

SPECIFICATION: FIBERGLASS REINFORCED PLASTIC (FRP) LAUNDER COVER

PART 1 – GENERAL

1.01 Description of Work

The work covered by this section shall include materials and installation for the fiberglass reinforced plastic (FRP) Launder Cover Panels, which includes but is not limited to:

- A. FRP Launder Cover panels.
- B. FRP or stainless-steel support brackets.
- C. Stainless steel fasteners and connections.

1.02 Quality Assurance

- A. Manufacturers must be ISO 9001 certified and manufacture the FRP components in their own facilities.
- B. The contractor shall be responsible for verifying all field dimensions for development and approval of manufacturer's drawings and shall coordinate the FRP products with the any other participating equipment manufacturers.
- C. Launder Cover components (excluding any associated concrete items) shall be provided by a single supplier to ensure coordination and compatibility of component parts.
- D. The manufacturer shall maintain a continuous quality control program with supporting documentation.
- E. The manufacturer shall warrant the launder covers to be free of defects in materials and workmanship for a period of one year after the date of delivery.
- F. FRP material shall be manufactured with a UV stabilized polyester resin.

1.03 Product Substitutions

- A. Substitutions shall be considered only if the consulting engineer has received a written request at least two weeks prior to the bid date. All bidders shall be notified by addendum if substitutions are acceptable prior to the bid.
- B. Requests for substitutions shall include technical information and any other information required for evaluation.

1.04 Performance Testing

- A. Materials shall comply with Federal and Local laws or ordinances, applicable codes, standards, regulations, and/or regulatory agency requirements including:
 1. ASTM D 638, Standard Test Method for Tensile Properties of Plastics
 2. ASTM D 790, Standard Test Method for Flexural Strength, and Flexural Modulus Properties of Plastics
 3. ASTM D 570, Standard Test Method for Water Absorption of Materials
 4. ASTM D 256, Standard Test Method for Izod Impact (Notched)
 5. ASTM D 696, Standard Test for Average Coefficient of Thermal Expansion
 6. ASTM D 2853, Standard Test for Barcol Hardness

1.05 Design Criteria

Controlling the growth of algae formed in the clarifier effluent stream is an enormous challenge in today's modern water and wastewater treatment plants. Left unchecked, algae can change the hydraulic dynamics of clarifiers by obstructing weir design features typically found in v-notched weir configurations. Battling this issue on a weekly or daily basis, plant personnel have increased safety concerns associated with manually cleaning the weir and trough area. Performing time consuming repetitive tasks results in unnecessarily higher maintenance costs while taking a toll on valuable personnel that typically keep them from more pressing issues.

In addition, at plants utilizing the newer ultraviolet disinfection technology, the larger algae strands tend to dislodge at the place of origin and move downstream through the plant to the UV facility. The "sticky" algae then interrupt the disinfection process by substantially covering the UV bulbs, essentially making them ineffective and eventually may cause these expensive bulbs to fail all together.

The FRP launder cover inhibits (direct) sunlight from reaching these elevated growth areas at the clarifier launder and weir by forming a continuous protective environment above the effluent stream. Once installed, the cover provides an attractive, yet extremely low maintenance passive structure designed to eliminate algae growth issues described above. Additional benefits of the cover help to prevent windblown debris like leaves, plastic bags, etc. from entering the stream and may also help to contain localized odors if present in the effluent trough – weir area.

1.06 Design Parameters

The manufacturer relies on the following critical information to provide an accurate arrangement for the design of the launder cover to function as intended. Actual design requirements, which vary from plant to plant with process, must be established for each application.

Standard Design Parameters (Imperial or Metric):

Tank design (internal or external launder) = _____ External launder wall top elevation = _____
External launder wall inner radius = _____ Internal (weir) wall top elevation = _____
Launder trough width = _____ Weir top elevation = _____
Internal launder wall width = _____ Scum baffle top elevation = _____
Internal (weir) wall inner radius = _____ Water surface elevation = _____
Scum baffle offset from weir = _____ Known obstructions = _____

1.07 Submittals

Submittals shall include, but not be limited to:

- A. Drawings include dimensional layouts, product description, connection details; fastener types and location spacing, bill of materials, shipping, handling, storage and protection information, and installation guidelines.
- B. Information from the manufacturer including materials of construction, resin and glass fiber content, material certifications, physical samples, catalog information, warranty information, certified test reports of physical and mechanical properties of the product, preliminary installation, operation, and maintenance (if applicable).

PART 2 – PRODUCTS

2.01 Manufacturer(s)

A. The standard for design and characteristics shall be based on materials and components provided by:

1. Enduro Composites, Inc., Houston, TX (713) 358-4000, www.endurocomposites.com.
2. Approved equal by Engineer.

2.02 Materials

A. FRP Launder cover panels and appurtenances shall be fiberglass reinforced plastic molded to produce uniform smooth surfaces and shall be consistent with environmental and structural conditions present for a particular application. The cover shall be resin rich, free of voids and porosity, without dry spots, crazes or unreinforced areas and shall provide for increased corrosion resistance. Launder cover panels shall include structural glass fiber reinforcements 30% (minimum) by the material weight embedded within UV stabilized Isophthalic polyester resin for additional corrosion protection. The outer (top; exterior) portion of the laminate shall consist of either 1) a resin-rich layer reinforced with veil or 2) a 20-mil gelcoat layer. When a gelcoat layer is used, the gelcoat shall be compatible with the resin used in the structural portion of the laminate. FRP laminate shall have a resin rich hot coat bottom surface after light sanding. The color shall be standard gray (laminate) and white (topcoat). Factory cut edges and drilled holes shall be sealed with resin.

B. FRP Launder Cover panels shall exhibit these minimum properties:

a. Tensile Strength	12,000 psi	ASTM D 638
b. Flexural Strength	20,000 psi	ASTM D 790
c. Flexural Modulus	1.0 x 10 ⁶ psi	ASTM D 790
d. Izod Impact (Notched)	12.0 ft-lb/in	ASTM D 256
e. Water Absorption	.20% maximum	ASTM D 570
f. Barcol Hardness	40 (nominal)	ASTM D 2853
g. Average Coefficient of Thermal Expansion	10.5 x 10 ⁻⁶ inch per inch ⁰ F	ASTM D 696

C. FRP Launder Cover Panels

- a. Nominal panel size is 1/4" thick x 4 feet long (minimum) x "width" generally described as the unobstructed distance extending from the external tank wall across the effluent trough and weir area to the scum baffle without interfering with the clarifier mechanism or as otherwise indicated on the drawings.
- b. The cover shall be designed and molded of UV protected fiberglass-reinforced polyester resin composite laminate opaque to sunlight.
- c. Cover consists of individual adjacent panels that fit together side by side thus forming a continuous rigid structure to inhibit incident (direct) sunlight from reaching the effluent launder and weir area.
- d. The cover shall match the tank curvature (if round) or straight (if rectangular or square) as shown in the drawings.
- e. Cover supports shall be located and made in such a manner to hold the panels securely in place yet pivot to provide access to the launder and weir for inspection and maintenance.
- f. Designed to withstand common wind and snow loads (if applicable), the cover shall not be intended as a "walk-on" cover capable of supporting the weight of plant personnel.
- g. Cover design as shown or intended in the contract documents, shall open away from or toward the operator yet ultimately may depend on certain qualities or parameters associated with a particular tank configuration.
- h. Provide a means to restrain the cover from opening in the closed position or closing from the open position and limit the travel of the operable section to avoid interfering with the clarifier mechanism.

- i. Where the trough is interrupted by a bridge-support or another obstacle, provide a fixed panel(s) around the support to ensure the surface of the cover remains continuous around the entire tank. Alternatively, vertical panels may be installed on both sides of the bridge supports to block out sunlight.
- j. All panel edges, mounting holes and top surface lap holes shall be factory drilled and sealed with resin unless otherwise noted or directed by the manufacturer for field modification on the approved installation drawings.

D. Hardware

- a. Shall be 316 stainless-steel fasteners, anchorage, and other structural hardware (as indicated) provided by the manufacturer.
- b. Cover panel fasteners shall be nut and bolt type assembly with washers and, where applicable, lock washer.
- c. Mounting anchors shall be expansion (wedge) type or adhesive type (sized as required).

PART 3 - EXECUTION

3.01 Material Handling

- A. At the time of delivery, all materials shall be inspected for shipping damage. The freight company and the manufacturer shall be notified immediately of any damage or quantity shortages noted.
- B. The contractor shall protect FRP materials from cuts, scratches, gouges, abrasions, and impacts. When lifting crated FRP materials, spreader bars shall be used with straps (not wire slings unless materials are fully protected). FRP components shall not be dragged across one another unless separated by a non-scratching spacer.

3.02 Installation

- A. Before placing and attaching components, the contractor shall confirm the alignment and location of cover across the entire installation. All contact surfaces must be solid, free of voids or grout, relatively smooth, level, clean and free of debris.
- B. Unacceptable surfaces shall be corrected, modified, or even replaced by the contractor to create a level or smooth surface for cover attachment.
- C. The installer shall erect the FRP cover panels according to sequence shown or stated on the approved installation drawings. Cover panels shall be properly aligned by the installer at all mounting and connection conditions to form a professional-looking rigid structure.
- D. Unless noted otherwise, FRP cover panels shall be attached to the supporting structure as follows:
 - a. For concrete structures - use 3/8" diameter concrete anchors (min) unless otherwise noted.
 - b. For other structures like steel tanks or launder - use 3/8" hex head type fasteners unless otherwise noted. Refer to manufacturer's instructions in the Enduro Installation - Operation - Maintenance manual (IOM) and approved drawings for proper fastener selection and procedure.
- E. Unless specifically shown or stated on the approved installation drawings, field modifications of any kind (cuts, copes, holes, etc.) are expressly prohibited without proper notification of the issue and a corrective action approved and authorized by the engineer. Only then will modifications be allowed as directed by Enduro Composites according to Enduro IOM manual.
- F. The installer shall seal all field cut edges and field drilled holes with an approved material.
- G. Install additional miscellaneous components or hardware as shown on the approved drawings.

3.03 Adjust and Clean

- A. Surfaces are to be cleaned according to manufacturer's instructions according to Enduro IOM manual.
- B. Remove excess materials of construction and trash to leave site in a clean condition for subsequent operation.