finished panel or integrally mold into panel. Bond attachments with glass fibers and resin from interior of panel.
- B. Resin seal cut all drilled edges.

### **PART 3 - EXECUTION**

#### **3.01 EXAMINATION**

- A. Examine surface to receive dome for acceptable installation conditions.
- B. Do not start installation unless acceptable conditions are provided.

#### **3.02 INSTALLATION**

- A. Install in accordance with manufacturer's instructions and approved submittals.
- B. Field erect panels. Flanges between adjacent panels shall be bolted and gasketed.
- C. Use washers to avoid localized stresses.
- D. Seal exterior edges of adjacent panels with color matched silicon sealant.
- E. Install continuous neoprene gasket between perimeter anchoring flange and where panels rest on supporting structure.
- F. Resin seal cut all drilled edges.
- G. Repair damaged panels.
- H. Minimum spacing and edge distances of concrete anchors shall conform to requirements of Section 05500.

END OF SECTION