

ALUMINUM TRUSS SUPPORTED FLAT DOME SPECIFICATION

1. SCOPE OF WORK

- A. The truss supported flat dome fabricator/erector shall furnish all labor, materials and equipment required to design, fabricate, deliver and erect aluminum truss supported flat domes with all appurtenances as shown on the contract drawings and as specified herein.

2. DESIGN

- A. The truss supported flat dome shall conform to the specified dimensions and shall consist of a flat aluminum dome supported by a series of braced aluminum trusses. Full provisions shall be made to allow for thermal expansion of the truss supported flat dome system. The dead weight of the roof shall not exceed 3.5 pounds per square foot of covered area.
- B. Each truss shall be a clear span structure consisting of aluminum structural members arranged uniformly in a pattern of triangular spaces. The trusses shall be designed to be self-supporting from the tank wall, and shall be braced to resist all specified design loads.
- C. The flat dome shall consist of a triangulated aluminum frame with triangular aluminum closure panels. All raw edges of the aluminum panels shall be covered, sealed, and firmly clamped with batten bars in an interlocking manner to prevent slipping or disengagement under all load and temperature changes.
- D. The flat dome framing system shall be designed as a three dimensional truss with moment-resisting joints. The design must consider the increased minor axis bending and compression induced in the framing members due to tension in the roof panels.
- E. The structural analysis shall be performed using stiffness analysis models. The structural computer models shall include the effect of geometry irregularities such as access openings and perimeter support members.
- F. Connection forces shall be transferred through gusset plates connected to the top and bottom flanges of the structural frame members. The connections shall be designed as moment connections; a minimum of four bolts shall be used to connect the gusset plate to each flange.
- G. Fasteners shall be designed with a safety factor of 2.34 on ultimate strength and 1.65 on yield strength.

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- H. The design of welded components shall be done in accordance with the Aluminum Structural Welding Code ANSU/AWS D1.2-90.
- I. The vertical loads transferred from the truss supported flat dome to the tank shall be in line with the tank wall. The transfer of horizontal loads to the tank shall be minimized by means of low friction slide supports. Radial forces applied to the tank shall not exceed 10% of the vertical reactions.
- J. Dissimilar materials which are not compatible shall be physically separated or insulated from each other by means of gaskets or insulating compounds.

3. MATERIALS

- A. Structural framing (trusses, beams, flat dome frame, cross bracing), bearing plates and ledger angles: 6061-T6 extruded aluminum, mill finish.
- B. Structural frame gussets: 6061-T6 aluminum, .375" nominal thickness.
- C. Flat dome panels and closure flashing: 3003-H16 aluminum sheet, .050" nominal thickness, mill finish.
- D. Fasteners: 7075-T73 anodized aluminum or series 300 stainless steel.
- E. Sealant: Silicone by Pecora, General Electric, or equal.
- F. Gaskets and closures: Hypalon, Silicone rubber, or equal.
- G. Expansion anchor bolts: series 300 stainless steel.
- H. Hatches: 6061-T6, 5052-H36, 5086-H34 or 3003-H16 aluminum, 0.090" nominal thickness. Hatches shall have 4" X 3" X 1/4" curbs with locking hasp.

4. DESIGN LOADS

- A. Design Loads

The truss supported flat dome shall be designed in accordance with the "Specifications for Aluminum Structures" as published by the Aluminum Association and designed for full dead load plus live or snow load in accordance with applicable local codes.

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1. Basic Live Load [psf]:
2. Ground Snow Load [psf]:
3. Wind Load:
4. Seismic Zone:

B. Panel Design Loads (not acting simultaneously with the above loads)

The aluminum panels shall be secured to the flat dome frame to withstand the following vertical loads:

1. Two concentrated loads of 250 pounds each, applied simultaneously on two separate one square foot areas of the panel.
2. A distributed load equal to the ground snow load (Item 4.A.2) or 60 pounds per square foot over the total panel, whichever is greater.

5. SHOP DRAWINGS AND DESIGN CALCULATIONS

- A. Before executing any of the work in this section, the truss supported flat dome fabricator/erector shall submit prints or drawings to the Owner and/or Engineer showing dimensions, sizes, thicknesses, gauges, materials, finishes, joint attachments and erection procedure, including erection bracing, guying and sequence of work.
- B. A complete set of design calculations for the truss supported flat dome shall also be submitted for approval. These calculations shall be signed by a registered Professional Engineer. The truss supported flat dome shall be fabricated and erected in accordance with the approved drawings.
- C. Certification(s) from the manufacturer of the aluminum used in the fabrication of the truss supported flat dome shall be submitted stating that the alloys have been tested, inspected, and are in compliance with the requirements of this specification.
- D. An affidavit certifying that the specified material alloys, sizes and quantities have been furnished shall also be submitted by the truss supported flat dome fabricator/erector upon completion of the work.

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6. FABRICATION AND ERECTION

- A. Complete design and construction of the truss supported flat dome and all appurtenances as specified herein shall be performed by one single manufacturer and installer.
- B. The truss supported flat dome fabricator/erector shall field verify all existing dimensions and elevations prior to commencing fabrication.
- C. The truss supported flat dome fabricator/erector shall comply with all Aluminum Association and AISC specifications and standards applicable to the work specified herein. All work shall be performed with mechanics skilled and experienced in the fabrication and erection of aluminum structures.
- D. All field work shall be directed by a qualified supervisor who will remain on the jobsite until completion of the work.
- E. Field refabrication of structural components and flat dome panels will not be accepted, and forcing of the structure to achieve fit-up during construction shall be expressly forbidden.
- F. All threaded fasteners shall use series 300 stainless steel hex head bolts, hex head nuts and circular flat plate washers under the head and nut of all bolts.
- G. Field welding of aluminum shall not be allowed.

7. QUALIFICATIONS TO BID

- A. The truss supported flat dome manufacturer must have installed and had in satisfactory service for a period of not less than five years at least one truss supported aluminum cover with a span equal to or larger than the unit specified, and shall submit evidence of such with his bid proposal and/or pre-bid submittal.
- B. The experience requirement may be waived if the truss supported flat dome manufacturer provides a five-year Maintenance Bond to guarantee the structural safety and satisfactory performance of the roof under the design conditions specified herein. Proof of the ability to furnish the required bond shall be submitted to the Engineer not less than seven (7) days prior to the receipt of bids.

The bond shall provide that the manufacturer will remedy problems causing unsatisfactory service within thirty (30) days after written notice of the problem. If the roof is not restored to conform to the requirements specified herein, the manufacturer shall replace the roof with one that meets these specifications or he shall forfeit the

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bond. The bonding period shall commence upon written acceptance by the Engineer or Owner of the roof and all appurtenances thereto.

- C. The aluminum truss supported flat dome shall be manufactured by TEMCOR of Gardena, California, (800-421-2263) or an approved equal.

8. WARRANTY

- A. The truss supported flat dome shall be guaranteed for a period of one (1) year against defective design, materials and construction.
- B. Provide Maintenance Bond as specified in Item 7.B if qualifications to bid are not met.

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