NEFCO FRP TANK COVERS

** Engineer to select where there's a [ ] present.

PART 1–GENERAL

1.01 SUMMARY

A. The prefabricated fiberglass reinforced plastic (FRP) tank covers are designed to help contain odors, inhibit algae growth and prevent debris from entering a tank. They span the full open distance of the tank and can provide a walkway for personnel.

B. The cover may be outfitted for an odor control/air scrubber system to be attached by way of pipe flanges or openings. [ ] yes [ ] no

C. Related Sections and Divisions: Applicable or reference sections and divisions

1.02 SYSTEM DESCRIPTION

A. The FRP cover system shall be designed to cover the structure and other equipment as shown in the contract drawings.

B. Each cover system shall consist of cover panels, structural supports (if required), access hatches (if required), gaskets (if required), flashing and trim (as required), hardware, anchors and fasteners and other items necessary for a complete FRP cover system. All materials and appurtenances shall be furnished by the same supplier.

1.03 SUBMITTALS

A. Submit shop drawings and Operation & Maintenance Manuals.

B. Shop drawings shall specify all materials. The size, number, and location of the following shall be indicated: handles, fasteners, structural members, connections, attachments, openings, and other items not listed that are a necessary component of a complete installation.

C. Provisions for special openings, removable sections, seals for inlet/outlet ports or vents, or other areas as noted on the drawings shall be provided and detailed by the manufacturer on the shop drawings.

1.04 QUALITY ASSURANCE

A. Qualifications:

1. Manufacturer shall maintain a continuous quality control program and shall furnish to the Engineer certified test results for all the FRP production parts.

2. Must be manufactured in the U.S.A.

3. The manufacturer shall have been engaged in the design and fabrication of similar structures for a minimum of 5 years and shall submit a list that states the location and description of five installations minimum.

4. Manufacturer shall submit to the Engineer a certification that the cover system was manufactured in compliance to the specifications and meets or exceeds the requirements of the specification.

1.05 PROJECT CONDITIONS

A. Contractor shall confirm the condition and configuration of the structure to be covered. This includes field measurements and locating obstacles that may inhibit the installation.

1.06 WARRANTY

A. Standard One-Year Warranty: Unless otherwise stated below, manufacturer shall warrant the equipment to be free from defects in material and workmanship for a period of 1 year from the date of equipment acceptance.

PART 2–PRODUCTS

2.01 MANUFACTURERS

A. The Full Span Cover System as manufactured by NEFCO SYSTEMS, Incorporated, 8895 Military Trail, Building C, Suite 100, Palm Beach Gardens, FL 33410 shall be considered as the basis of design and quality required as defined in the General Conditions.

2.02 MATERIALS AND ACCESSORIES

A. General:

1. The cover system shall be a flat, walk-on type. It will consist of a series of FRP panels with support structure (if required). Hinged hatches for inspection and maintenance shall be provided (if required). The surface of the covers shall be flat without any protruding items that may cause a tripping hazard. The covers shall completely cover the tank and or structure as required per plans. The cover panels shall have an anti-skid surface (if required).

2. Each cover panel shall be manufactured by the pultrusion process utilizing [ ] Isophthalic polyester [ ] Vinyl Ester resin with corrosion resistant properties and additives to inhibit UV absorption. A synthetic surfacing veil shall be the outermost layer covering the exterior surface. Open molded panels are acceptable if they meet the deflection and load requirements. The “minimum physical properties” table will not apply for the open molded panels since it represents pultruded material.

3. The pultruded fiberglass laminate shall have the following minimum physical properties:

Property	Value	Test Method
Tensile strength	64,000 psi	ASTM D638
Flexural strength	61,000 psi	ASTM D790
Flexural modulus	1.8×10^{6}	ASTM D790
Notched Izod (ft-lb/in)	25	ASTM D256
Barcol Hardness	45	ASTM D2583
Water Absorption (%)	0.2%	ASTM D570
Thermal Expansion (in/°F)	7.0×10^{-6}	ASTM D696

4. Procedure used in determining the above properties shall be in accordance with the ASTM standards using the method designated above. Test coupons shall be prepared in accordance with the appropriate ASTM test method.

5. Design loads shall comply to local building codes with combined loads determined by allowable stress method

   a. Live or Snow: [ ] psf
   b. Wind Uplift: [ ] psf
   c. Dead Load: [ ] psf

6. Design Limits

   a. Dead + Live or Snow load: Deflection limit=L/180. FOS = 2.5
      [ ] _____Engineer requires

   b. Wind Uplift Less Dead Load: Deflection limit=L/60. FOS = 2.0
      [ ] _____Engineer requires

   c. Personnel Load: 250 lb. Load distributed over a 2.5' x 2.5' area with Deflection limit not to exceed L/180
      [ ] _____Engineer requires

B. Structural Framing (if required)

1. FRP and/or SST structural components shall be attached to the inner and/or top of the tank wall to support the cover system.

2. [ ] FRP support structure or components shall be [ ] Isophthalic [ ] Vinyl Ester. If Fire Retardant (FR) is required, flame spread rating of 25 or less per ASTM E84 test shall be a minimum.

3. If the cover system requires metal structure or components, the metal structure or components shall be type [ ] 304 stainless steel, [ ] 316 stainless steel, [ ] HDG, or [ ] aluminum as required.

2.03 FINISHES

A. The top surface of the cover shall have a non-skid surface (if required). [ ] yes [ ] no

B. FRP or stainless flashing (if required). [ ] yes [ ] no, Type_____

C. Hatches (if required). [ ] yes [ ] no

D. Vents (if required). [ ] yes [ ] no

E. Pipe flanges or openings for odor control system connection. [ ] yes [ ] no
(Provide description and quantity)

F. Lifting handles (if required). [ ] yes [ ] no (specify material and grade)

G. Provisions for special openings, removable sections, seals for inlet/outlet ports or vents, or other areas as noted on the drawings shall be provided and detailed by the manufacturer on the shop drawings

2.04 FASTENERS

A. Provide all required fasteners for equipment furnished. Fasteners shall be type [ ] 304 [ ] 316 stainless steel. Size determined by manufacturer.

2.05 ANCHORS

A. Provide all required anchors for attaching the cover system to existing concrete structure. Anchors shall be type [ ] 304 [ ] 316 stainless steel. Size determined by manufacturer.

PART 3–EXECUTION

3.01 FIELD QUALITY CONTROL AND DEMONSTRATION

A. **Prior to fabrication** of the cover system, the installation CONTRACTOR shall field measure the following:

1. Wall to Wall lengths for square/rectangular tanks
2. Radius or diameter for circular tanks
3. Load bearing wall thickness
4. Locate obstacles or structures such as cross bridges, walkways or mechanisms that interrupt the span or installation of the cover.
5. Any additional field requirements to ensure the correct fitment of the cover system.

B. Upon completion of installation, the following inspection functions shall be performed by the installation contractor.

1. All components are fitting together properly to form a rigid structure and has a well-engineered and professional appearance.
2. All fasteners and anchors are present and tight.
3. Hatches operate properly.
4. Vents are clear

END OF SECTION

NEFCO LAUNDER COVER SPECIFICATION

The NEFCO Launder Cover is designed to inhibit the growth of algae on the launder troughs and weirs of the clarifier tank by minimizing incident sunlight on these surfaces. In addition, the Cover is intended to contain odors and keep leaves and other airborne debris from entering the launder.

PART 1 GENERAL

1.1. SUBMITTALS

A. Shop Drawings

i. Manufacturer's catalog information, descriptive literature, specifications and identification of materials of construction, including resins and glass fiber content and layout for FRP constructions.
ii. Detailed drawings showing equipment fabrication, dimensions, method of attachment including number, locations and size of fasteners and weights of fabrications.
iii. Manufacturer's recommended Cover dimensions, mounting configuration and location for each application.

B. Quality Control Submittals

i. Manufacturer's Certificate of Compliance.
ii. Special shipping, storage and protection and handling instructions.
iii. Manufacturer's written/printed installation instructions.
iv. Must be manufactured in the U.S.A.
v. A list of ten installations of comparable size in operation for at least ten years.
vi. Certify that the cover meets local building code specifications for wind load, including uplift and deflection.
vii. Certified test reports of the physical and mechanical properties of the product. Each panel shall have the following minimum physical properties:

Property	Test	Value
Tensile Strength	ASTM D-638	18,900 psi
Flexural Strength	ASTM D-790	24,200 psi
Flexural Modulus	ASTM D-790	1.07×10^6 psi
Barcol Hardness	ASTM D-2853	45
Notched Izod	ASTM D-256	10 ft-lbs/in
Water Absorption	ASTM D-570	0.1%

1.2. WARRANTY

A. Manufacturer shall expressly warrant the Launder Cover System to be free of defects in materials and workmanship for a period of one year from the date of installation, exclusive of misuse, negligence or accident on the part of the installation contractors or owner.

1.3. COORDINATION

A. Manufacturer shall coordinate the Launder Cover design and installation requirements with the clarifier mechanism, scum box and launder effluent channel configurations.

PART 2 PRODUCTS

2.1. MANUFACTURERS

A. Materials, equipment and components in this section shall be the products of:

NEFCO, Incorporated, 8895 North Military Trail, Bldg. C, Suite 100,
Palm Beach Gardens, FL 33410 (561-775-9303)

2.2. DESIGN

A. The Launder Cover shall consist of a system of molded fiberglass panels that are attached together to form a continuous cover over the launder trough, weir and scum baffle within the treatment tank. The Cover shall be designed and manufactured to inhibit incident sunlight from striking the surfaces of the launder and weir. Each Cover section shall be molded of UV-protected fiberglass and shall be opaque to sunlight. Individual sections shall be a minimum of four feet in length and curved to follow the curvature of the tank. The Cover shall extend over the trough and weir as far as possible and may extend to a point immediately inside the scum baffle so long as the Cover does not interfere with the sweep arm. The Cover shall be designed such that adjacent panels fit together properly and the completed Cover, when installed, forms a rigid structure and has a well-engineered and professional appearance.

B. Provision shall be made to support the Cover in such a manner that the panels are held securely in place, with the panels hinged to provide access to the launder and weir for inspection and maintenance. Neither the Cover nor the means used to support it shall interfere with effluent flow over the weir or within the trough. Cover supports shall not impede personnel from entering and traversing the launder. Cover supports that cantilever from the outer effluent launder wall without support at the weir wall are unacceptable.

C. Launder cover panels shall have a curved or arched shape over the width of the launder trough with sufficient radius to strengthen the panel and minimize possible deflections against snow loads.

D. The Cover shall be designed to open away from the operator and toward the center of the tank, or back toward the operator and outside of the tank. Each Cover segment shall consist of a fixed Mounting Section and two (2) Cover Sections, each connected to the Mounting Section by a continuous stainless steel hinge. The Mounting Section shall provide a rigid mount for the Cover Sections and ensure the proper fixed spacing between them.

i. If the Cover opens toward the center of the tank, the Mounting Section is fastened to the weir wall with FRP and/or stainless steel brackets, and extends inward to a point just inboard the scum baffle. The hinged Cover Sections extend outward toward the outer launder wall and swing open to allow inspection and maintenance of the launder and weir. The hinge point of the Cover is strategically positioned to maximize

visibility of the launder and weir when the Cover is open. In the closed position, the Cover Sections rest on an FRP support flange attached to the outer launder wall.

ii. If the Cover opens toward the outside of the tank, the Mounting Section is fastened directly to the outer launder wall and extends a minimal distance into the effluent channel. The Cover Sections extend inward toward the center of the tank and swing open for inspection and maintenance of the launder and weir. In the closed position the Cover Sections rest on stainless steel brackets mounted to the weir wall.

E. The hinged Cover sections can be designed to open in one of three configurations as described below:

i. This “A/B” design allows alternate panels to open independent of every other panel. Alternate panels have an integral tab at both sides that rests on the adjacent panel and covers the seams between panels. The panels adjacent to a middle panel must be opened before the middle panel opens.

ii. This “Zipper” design is used where access to the launder is limited. Every panel has a tab at one side only that covers the seam with the adjacent panel. From any access point, every panel can be opened in sequential order and closed by reversing the order.

iii. This “B/B” design allows every panel to open independently. Each cover panel has integrally molded, 2” downward flanges along each side of the panel, leaving a small space between closed panels. This space can be filled by a suitable gasket attached to the flange on one side of each panel.

F. Provision shall be made to secure the Cover in the closed position for safety and security. If the Cover opens toward the center of the tank, this is accomplished by means of an easily operated, spring-loaded latch mechanism that secures the hinged Cover Sections. If the Cover opens toward the outside of the tank, the Cover can be secured in the closed position by spring-loaded latch mechanism that secures to the brackets. Handles or lift rings may also be required for some panels. A means of limiting the travel of the hinged Cover sections, in the form of a molded resting tab on the mounting section, may also be provided to protect against damage. A locking pin can be provided if required to help lock the cover panel in the open position. Covers with inspection hatches or cleanout doors are unacceptable.

G. Where the circumference of the trough is interrupted by a bridge-support or another obstacle, a fixed panel(s) shall be installed over the trough beneath the support such that the surface of the Cover is continuous around the entire tank. Alternatively, vertical panels may be installed on both sides of the bridge supports to block out sunlight.

H. The Cover system shall be designed to withstand common wind and snow loads but the entire Cover shall not be intended as a “walk-on” Cover designed to support the weight of plant personnel. Adequate stiffeners shall be integral to each panel, but panels reinforced with balsa or foam cores are not acceptable except where a single or double length reinforced walk-on section is used for safe entry to the launder.

2.3. MATERIALS

A. Each Cover panel shall be molded of fiberglass, reinforced plastics. The resins and fiberglass reinforcing materials shall be consistent with the environmental conditions and structural requirements of the application.

B. The resin shall be an industrial quality, isophthalic polyester resin with UV suppression additives, Corezyn COR75-AQ-010, or equivalent. The resin shall be pigmented to ensure that the resulting part is opaque. The glass reinforcement shall be chopped strand roving, 357-211 PLN CTC, or equivalent, with a minimum 1/2-inch strand length. Additional reinforcement in the form of stiffening ribs shall be added when necessary. The glass content of the finished laminate shall be not less than 30% by weight. The nominal thickness of each panel shall be 1/4 inch. The laminate shall consist of a 20 mil outer layer of marine quality white gelcoat, followed by chopped strand roving. The laminations shall be dense and free of voids, dry spots, cracks or crazes. All factory-trimmed edges shall be sanded and sealed. The finished laminate shall have a smooth, even appearance.

C. Fasteners, handles, hinge and latches shall be stainless steel. The weir wall mounting brackets shall be stainless steel, FRP or a combination of the two. The latch/handle shall be a spring-loaded mechanism with a positive detent positioned to indicate the closed/locked position of the handle. The latch is activated by pressing down on the spring-loaded handle and turning it. The magnetic latch is disengaged by pulling upward on the cover, ring or other fixture with sufficient force to overcome the force of the magnet.

D. The stainless-steel locking pin shall be secured to the mounting section molded resting tab. The locking pin is used to lock the cover in the open position while operators walk throughout the obstruction free launder.

PART 3 EXECUTION

3.1. INSTALLATION

A. The Cover sections shall be mounted to the weir wall on stainless steel or FRP brackets. The free end of each Cover panel shall be supported at the outer tank wall by an FRP support flange that attaches to the entire periphery of the tank.

B. The installation contractor shall install the Cover in accordance with the contract drawings, manufacturing drawings and manufacturer’s recommendations. Field cutting of panels shall be allowed to complete the structure and accommodate in-tank obstructions. All cut ends shall be dressed as per the manufacturer’s recommendations.

C. All of the fasteners and brackets required for the installation shall be Stainless Steel and shall be supplied by the Cover manufacturer. The support flange and weir wall brackets are installed using 3/8” x 3-3/4” expansion anchors with flat washers, lock washers and hex nuts.

END OF SECTION