

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. Glass fiber reinforced plastic (FRP/GRP) tank cover deck panels.
- B. Glass fiber reinforced plastic (FRP/GRP) structural supports.
- C. Flashing and trim.
- D. Fasteners and anchors.
- E. Gaskets.
- F. Accessories and appurtenances.
- G. Covers for these tanks, channels, and other areas:
 - 1.
 - 2.
 - 3.

1.2 RELATED SECTIONS

**** Note to Specifier ** Add or delete sections as required.**

1.3 REFERENCES

- A. ASTM D638, Standard Test Method for Tensile Properties of Plastics
- B. ASTM D790, Standard Test Method for Flexural Properties of Plastics
- C. ASTM D695, Standard Test Method for Compressive Strength of Plastics
- D. ASTM E84, Standard Test Method for Surface Burning Characteristics of Plastics

1.4 SUBMITTALS

- A. Submit under provisions of Section 01 30 00 – Administrative Requirements.
- B. Product Data: Manufacturer’s data sheets on each product to be used including:
 - 1. Calculations, design data, and test reports as applicable indicating compliance with requirements.
 - 2. Storage and handling instructions.
 - 3. Installation instructions.
- C. Drawings including layouts, product description, connection and framing details, fastener types and spacing.
- D. Miscellaneous certifications.

1.5 QUALITY ASSURANCE

- A. Tank cover supplier shall manufacture and fabricate all FRP components in its own facility, which must be ISO 9001 certified.
- B. Tank cover manufacturer shall have completed minimum of ten (10) projects of similar type as required in this scope within the last five years.
- C. Contractor shall verify all field dimensions for development of manufacturer’s drawings.
- D. Contractor shall review and confirm in writing approval of manufacturer’s drawings.

1.6 PRODUCT SUBSTITUTIONS

- A. Substitutions shall be considered if the Engineer has received a written request at least two weeks prior to bid date. If substitutions are acceptable, bidders shall be notified by addendum.
- B. Requests for substitutions shall include technical information, including but not limited to air leakage test report and structural performance data.

1.7 PERFORMANCE TESTING

- A. Materials shall comply with Federal and Local laws or ordinances, applicable codes, standards, regulations, and/or regulatory agency requirements.
- B. Structural framing and deck panels shall meet the performance and design criteria listed herein for the span conditions indicated on the drawings. Individual units shall demonstrate compliance with design criteria by large-scale testing.
 - 1. FRP Deck Panels: Uniform Load and Deflection Test.
 - 2. FRP Structural Components: 3 Point Load Bending Test
- C. Air Leakage
 - 1. Air leakage rate shall not exceed .2 CFM/SF at negative pressure of .2 inches of water column for a 5-minute duration per Air Leakage Test in accordance with Procedural Standards for Adjusting and Balancing of Environmental Systems.
 - 2. Testing shall be conducted by independent test agency certified by Associated Air Balance Council (AABC) or National Environmental Balancing Bureau (NEBB).

1.8 DESIGN CRITERIA

- A. Design Loads shall comply with local codes with combined loads determined by Allowable Stress Method.
 - 1. Live or Snow: _____ psf

2. Wind Uplift: _____ psf
3. Dead Load: _____ psf
 - a. Deck panels: Individual unit weight plus other materials attached to and supported by panels.
 - b. Cover structure: Individual unit weight plus other material attached to and supported by cover structure.

B. Design Limits

1. Dead + Live or Snow Load: Limit = L/_____ (min); Factor of Safety = 2.5
2. Wind Uplift less Dead Load: Deflection Limit = L/60; Factor of Safety = 1.88
3. Personnel Load: Cover shall be capable of supporting a 300 lb. concentrated load over a 30"x 30" area located at panel midspan with L/240 deflection limit or deflection not exceeding 5/8".

C. Cover Panel Removability:

1. Each cover panel shall be removable without having to remove any adjacent cover panel.
2. Each cover panel shall be removable vertically and without cutting of a cover component.

PART 2 – PRODUCTS

2.1 MANUFACTURER

A. The standard for design, characteristics, and performance shall be XL3 Cover System as manufactured by Enduro Composites, Inc., located at 16602 Central Green Blvd., Houston, TX 77032; 713-358-4000, 800-231-7271; www.endurocomposites.com.

2.2 MATERIALS

A. Fiberglass reinforced plastic (FRP) structural components including cover panels, beams, and framing shall be manufactured by pultrusion process. Contact molded, hand-laid up or filament wound fiberglass materials are not acceptable as structural components.

B. XL3 Tank Cover Panels

1. Resin type for FRP tank cover decking shall be UV stabilized isophthalic polyester or Vinyl Ester. Orthothalic (general purpose) polyester is not acceptable.
2. Glass fiber reinforcements shall be 50% (min) of the material weight.
3. Materials shall be fire retardant and have a flame spread rating of 25 or less per ASTM E84.
4. Materials shall exhibit these physical properties (at a minimum):

Tensile Strength	30,000 psi	ASTM D 638
Flexural Strength	30,000 psi	ASTM D 790
Flexural Modulus	2,270,000 psi	ASTM D 790
Compressive Strength	30,000 psi	ASTM D 695
Izod Impact (Notched)	20	ASTM D 256
Water Absorption	.20% max	ASTM D 570
5. Cover panels shall be sealed at side-laps with EPDM gasket. Side-lap gaskets shall be factory installed and oriented vertically so they are compressed when the locking channel is placed into position.
6. Top of tank cover panels shall be flat with factory applied, non-skid, and UV resistant surface.
7. Color of deck panels shall be standard gray.

C. Access Hatches (as shown and detailed on plan drawings)

1. Access hatches shall be raised or flat with one-leaf hatch door and fabricated from pultruded fiberglass components.
2. Access hatches and framing shall fit inside a single deck panel so individual deck panels with hatches can be removed without affecting adjacent panels. Standard sizes include 24"x24", 24"x36", 36"x36" dimensions. Inquire for additional sizes.
3. Underside of raised hatch lids shall be sealed with factory installed, 3/8" diameter neoprene bulb gasket. Perimeter hatch curb shall be sealed to decking surface with adhesive sealant.
4. Underside of flat hatch lids shall be sealed with factory installed, 1/4" EPDM Flat gasket. Perimeter hatch curb shall be sealed to decking surface with adhesive sealant.
5. Hatches shall have a stainless steel gas piston hold open device. Gas piston shall be designed to aid in the opening the hatch and hold open hatch once locked in place.
6. Hatch lids shall have factory applied non-skid, UV resistant surface with plastic or stainless steel lift handles.
7. View port hatches, if indicated on drawings, shall be 12 inches square or less.
8. Hatch openings shall be factory cut in cover deck panels by manufacturer.

D. FRP Structural Framing (as shown and detailed on plan drawings)

1. Resin type for FRP beams and framing members shall be vinyl ester.
2. Glass fiber reinforcements shall be 50% (min) of the material weight.
3. Structural components shall be fire retardant with flame spread rating of 25 or less per ASTM E84.

4. If cover is flush mounted, ledger angles shall be 316 Stainless Steel.
5. All connections for attachment to FRP beams or fastening connections shall be stainless steel angles or plates. Use of FRP for connections shall not be allowed.

**** Note to Specifier ** Select suitable material**

___ 316 Stainless Steel ___ 304 Stainless Steel

E. Trusses (if indicated by manufacturer or on drawings) shall be designed and provided by tank cover manufacturer and conform to these specifications:

1. Truss components not exposed to inside of tank shall be galvanized steel.
2. Truss components exposed to inside of tank shall be stainless steel.
3. Trusses shall have minimum 6'6" of headspace from top of tank cover to bottom of top chord.
4. Trusses shall be provided in sections (30 ft. max length) to be bolted together by the contractor.

F. Flashing and Trim

1. FRP flashing shall be isophthalic polyester with dimensions, and profile as shown on the drawings.
2. Non-radius end flashing shall be factory attached to individual deck panels.
3. Flashing with a radius or at the perimeter of a circular tank shall be a separate part and field attached by the installing contractor.
4. Slide gate flashings (if indicated on drawings) shall be aluminum brush type.

G. Air Vents and Connections (if indicated on drawings)

1. FRP gooseneck ventilation piping (if indicated on drawings) with bird screen shall be provided by cover manufacturer.
2. FRP stub-vent connections with a blind flange (if indicated on drawings) shall be provided by cover manufacturer. Connections shall extend at least 6 inches from top of tank cover deck.

H. Pipe Penetrations

1. Existing or new pipe penetrations shall be retrofitted by contractor to penetrate cover at 90-degree angle.
2. Pipe penetrations shall be flashed in the field with a Sealtite retrofit, zipper type, pipe flashing or equal as provided by cover manufacturer.

I. Hardware

1. Fasteners, anchorage, hinges, and other structural accessories located on underside of cover shall be:

**** Note to Specifier ** Select suitable material**

___ 316 Stainless Steel ___ 304 Stainless Steel

2. Perimeter flashing anchors, concrete anchors, or other hardware not exposed to the inside environment of the tank shall be 304 Stainless Steel.

3. Fasteners to attach tank cover decking to structural supports shall be:

**** Note to Specifier ** Select suitable material**

___ 316 Stainless Steel ___ 304 Stainless Steel

J. Gaskets and Sealants

1. All panel side laps and perimeter conditions shall have gaskets.
2. Gaskets under flashing with a radius and at perimeter of circular tanks shall be installed by the contractor.
3. Adhesive sealant shall be applied by contractor at various locations as required by manufacturer for odor containment.

PART 3 – EXECUTION

3.1 MATERIAL HANDLING

A. At time of delivery, all materials shall be inspected for shipping damage. Freight company and manufacturer shall be notified immediately of any damage or quantity shortages.

1. Contractor shall protect FRP materials from cuts, scratches, gouges, abrasions, and impacts. When lifting FRP materials, spreader bars shall be used (not wire slings unless materials are fully protected). FRP components shall not be dragged across one another unless separated by a non-scratching spacer.

3.2 INSTALLATION

A. Before placing and attaching components, erector must confirm alignment and location of bearing plates, surfaces, brackets, saddles, etc. All bearing surfaces must be clean and free of debris.

B. Before placing secondary framing members or deck, erector must check the alignment and location of supports.

C. Erection shall proceed according to sequence shown on the approved drawings.

D. If applicable, contractor shall install structural members, beam seats, or ledger angles in locations shown on the approved drawings. Contractor shall assemble trusses as required.

E. Position FRP tank cover beams (if applicable) in locations, as shown on the manufacturer's drawings. Field modifications (cuts, copes, holes, etc.) other than work shown on the drawings are not allowed without the manufacturer's written consent.

F. Anchor FRP beams and adjust tank cover components into final position with proper bearing and alignment at joints, laps, and supports before fastening. Refer to the manufacturer's installation instructions for proper fastener selection, fastener location, driving techniques, and pertinent information for fastening equipment.

G. Starting at end shown on the manufacturer's drawings, position and place cover deck panels in locations as shown. Field modifications (cuts, copes, holes, etc.) other than work shown on the drawings are not allowed without the manufacturer's written consent.

H. Fasten or anchor FRP cover deck panels into location as shown on the drawings.

I. Place and attach flashing as shown on the drawings.