

# **SPECIFICATION: FIBERGLASS REINFORCED PLASTIC (FRP) WALKABLE 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) Walkable Laundry Cover Panels, which includes but is not limited:

- A. FRP Walkable Laundry 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. Walkable Laundry Cover components (excluding any associated concrete items) shall be provided by a single manufacturer to ensure coordination and compatibility of component parts.
- D. The manufacturer of the walkable laundry cover shall have full responsibility for products and design. Split responsibility of material or design is not acceptable.
- E. The manufacturer of the walkable laundry cover must be the manufacturer and fabricator of the fiberglass components utilized on the pre-engineered walkable laundry cover. The supplier and manufacturer of the fiberglass components shall take full responsibility for the products, materials, and design. In addition, a certification letter from the manufacturer identified to be the material source shall state that the manufacturer takes full responsibility for the design and use of the products specified. No split responsibility of the product manufacturing, fabrication, design, or quality of the fiberglass components purchased by the contractor from a manufacturer shall be acceptable, implied, or expressed, regarding the walkable laundry cover provided on this project.
- F. The manufacturer shall maintain a continuous quality control program with supporting documentation.
- G. The manufacturer shall warrant the laundry covers to be free of defects in materials and workmanship for a period of one year after the date of delivery.
- H. 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
  - 7. ASTM E84, Standard Test for Surface Burning Characteristics of Building Materials

### **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.

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 FRP Walkable Laundry Cover inhibits (direct) sunlight from reaching these elevated growth areas at the clarifier laundry 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.

The FRP Walkable Launder Cover and associated FRP or stainless-steel component material shall comply with ANSI/AWWA Standards as applicable for water or wastewater treatment applications. Unique design features incorporated into the size and mounting location of the FRP walkable launder cover works in conjunction with clarifier configuration to maximize coverage of the affected areas.

- A. Design Loads shall comply with local codes with combined loads determined by Allowable Stress Method.
1. Dead + Live or Snow Load: \_\_\_\_\_ psf.
  2. Wind Uplift Load: \_\_\_\_\_ psf.
  3. Concentrated Load: \_\_\_\_\_ lbs.

B. Design Limits:

1. Dead + Live or Snow Load: Deflection Limit=L/180; FOS=2.0
2. Wind Uplift less Dead Load: Deflection Limit=L/60; FOS=1.88
3. Concentrated Load: 300 lb. load distributed over 2.5'x2.5' area at mid-span of cover panel with deflection not to exceed 5/8" or L/180.
4. Each cover panel shall be operable without having to remove adjacent panels or cutting any components. Individual panel units shall weigh no more than 135 pounds. Panels shall be fastened to structural supports.
5. Slip resistance of decking panels shall have (min average) Dynamic Coefficient of Friction of 0.50 per ANSI A137.1/ A326.3 Dynamic Coefficient of Friction Test.
6. The top of tank cover shall be flat with change in vertical level of walking surfaces no greater than 1/4".

The FRP Walkable Launder Cover shall be able to support its own weight plus snow and its own weight plus a minimum 40psf live load after installation when the tank is full or empty. The FRP Walkable Launder Cover shall also be designed for wind uplift and shall also be suitable for supporting a 300 lb. concentrated load area of 2.5 feet x 2.5 feet.

**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 = _____	Known obstructions = _____
Scum baffle offset from weir = _____	

**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. Standard design and characteristics shall be based on materials and components provided by:
  1. Enduro Composites, Inc., Houston, TX (713) 358-4000, [www.endurocomposites.com](http://www.endurocomposites.com).

2. Approved equal by Engineer.

## 2.02 Materials

- A. FRP Walkable Launder Cover panels and appurtenances shall be fiberglass reinforced plastic pultruded 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. Walkable Launder Cover panels shall include structural glass fiber reinforcements 50% (minimum) by the material weight embedded with UV stabilized Isophthalic polyester resin for additional corrosion protection. The color shall be standard gray. Factory cut edges and drilled holes shall be sealed.
- B. FRP Walkable Launder Cover panels shall exhibit these minimum properties (unless noted otherwise):
- |                               |  |             |
|-------------------------------|--|-------------|
| a. Stiffness (EI)             | 46,000 lb-in. <sup>2</sup>                   |             |
| b. Tensile Strength           | 30,000 psi                                   | ASTM D 638  |
| c. Flexural Strength          | 30,000 psi                                   | ASTM D 790  |
| d. Compressive Strength       | 30,000 psi                                   | ASTM D 695  |
| e. Izod Impact (Notched)      | 20.0 ft-lb/in                                | ASTM D 256  |
| f. Water Absorption           | .20% maximum                                 | ASTM D 570  |
| g. Barcol Hardness            | 50 (nominal)                                 | ASTM D 2853 |
| h. Coef. of Thermal Expansion | 8.0 x 10 <sup>-6</sup> inch/inch/F (average) | ASTM D 696  |
- C. FRP Walkable Launder Cover Panels
- a. Nominal panel size is 3/16" thick x 6 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 walkable launder cover panels shall be designed and pultruded of UV protected fiberglass-reinforced polyester resin composite laminate opaque to sunlight.
  - c. The FRP Walkable Launder 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 walkable launder cover shall match the tank curvature (if round) or straight (if rectangular) 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 allow access to the launder and weir for inspection and maintenance.
  - f. Cover design as shown or intended in the contract documents, shall open away from the operator (towards the interior of the tank) yet ultimately may depend on certain qualities or parameters associated with a particular tank configuration.
  - g. Provide a means to restrain the cover from opening in the closed position.
  - h. 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.
  - i. 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.
  - j. Enduro recommends adding a safety railing according to OSHA requirements to prevent falling from the walkable launder cover. Safety railing requirements are project specific according to local and state requirements and shall be defined elsewhere in the project specifications.
- D. Hardware
- a. Shall be 316 Stainless-steel fasteners, anchorage, and other structural hardware (as indicated) shall be stainless steel provided by the manufacturer:
  - b. Cover panel fasteners shall either be nut and bolt type assembly with washers and lock washer or self-tapping screws (if applicable or as indicated).
  - 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. Installer shall erect the FRP walkable laundry 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 according to the approved submittal drawings. 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 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.