

# VR Containme!

176-25 Union Turnpike Suite 175 Fresh Meadows NY 11366

COVERS SPECS 13550

## SECTION 13550

### PRE-ENGINEERED FORMED PANEL ALUMINUM COVER SYSTEM

#### PART 1 GENERAL

##### 1.01 SCOPE OF WORK

1. Under this Section, provide a complete Design-Build of aluminum, fixed, substantially **AIR TIGHT**, and **WATER-TIGHT** flat covering systems for ( **INSERT APPLICABLE AREAS TO BE COVERED** ) as indicated in the CONTRACT DRAWINGS.
2. Take all necessary and required field measurements and prepare a complete structural and mechanical design for each of the areas & tanks to be covered under this section.
3. Furnish all factory and field labor and supervision; furnish all materials and Installation equipment; and furnish all incidentals required. Install and completely make ready for beneficial use by the **OWNER**, the number and sizes of Formed Panel Aluminum Covering Systems suitable for use in wastewater applications. The Section also includes all structural, mechanical, and ancillary components, as shown on the Contract Drawings, as specified herein, and / or as evidently necessary to meet the intent of this Section.
4. This Section defines the design requirements for the formed panel aluminum cover(s) as described in the CONTRACT DRAWINGS and these documents. The covers shall be installed on the tanks and are intended for removable enclosure of tanks and basins.
5. The aluminum covers shall consist of formed panel aluminum covers installed at the location and to the configuration as indicated on CONTRACT DRAWINGS.
6. No part of the cover system shall extend beyond the outside edge of the concrete wall. The existing clear walking space around the tanks shall be maintained.

##### 1.02 REFERENCES:

The following codes and standards form a part of this Section to the extent specified herein:

1. Applicable State Basic Building Code BOCA
2. Aluminum Association Specifications for Aluminum Structures
3. Aluminum Association Aluminum Standards and Data
4. ASCE 8-90 - Specification for the Design of Cold-Formed Stainless Steel Structural Members
5. ASTM F593 - Standard Specification for Stainless Steel Bolts
6. AASHTO Division 2 Section 25 Elastomeric Bearings
7. Federal Specification TT-S-00230C
8. OSHA-Confined Space

##### 1.03 RELATED WORK SPECIFIED ELSEWHERE

- A. General Conditions
- B. Special Requirements
- C. Scope of Work

1.04.1.1.1.1.1.7

1

1.04.1.1.1.1.1.6

1

# VR Containme!

176-25 Union Turnpike Suite 175 Fresh Meadows NY 11366

## COVERS SPECS 13550

- D. Submittals
- E. All other applicable Sections

### 1. 04 QUALIFICATIONS

1. The entire Formed Panel Aluminum Cover System shall be furnished by a single manufacturer who is fully experienced, reputable, and qualified in the manufacture of the products and the specific types of systems specified herein.
2. The Formed Panel Aluminum Cover System manufacturer specified in this Section must have complete in-house design and fabrication facilities. The manufacturer shall be solely responsible for the design, fabrication, delivery, erection, and satisfactory performance of the cover system specified herein, including all accessories and appurtenances that comprise the entire system. No division of responsibility between manufacturers of components shall be implied or allowed.
3. The **BASIS OF DESIGN** was determined upon demonstrated ability to meet specific performance criteria which in turn was used as the **BASIS OF DESIGN** for related equipment, particularly odor control scrubbers, fans, pipes & ducts. The specific performance capabilities were demonstrated through tests conducted by the **OWNER** or submitted to the **OWNER** for evaluation and consideration. Meeting the performance criteria as specified is essential to the overall performance of the odor & emission control system. Failure to meet performance criteria specifically air, vapor and water tightness will render the entire system ineffectual. Conversely, the successful operation of the odor & emission control system will result in substantial economic benefits to the **OWNER**.

#### **ALTERNATE SUPPLIERS WILL BE CONSIDERED SUBJECT TO THE CONDITIONS LISTED BELOW.**

4. Experience: Consideration shall be given to only those alternate suppliers who can demonstrate FIVE (5) successful installations of the specific roofing / covering system specified herein, including the design and size as specified herein for a period of not less than the most recent THREE (3) YEARS.
5. Company experience data including, but not limited to, arrangement drawings, names and telephone numbers of a minimum of five (5) plant operating personnel shall be submitted to the Engineer for review prior to acceptance of the specific covering system.
6. In addition to the requirements specified in paragraphs A, B and C & D above, an aluminum covering system manufacturer that can meet all the technical and performance requirements of this specification will be considered if the Contractor provides the **OWNER** with an acceptable performance bond which will guarantee complete replacement with the specified manufacturer including all material and labor, if the equipment fails due to defects in design, material or workmanship. The bond value shall be equal to TWO HUNDRED (200%) PERCENT of the covering system price, which price shall be for the total value of the manufactured covering system, the cost of removing the faulty covering system, the cost of installing a new covering system, and any inflationary cost increases over the bond period. The bond shall be for a period of TEN (10) YEARS. Documented evidence of the actual equipment price shall be provided by the equipment manufacturer in the form of actual invoices for recently provided equipment to other contractors.
7. In addition, an alternate supplier shall provide to the **OWNER** along with bid documents at time of bid complete set of drawings, calculations and tests results demonstrating technical

# VR Containme!

176-25 Union Turnpike Suite 175 Fresh Meadows NY 11366

## COVERS SPECS 13550

ability and capabilities of meeting with all conditions as specified in this section. Submittals shall be in accordance with sec 1.05

8. Failure to provide all required bonds and submittals will result in considering bids non-responsive.

### 1.05 SUBMITTALS

1. Shop Drawings shall be submitted in accordance with Section (**ENTER SECTION**). All Shop Drawing Submittals shall be prepared specifically for this project. Generalized or generic
2. Submittals or general brochures or Submittals with drawings / sketches not drawn to scale
3. shall be grounds for rejection of the submittal. CONTRACTOR shall submit small-scale layouts of panels and large scale details of edge conditions, joints, corners, custom profiles, supports, anchorage, trim sections, closures and special details. Distinction shall be made between factory & Field assembly work.
4. Engineering Data: Design calculations, certified by a registered structural engineer, certifying that the proposed flat cover system will meet the specified design criteria.
5. **BIDDER / CONTRACTOR NOTE WELL.:** The formed panel covering system manufacturer shall include A COMPLETE, COMPREHENSIVE SET of submittal drawings additional structural calculations and notes detailing every component of the aluminum covering system, showing its capability to perform under the design load conditions specified under paragraph 2.04 of this Section of the Specifications.
6. The covering system manufacturer prepared structural analysis and accompanying calculations shall be made by a licensed Professional Engineer (qualified in the structural discipline), and shall contain a complete structural analysis of the proposed cover system to be provided under this Section. The structural calculations shall be accompanied by a written narrative which documents the assumptions, analyses, and conclusions of the structural calculations.
7. Factors of Safety shall be identified and the weakest member(s) shall be specifically identified. The design loads, load combinations, deflection limits and Factors of Safety to be provided for all structural members shall be as specified hereinafter.
8. Samples: CONTRACTOR shall submit the following samples and accompanying descriptive data:
  - a. Flat Cover Panel: Full panel width, 12 inches long, male and female.
  - b. Fasteners: Two of each type to be used, with statement regarding intended use.
  - c. Closures: One metal closure with gasket seal.
  - d. Procedures for conducting tightness tests as specified. The procedures will state in detail all equipment, methods of measurement, and modes of implantation for conducting tightness test.

### 1.06 SERVICES DURING INSTALLATION OF THE COVERS

1. The cover manufacturer shall provide all materials, products, tools, labor, equipment, full-time inspection, full-time supervision, engineering oversight, factory support services, and all other necessary services required during the delivery, off-loading, and erection / installation of the covers.
2. Inspection and supervision Services: During the installation of the covers, thoroughly qualified and experienced factory representatives, who have full knowledge and experience in the

# VR Containment

176-25 Union Turnpike Suite 175 Fresh Meadows NY 11366

## COVERS SPECS 13550

installation of the covering system, shall be provided by the manufacturer while the covers are being installed. A minimum of two full eight-hour work days shall be provided by the manufacturer for each cover.

3. Upon the completion of the work, the manufacturer will conduct tests to determine the "Air-Tightness" of the entire tank covering systems.
4. The Contractor shall make a factory technical representative available during those tests. If the **OWNER** determines that the covering system provided under this Section is not acceptable, the Contractor shall provide additional labor, equipment, tools, products, and all other things necessary to make the tank covering system **AIR-TIGHT** as specified. Covers shall consist of single panels, no multiple panels will be allowed. Upon removal of covers, the entire area under cover is to be exposed, no sub-structure in the form of beams and trusses will be allowed unless specifically indicated in the CONTRACT DRAWINGS.

### 1.07 SYSTEM DESCRIPTION

The Formed Panel Aluminum Cover System specified herein shall be of the highest quality and totally suitable for use in wastewater treatment plant applications. The Formed Panel Aluminum Cover system shall be assembled from totally new components capable of being suitably installed over existing / new tanks, the approximate dimensions of which are shown on the CONTRACT DRAWINGS. The cover manufacturer shall be responsible for taking all necessary detailed field measurements for the fabrication and installation of the cover system.

## 2.0 PRODUCTS

### 2.01 BASIS OF DESIGN

The product-line used by the Engineer as the "**BASIS OF DESIGN**" for the Formed Panel Aluminum Covering System, as reflected on the CONTRACT DRAWINGS, is an aluminum covering system manufactured by.

#### **VR Containment**

**Suite 175 - 176 – 25 Union Turnpike**

**Fresh Meadows NY 11366**

**Telephone (516) 673-4961. FAX: (866)286 5616**

E-MAIL: [VR\\_CONTAINMENT@YMAIL.COM](mailto:VR_CONTAINMENT@YMAIL.COM) / WEB SITE [WWW.VRCONTAINMENT.COM](http://WWW.VRCONTAINMENT.COM)

Or equivalent. (See substitution section for qualifications and conditions)

1. The "**BASIS OF DESIGN**" manufacturers identified above shall be responsible for providing all equipment and appurtenant devices, whether or not shown on the CONTRACT DRAWINGS and / or specified in this Section, as necessary to provide a completely functional system consistent with the intent of this Section.
2. Notwithstanding the naming of particular manufacturers herein, the equipment furnished by the **BASIS OF DESIGN** manufacturer or by other acceptable equivalent equipment manufacturers shall be provided in strict conformance with this Section of the Specifications for all components. No deviation from any provision of this Section will be considered.

1.04.1.1.1.1.1.7

4

1.04.1.1.1.1.1.6

4

# VR Containme!

176-25 Union Turnpike Suite 175 Fresh Meadows NY 11366

## COVERS SPECS 13550

3. If an equipment manufacturer other than the acceptable manufacturers listed above elects to submit a bid for this project, said manufacture shall, in electing to provide equipment other than that listed above, assume full responsibility for all modifications to structure, equipment, and all other ancillary systems and work necessary to effect the proper installation of the tankage covering system.
4. All such changes shall be reflected in the Shop Drawings submitted for this covering system and shall be provided at no additional cost to the OWNER.
5. Performance Test Standards: CONTRACTOR shall provide Flat cover systems which have been pre-tested and certified by the manufacturer to provide the indicated resistance to air and water infiltration and structural deflection and failure when installed as indicated and when tested in accordance with test procedures described herein.

### 2.01-1 DESIGN

1. The Flat covers shall be clear-span and designed to be self-supporting from the periphery curbs. Full provisions shall be made to allow for thermal expansion.
2. Each cover shall consist of free standing, Flat one-piece interlocking panels. Each panel shall be continuous piece, supported at each end only. No intermediate supports shall be used or will be allowed. Panels comprised of multiple pieces will not be acceptable. Upon removal of covers, the entire area under cover is to be exposed; no sub-structure in the form of beams and trusses will be allowed unless specifically indicated in the CONTRACT DRAWINGS.
3. The Flat cover deadweight shall not exceed one hundred fifty (150#) pounds per removable module. Each of the module shall be easy to remove and the lifting force shall not exceed the module's dead weight.
4. The Flat cover surface paneling shall be designed as a substantially **AIR-TIGHT & WATER-TIGHT** system specified design loading conditions, not allowing air or water from below the covers to escape or air or water from above the covers to infiltrate to the covered area.
5. Dissimilar materials shall be separated from each other through the use of approved gaskets or coatings.
6. Stiffener angles shall be welded to panel underside and concealed from view. Bolted or riveted construction is not acceptable.
7. The direct attachment of panels to the surface of frame members by means of bolts, screws or self-drilling fasteners extending through the panels, other top flanges, or outer edges of the panel will not be acceptable.
8. No more than six (6) bolts, or screws shall be required for the removal of any one panel.
9. The flat cover system shall be designed to conform to the following criteria for water penetration and air infiltration:
10. Water Penetration: No leakage utilizing a spray test with water pressure set at four (4#) pound water gauge as measured at the water source.
11. Air infiltration: 0.2 cubic feet per minute per square foot for gross roof areas, with two (2) pounds per square foot differential pressure.
12. Horizontal joints between male and female panels shall be gasketed with a compressible neoprene gasket mechanically attached to one of the panels. No caulking sealant or adhesive gasket material shall be used.
13. Lift pockets or handles without the penetration of covers shall be provided with each panel to provide for manual removal and placement of panels.
14. Up to ten (10%) percent of the panels shall be provided with adjustable openings to provide

# VR Containment

176-25 Union Turnpike Suite 175 Fresh Meadows NY 11366

## COVERS SPECS 13550

for CONTROLLED ventilation of the air space below the covers. The adjustable opening shall be submitted for approval with materials to be limited to the cover material as specified rubber and neoprene.

### 2.02 APPURTENANCES:

1. **ACCESS HATCHES:** Hatches shall be provided at the locations, quantities and clear opening dimensions as shown on the CONTRACT DRAWINGS. Hatches shall be mounted on two (2") inch high extruded structural aluminum frames.
2. Hatch lids shall be fabricated of 0.100" minimum thickness, aluminum with a downward overlap of the hatch frame of two (2 ) inches and shall be fully gasketed to be substantially **AIR TIGHT**. Lids shall be furnished with a lifting handle and positive locking device to insure air tightness in the locked position. A minimum of 2 such devices per hatch shall be provided.
3. Hatch openings shall be properly reinforced with aluminum channel on the underside of the surrounding panel. Hatches shall be provided with aluminum medium duty commercial hinge assemblies and stainless steel fastening devices.
4. **Duct and Mushroom Vent:** A flanged connection for a duct shall be provided to remove air from the enclosure. One-way mushroom vents shall be provided to allow passage of air in but not out.
5. **Duct Connection:** Provide flanged duct connection as shown on the CONTRACT DRAWINGS, Flange to be compatible to connecting flange of ventilation duct.

### 2.03 MATERIALS OF CONSTRUCTION

1. The covering system shall be a formed panel supported cover structure conforming to the general dimensions shown on the CONTRACT DRAWINGS.
2. The structure shall consist of self-supporting formed aluminum panels. Full provisions shall be made to allow for thermal expansion. The formed panel aluminum cover system structure deadweight shall not exceed one hundred fifty (150#) pounds per module unit.
3. The aluminum cover surface paneling shall be designed as substantially **WATER -TIGHT / AIR -TIGHT**
4. System under the design load and temperature conditions specified elsewhere in this Section. All raw edges of the aluminum panels shall be firmly secured to the support frame to prevent slipping or disengagement under all load and temperature changes. Dissimilar materials which are not compatible shall be physically separated or insulated from each other by means of gaskets or insulating compounds.
5. The Formed Panel Aluminum Cover System shall be fabricated using the following approved materials and / or material specifications. All aluminum alloys listed below shall be as defined by the Aluminum Association and published in the ALUMINUM STANDARDS AND DATA:
  1. Formed Panels: 0.100' MINIMUM THICKNESS, formed panel fabricated from 5052-H36 aluminum sheet or 6061 interlocking extruded deck.
  2. Anchor Bolts: Series 316 Stainless Steel. Bolts and Fasteners: Series 316 stainless steel or 7075-T73 anodized aluminum
  3. Miscellaneous Formed 5052-H32 or 3003-H16 alloys.
  4. Metal Components (Non-structural) e.g. Vents & Hatches:
  5. Closure Gaskets: EPDM, Neoprene Hypalon or equal (to seal exposed corrugations in the sheet metal cladding), resistant to ozone and ultraviolet light.

# VR Containme!

176-25 Union Turnpike Suite 175 Fresh Meadows NY 11366

## COVERS SPECS 13550

6. Sealant: Silicone, conforming to Federal Specification TT-S-00230C; resistant to ozone and ultraviolet light; and shall be Dow 790, GE Silglaze N2500m, or equivalent.
7. Support Bearings: (if applicable or deemed needed.) Acceptable bearing surfaces for sliding bearings are Teflon to stainless steel ONLY. Avoid damage to the Teflon and reduce the coefficient of bearing friction, DO NOT bear Teflon on aluminum surfaces.
8. Fabric Air Seal: Hypalon impregnated glass fabric, 0.020" minimum thickness, Viton, or equivalent.
9. Stiffener Angles: Aluminum structural angles 6061-T6 alloy.
10. Extrusion: 6061-T6 aluminum
11. ALL exposed aluminum: Coated anodized etched with architectural class I both sides, AA-M- 12C22A-41 , clear as specified by the Aluminum Assoc.

## DESIGN LOADS:

1. The entire self-supporting structure shall be designed in full compliance with the **(ENTER STATE )** BUILDING CODE (BOCA ) and shall MEET OR EXCEED the criteria specified herein below, all within the stress limitations of the Aluminum Association's manual entitled: SPECIFICATIONS FOR aluminum Structures. **CONTRACTOR NOTE WELL.:** Where a conflict exists between the Building Code and the criteria below, the Building Code SHALL GOVERN.
  2. The formed panel aluminum covering system shall be designed for the following load cases:
    1. Dead Load. The manufacturer's calculated actual weight per square foot of the aluminum cover system structure, including all material permanently attached to and/or supported by the cover structure such as equipment, piping, ductwork, etc.
    2. Live Load: 30 PSF MINIMUM.
    3. Snow Load: 30 PSF, MINIMUM, with an Exposure Factor equal to 1.00, and an Importance Factor equal to 1.00.
    4. Unbalanced snowdrift Load: Per BOCA to account for any drift load caused by the any adjacent structures.
    5. Vacuum Load: 1.3 PSF, MAXIMUM load caused by forced air ventilation system.
    6. Point Load: 250 pounds MAXIMUM, concentrated point load, placed in any one square foot area of the cover.
    7. Wind Load. 80 mph, MAXIMUM (per ASCE-7-88) to account for wind forces on the cover system components and cladding.
    8. Temperature: Range of from 40 degrees F below zero to 160 degrees F above zero.
    9. Deflection Limits:
      - a) Self-supporting Members:
        1. Dead Load.
        2. Dead Load & Live Snow Load: L/240
- Load Combinations: The loads described above shall be applied to the cover system according to the Building Code, but AT LEAST IN the following combinations:
1. Dead Load
  2. Dead Load and Uniform Live Load and Vacuum Load
  3. Dead Load, Live Load, Unbalanced (snow-drift) Load and Vacuum Load
  4. Dead Load and Wind Load and Pressure Load
  5. Dead Load, Live Load, Unbalanced (snow-drift) and Wind Load

1.04.1.1.1.1.1.7

7

1.04.1.1.1.1.1.6

7

# VR Containme!

176-25 Union Turnpike Suite 175 Fresh Meadows NY 11366

## COVERS SPECS 13550

6. Dead Load, Live Load, Unbalanced ( Snow-drift) Load and Wind Load

### 2.05 Connections:

1. In no case shall a joint be designed to sustain a greater total resultant shear force than that which would be allowed by summing the allowable shear force of the individual fasteners, based on their net cross-sectional area through the shear plane and the allowable shear stress of the material. The use of manufacturer's test data to rationalize an increase in assumed fastener strengths may be allowed at the Owner's discretion. In no case shall values greater than those published by the Aluminum Association and the AISI for aluminum and stainless steel fasteners, respectively, be used.
2. The allowable stresses are as summarized below.
  1. Fastener Material: Allowable Shear Stress
  2. Series 300 Stainless Steel: 20% of Minimum Tensile Strength as published in ASTM F~93
  3. 6061-T6 Aluminum: 12 ksi
  4. 7075-T73 Aluminum: 17 ksi
3. Installation shall be in strict accordance with the respective manufacturer's instructions and recommendations at the locations shown on the CONTRACT DRAWINGS.
4. Anchor bolts shall be set in the concrete prior to the installation of any covers, in accordance with the manufacturer's recommendations.
5. Excess scrap shall be removed and working surfaces shall be kept from debris on regular daily basis.
6. Filings caused by drilling or cutting shall be removed immediately from finished surfaces and from the tank below if materials fall below.
7. Installation Tolerances: Panel units shall be plumb, level, and aligned within an installed tolerance of 1/4-inch in 20 feet and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

### 3.03 INSTALLATION INSPECTION, SUPERVISION, AND TESTING

1. A factory representative who has complete knowledge of proper installation of the formed panel aluminum covering systems shall inspect the final installation and supervise the installation of each covering system component, as provided under paragraph above entitled
2. "Services During the Installation of the Covers"
3. The covering system manufacturer shall provide thoroughly trained supervisor who shall perform field inspection of the covering system to ensure that it has been installed in full compliance with the manufacturer's recommendations. The manufacturer shall provide the **OWNER** with a notarized certificate, in a form acceptable to the **OWNER**, that certifies that the covering system has been installed according to the manufacturer's requirements
  1. **AIR & WATER TIGHTNESS** tests shall be conducted on each completed cover installation to demonstrate compliance with the tightness criteria stated above.
    1. **Water tightness:** Spray water test.
    2. **Air tightness:** Smoke tests at the allowable rate of leakage.
    3. **Airflow test** utilizing contractor Equipment to measure tightness of total area being covered.
    4. **Load test** uniform loads.



# VR Containment

176-25 Union Turnpike Suite 175 Fresh Meadows NY 11366

## COVERS SPECS 13550

5. **Load Test** Point – concentrated loads.
2. One of the above tests will be required unless determined otherwise by the project engineer at the time of submittal review. The engineer may request that all or some additional test be performed to satisfy concerns that may be raised during the submittal approval process.
3. **BIDDER CONTRACTOR NOTE WELL:** Payments for this section will be subject to an additional 30% retainage in addition to all other retainage as outlined in the contract document subject to the successful completion of tests as required and determined by the engineer.

### 3.04 WARRANTY.

The formed panel aluminum covering system manufacturer shall warrant in writing to the **OWNER** that the work provided under this Section shall be free from defects in workmanship and material. The warranty shall provide that the aluminum covering system manufacturer shall replace or repair any faulty workmanship or defective material furnished by it that is reported to it within one (1) year from the date of written acceptance of the work by the **OWNER**, at no additional cost to the **OWNER**.

**END OF SECTION**