

Tank Connection Covers

APEX EFC (Extruded Flat Cover) Specification

PART 1 - GENERAL

1.01 DESCRIPTION

A. Provide all coordination, labor, materials, equipment and services necessary for and incidental to, the complete and satisfactory installation of the equipment as shown or specified and in accordance with the requirements of the Contract Documents.

B. This specification is for a fully engineered, substantially airtight, aluminum cover structure comprised of panels, and supporting beams or trusses as designed and manufactured by Tank Connection LLC, Parsons, KS (phone 623-423-3010). This specification shall be regarded as a minimum standard for design and fabrication.

C. Scope of Work: Furnish all labor, materials, and equipment to provide a complete, installed system of fixed and hinged, custom fit, flat aluminum covers. The extruded flat cover system includes cover panels, structural supports, and attaching hardware.

1.02 SUBMITTALS

A. Furnish detailed shop drawings for all items specified herein in accordance for all items specified herein.

1. Submittal shall include:

1. Complete structural calculations showing the governing stresses in all members and connections, and detailed shop drawings. Drawings shall be signed and sealed by a registered Professional Engineer in the state of manufacture. Drawings shall include dimensioned layouts with sizes; thicknesses; materials; connection details; fastener types and spacing; and erection procedure.

2. A letter of certification signed and sealed by a registered Professional Engineer confirming that the aluminum cover is in full compliance with the plans and specifications including any testing provisions included therein.

3. Complete materials specifications.

4. Furnish detailed Operation and Maintenance manual.

1.03 QUALITY CONTROL

A. The manufacturer shall have a minimum of 10 years' experience in manufacturing aluminum covers.

B. The manufacturer shall be ISO 9001 certified.

1.04 DELIVERY, STORAGE AND HANDLING

A. The covers shall be packaged to minimize possible damage from moisture, temperature variations and impact due to shipping conditions. Detailed installation instructions shall accompany the covers.

B. The contractor shall inspect the covers when they are delivered to ensure that they are not damaged. Store the covers in a secure, dry location and maintain the covers per Manufacturer's recommendations.

C. Dispose of packing materials in accordance with state and federal regulations.

PART 2 - MATERIALS

2.01 DESCRIPTION

A. APEX EFC (Extruded Flat Covers), shall be manufactured by Tank Connection LLC.

B. The flat panel cover shall be a relatively flat structure conforming to the Contract Drawings. The flat panel cover shall consist of individual, interlocking panels made up of reinforced extruded aluminum planks assembled edge to edge with a tongue and groove detail. Individual planks making up a panel assembly shall be secured around their perimeter with specialized aluminum extrusions which allow the panels to be interlocked and sealed to each other. The panels shall be supported at the perimeter of the tank by the tank rim.

C. Hinged panels shall be provided to allow access under the cover in the areas shown on the Contract Drawings. Removable panels and hatches added to fixed panels are expressly prohibited as means of providing access under the cover.

D. The maximum hinged panel weight shall not require more than 50 lbs. of force to open.

E. Hinges used for hinged panels shall allow 180 degrees of rotation and shall not protrude above the walking surface.

F. Extrusions used for the walking surface that don't provide a continuous uninterrupted walking surface are considered to be a tripping safety hazard and are expressly prohibited.

G. Aluminum support beams and/or trusses, spanning portions of the tank, may be utilized to support the panels. The trusses must be fully triangulated, self-supporting with aluminum structural members joined with rigid bolted connections to aluminum node plates.

H. The flat panel cover shall be designed as a reasonably water tight and air tight system under all design load & temperature conditions. All panel-to-panel and panel-to-truss connections shall utilize a system of solid silicone gaskets to ensure maximum sealing

efficiency. Sealing forces on the gaskets shall be in the vertical axis to allow for panel alignment tolerances.

J. The fixed panels shall be fastened to the support members, tank rim supports, support trusses, etc. with stainless steel fasteners. Hinged panels shall be held closed by latches which are below the level of the cover walking surface. No special tools shall be required to open latches and hinged panels.

K. Fixed panels or hinged panels that require the removal of concrete anchor bolts and/or their nuts to remove or open fixed and hinged panels is expressly prohibited.

2.02 MATERIALS

A. General

All materials furnished to meet the provisions of the specification shall be new, previously unused, in first class condition, and shall comply with all the requirements of this specification.

B. Structural Members

1. All structural members - panel edge extrusions, support beams, support truss extrusions, support truss bolting node plates, etc. - shall be suitable aluminum shapes or plate from 6063-T6, 6005-T5, 6005A-T6 or 6061-T6 aluminum alloy.

C. Panel Surfaces

1. All panel members shall be suitable aluminum shapes or plate from 6063-T6, 6005-T5, 6005A-T6 or 6061-T6 aluminum alloy.

2. Panel surfaces shall be fabricated from extruded aluminum plank with a minimum nominal thickness of 0.100" for the cover's walking surface. The surface shall provide a bi-directional slip-resistant surface over the entire area of the extruded planks. The surface treads shall be spaced no wider than $\frac{3}{4}$ " apart on each plank and shall extend no less than 0.100" above the flat surface. The bottom of the cross texturing shall be at least 0.040" below the top of the primary treads.

3. Panel surfaces configured as described above shall be considered to be slip-resistant.

4. Alternative methods to provide a non-slip surface such as; rolled deck plate, traction tape, textured paint, wire brushing, sandblasting or other applied coatings, are expressly prohibited.

D. Finish

1. All panels and support members shall be mill finish aluminum without applied coatings, finishes, or surface treatments. Aluminum that is to be in contact with carbon steel or concrete shall be isolated using a silicone gasket.

E. Bolts

1. All bolts shall be 300 series stainless steel. Only stainless steel fasteners shall be used to attach aluminum to carbon steel or concrete. All fasteners exposed to the elements or to high humidity shall be stainless steel. All bolts shall be removable and replaceable with common hand tools.

2. Anchor Bolts shall be 316 series stainless steel.

F. Sealants

Sealants shall remain flexible over a temperature range of - 80 to +300 degrees F (-62 to +149 degrees C) without tearing, cracking or becoming brittle. Elongation, tensile strength, hardness and adhesion shall not change significantly with aging or exposure to ozone or ultraviolet light.

G. Gaskets

All preformed gasket material shall be EPDM elastomer or equal unless another material is required for compatibility with stored materials.

H. Truss Slide Bearing Pads

Truss slide bearing pads shall be low-friction bearing pads to minimize the horizontal forces transferred to the tank.

J. Louvers, nozzles and vents

Louvers, nozzles, and vents shall be 6061-T6, 5052-H32, or 3003-H16 aluminum.

PART 3 - DESIGN

2.03 ALLOWABLE STRESSES

A. Aluminum Structural Members and Panels

1. Aluminum structural members and connections shall be designed in accordance with the Aluminum Association's Specifications for Aluminum Structures.

2.04 DESIGN LOADS

A. The flat panel cover shall be designed in accordance with the latest edition of the Aluminum Design Manual, Specifications for Aluminum Structures, Allowable Stress Design, as published by the Aluminum Association, and designed for dead load plus live load conditions as required by applicable U.S. standard building codes.

B. The magnitude of the loads applied to the structure shall be determined in accordance with ASCE 7-16 except that in no case shall the panels be designed for an applied live load of less than 40 psf.

C. The load cases to be considered shall be those described below:

1. Dead Load - The dead load shall be defined as the weight of the structure and all material permanently attached to and supported by the structure.

2. Panel Live Load - The panel live load shall be defined as the weight uniformly distributed across the entire surface of a panel and shall be no less than 40 psf. No reductions are allowed for the panel live load.

3. Live Load - The roof live load shall be defined as the load uniformly distributed across the entire surface as defined in ASCE 7-16, Chapter 4.

4. Snow Load - The ground snow load as defined in ASCE 7-16, Chapter 7. Structure shall be assumed to be unheated.

5. Wind Load - The wind load shall be applied in accordance with ASCE 7-16.

6. Seismic Zone - The seismic loading as defined in ASCE 7-16.

7. Panel Design Load - In addition to the above mentioned loads, the panels shall be designed for a 250 pound load distributed over one square foot at any location. This load is to be taken separately and not simultaneously with other design loads.

2.05 FLAT PANEL COVER ACCESSORIES

A. Intake vents with bird screen shall be provided and mounted as shown in Contract Drawings.

B. Penetrations for air intakes, exhausts, and odor control piping, shall be sized and located as shown in Contract Drawings.

C. Additional accessories not listed above shall be provided as shown on the Contract Drawings.

PART 4 - EXECUTION

3.01 INSTALLATION

A. Install the covers and appurtenances in accordance with the manufacturer's recommendations.

B. Manufacturer shall provide templates, anchors, bolts and specialties as required for embedding in the concrete support structure. All anchor bolts shall be 316 series stainless steel.

C. Tolerance on concrete work shall be in accordance with the manufacturer's recommendations.

D. Installation of the covers shall not be attempted until the cover manufacturer has provided detailed installation drawings to the Contractor and the Contractor and manufacturer have instructed key field personnel in detail regarding installation of the covers.

3.02 CLEANING

Clean the covers and work area from all construction debris in accordance with contract documents. The covers provided shall be free from debris prior to placing into service.

3.03 TESTING

MANUFACTURER shall perform a prequalified shop air tightness test and certification for the cover components proposed. This test shall be performed in accordance with the "Procedural Standards for Testing, Adjusting and Balancing of Environment System" as published by the National Environmental Balancing Bureau (NEBB) on cover components of not less than 80 square feet. Said test shall be conducted and witnessed by a NEBB certified technician. The method of testing, test apparatus and proposed contents of the test report shall be submitted to the ENGINEER for approval. A report of the test shall be prepared by the certified technician and shall be sealed with the NEBB seal. The report shall include a description and illustration of the test components, a description and illustration of the test apparatus and a report of the results. The cover shall maintain an air intrusion leakage rate not to exceed 0.2 cfm per square foot at an applied negative pressure of 0.2 inches of water column for a 5-minute duration.