# SECTION 43 42 34 FIBERGLASS DOME

**PART 1 GENERAL**

* 1. **SUMMARY**
     1. Section Includes
        1. Fiberglass domes as required by project.

Please list all tanks where FRP domes are required and clearly identify on the contract drawings provided:

1.

2.

3.

4.

# SUBMITTALS

* + 1. Shop drawings in accordance with submittal procedures, including:
       1. Available colors
       2. Design calculations
       3. Dimensional drawings showing anchor locations and location and size of all openings.
    2. Manufacturer's experience certification
    3. Certification of laminate confirming

# QUALITY ASSURANCE

* + 1. Manufacturer shall certify to minimum five years experience in producing tank covers.
    2. Design calculations shall be based on given diameter, span and loading conditions. Calculations shall be certified by a professional engineer licensed in the state where dome is installed and experienced in FRP design.
    3. Submit test results of the laminate from an independent testing laboratory confirming values used in design. Results shall not be more than five years old. Test result shall confirm the following minimum properties:

|  |  |
| --- | --- |
| Compressive strength (ASTM D-695) | 12,600 PSI |
| Flexural strength (ASTM D-790) | 15,000 PSI |
| Flexural modulus (ASTM D-790) | 900,000 PSI |
| Tensile strength (ASTMD-638) | 12,600 PSI |
| Glass/resin content | 30/70 |

# SYSTEM DESCRIPTION

* + 1. Design cover for the following loads and current international building code (IBC):
       1. Dead load: Defined as the weight of the structure and all material attached to and supported by the structure.
       2. Uniform live load: flat roof snow load (pf) = 42 pounds per square foot, acting vertically upon the area of the dome projected upon a horizontal surface (pg=50 psf; I = 1.1; Ct = 1.1; Ce = 1.0). The domed roof designer shall also design the domed roof for balanced and unbalanced sloped roof snow loads in accordance with Section 7.4; 7.4.3; and 7.6.2 of ASCE Standard 7-05 "Minimum Design Loads for Buildings and Other Structures".
       3. Wind load: Design shall be based on 90 mph wind gust for a duration of 3 seconds from any direction (wind exposure = C, wind importance factor = 1.15).
       4. Design safety factor of 3:1 for allowable stresses for all load combinations.
    2. Functional Requirements
       1. Design for expansion and contraction over an ambient temperature range of -20 to 100 degrees F. Allow for heat build-up under cover.
       2. Horizontal thrust loads shall not be transmitted to tank wall.

# DELIVERY, STORAGE AND HANDLING

* + 1. Deliver, store and handle components in accordance with manufacturer's recommendations.

# WARRANTY

* + 1. Warrant fabricated dome roof for materials and workmanship for one (1) year.

# PART 2 PRODUCTS

* 1. **MANUFACTURERS**
     1. Products specified in this section shall be manufactured by RPS Engineering, Inc.
     2. Plan layouts, weights, and pertinent specification language used in the design have been based upon RPS Engineering, Inc.
     3. All equipment called for in this section shall be supplied by a single manufacturer or authorized sales representative to assure uniform quality, ease of maintenance, and minimal parts storage.

# MATERIALS

* + 1. Resin:
       1. Thermosetting polyester designed for temperatures ranging from -30 to 140 degrees F; capable of continuous exposure to gases and vapors from sewage.
          1. Barcol hardness: 30-40
          2. Specific gravity: 1.05
          3. Flexural strength: 12,500 PSI
          4. Flexural modulus: 520,000 PSI
          5. Tensile strength: 6,500 PSI
       2. Corrosion resistant
       3. Contain no bulk extenders or fillers
       4. Add ultraviolet inhibitors to entire laminate for translucent color selections.
    2. Gel Coat: Thermosetting polyesters designed for constant exposure to outside environment; resist ultra-violet degradation; color to be selected by Owner.
       1. Barcol hardness: 40 - 42
       2. Specific gravity: 1.128
       3. Flexural strength: 17,600 PSI
       4. Flexural modulus: 550,000 PSI
       5. Tensile strength: 9,500 PSI
    3. Glass Reinforcing: Chopped strand, woven roving and/or unidirectional roving equal to Owens Corning, CertainTeed, FGI, PPG or equal and shall be treated with a finish compatible to the resin being used.
    4. Hardware: 316 stainless steel

# COMPONENTS

* + 1. Fiberglass compression ring with removable bolt on cover and aluminum gravity ventilator.
    2. Integral fiberglass tension ring.
    3. Lifting lugs:
       1. Embed lifting lugs at balance points in each segment
       2. Suitable for handling, installing and removing each panel segment.
    4. Furnish neoprene sponge gaskets for radial joints and back flange of dome roof segments.
    5. Integrally molded drip lip near the periphery of each panel segment to prevent condensate from seeping onto tank wall exterior.

# ACCESSORIES

* + 1. Appurtenances shall be formed on separate suitable molds and fitted into proper openings which shall be cut in the finished panel. All attachments shall be glassed from both the interior and exterior of the panel to assure maximum strength.
       1. Personnel Hatches(when required)
          1. Dimensions: 30-inches tall by 24-inches wide
          2. Hinges and latches: 316 Stainless steel
          3. Provide on all dome segments not scheduled for aluminum air intake louvers.
       2. Aluminum Air Intake Louvers:
          1. Quantity: As Required
          2. Dimensions: 24-inch by 24-inch
          3. Adjustable ventilation louvers with bird/bug screen
       3. Location of appurtenances shown on drawings.
    2. Dormer Entries(Optional)
       1. Furnish one fiberglass entry dormer on each cover to accommodate personnel doors.
       2. Personnel Doors:
          1. Dimensions: 3 feet wide by 7'-0" high.
          2. Doors to have a 2-pound density polyethylene core with wood reinforcements at the hinges and lockset and a fiberglass skin.
          3. Hinges and lockset: 316 Stainless steel.
          4. Key locksets to match other buildings
          5. Heat trace door frame to prevent freezing.(When Required)

8 Watts per foot

120 VAC NEC Class 1, Division 1, Group D, explosion proof.

Provide heat trace manufacturer’s explosion proof connection kits and end kits.

* + 1. Skylights
       1. Provide skylight areas if specified on drawings.
       2. Skylight area (each) and location as specified on drawings.
       3. Areas shall be un-gel coated and sealed with parafinated wax resin containing UV inhibitors.

# FABRICATION

* + 1. Laminate Sequence
       1. Interior surface shall be the corrosion barrier consisting of 10-20 mils C-veil at 10 percent glass content.
       2. Surfacing veil shall be supported by 80 mil thickness of chopped strand E-glass.
       3. Structure shall consist of alternating layers of woven roving and chopped strand to complete the required thickness.
       4. Total laminate thickeners shall in no case be less than the design allowable for a 3:1 safety factor.
       5. Exterior surface shall be an exterior grade gel coat with ultra violet protection. A parafinated wax additive shall be used in conjunction with gel coat to eliminate the air inhabitation (14-18 mils thick).
       6. Cut edges or drilled holes shall be de-burred and resin or gel coat sealed.
    2. Interlocking panels shall be weather-tight with stainless steel bolts on 3-foot centers on each joint between the panels. Design molds such that each panel is cast in one piece, without bolting or bonding.
    3. Compression ring and tension member will be FRP.
    4. Gasketing for radial joints and back flange of dome roof segments shall be neoprene sponge.

# PART 3 EXECUTION

* 1. **ERECTION**
     1. Erect equipment in accordance with manufacturer's instructions.
     2. Install a 3/8-inch by 6-inch gasket between cover and wall.
     3. Anchor cover to wall with stainless steel anchor bolts. Stainless steel washers of a suitable size shall be used to avoid localized stresses in bolting.

# FIELD QUALITY CONTROL

* + 1. Manufacturer's authorized representative shall supervise critical installation procedures as necessary, inspect final installation, and perform any final adjustment.

# END OF SECTION