

# **SPECIFICATION: FIBERGLASS REINFORCED PLASTIC (FRP) WEIR AND SCUM BAFFLES**

## **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) Weir and Scum Baffle Panels, which includes but is not limited to:

- A. FRP Weir panels.
- B. FRP Scum Baffle panels.
- C. FRP Splice plates.
- D. FRP Scum Baffle supports.
- E. Stainless steel fasteners and connections.

### **1.02 Quality Assurance**

- A. FRP materials shall comply with ANSI/AWWA F102 standards for weir and scum baffle manufacture.
- B. The manufacturer must be ISO 9001 certified and manufacture the FRP components in their own facilities.
- C. FRP weirs, scum baffles and associated FRP components shall be ANSI/NSF Standard 61 certified for potable water application (as applicable for water treatment applications).
- D. 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.
- E. Weir and scum baffle components (excluding any associated concrete items) shall be provided by a single manufacturer to ensure coordination and compatibility of component parts.
- F. The manufacturer of the weir and scum baffle shall have full responsibility for products and design. Split responsibility of material or design is not acceptable.
- G. The manufacturer of the weir and scum baffle must be the manufacturer and fabricator of the fiberglass components utilized on the pre-engineered weir and scum baffle. 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 weir and scum baffle provided on this project.
- H. The manufacturer shall maintain a continuous quality control program with supporting documentation.
- I. The manufacturer of weir and scum baffle shall have completed within the last five (5) years a minimum of five (5) projects of similar type as those required in this scope.
- J. The manufacturer shall warrant the weir and scum baffle to be free of defects in materials and workmanship for a period of one (1) year after the date of delivery.
- K. FRP material shall be manufactured with a UV stabilized isophthalic polyester resin with corrosion-resistant properties. The weirs and baffles shall be fabricated to Type I classifications as defined in ANSI/AWWA F102 except that only isophthalic polyester resin formulations shall be considered. Orthophthalic formulations are not allowed.

### **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**

Weir and scum baffle design parameters determine the flow characteristics (load) through the tank(s) to meet a desired plant handling capacity. The manufacturer relies on this critical information to provide an accurate arrangement for these products to function properly as intended. Actual design requirements, which vary from plant to plant with process, must be specified by the consulting design engineer for each application.

**Standard Design Parameters (Imperial or Metric):**

Weir Invert Elevation = _____	Tank Water Elevation = _____
Weir V-Notch Depth = _____	Weir to Scum Baffle Distance = _____
Weir Size (Height) = _____	Scum Baffle Size (Height) = _____
Weir Wall Top Elevation = _____	Scum Baffle Top Elevation = _____
Weir Wall Inner Radius = _____	Scum Baffle Bracket Elevation = _____

**1.06 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, characteristics, and performance 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 weir and scum baffle panels and appurtenances shall be fiberglass reinforced plastic molded to produce uniform smooth surfaces. The surface shall be resin rich, free of voids and porosity, without dry spots, crazes or unreinforced areas and shall provide for increased corrosion resistance. Weir and scum baffle panels shall include a minimum glass fiber reinforcement of 40% by material weight embedded within UV stabilized isophthalic polyester resin with corrosion resistant properties. The glass reinforcement shall be an ECR or boron-free glass suitable for the production process. The color shall be standard gray. FRP material shall have a surfacing veil on both sides. Factory cut edges and drilled holes shall be sealed with resin.

B. FRP weir and scum baffle panels shall exhibit these properties (minimum unless noted otherwise):

a. Tensile Strength	30,000 psi	ASTM D 638
b. Flexural Strength	30,000 psi	ASTM D 790
c. Flexural Modulus	1,800,000 psi	ASTM D 790
d. Izod Impact (Notched)	20.0 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	8.0 x 10 <sup>-6</sup> inch per inch °F	ASTM D 696

C. FRP Weir Panels

- a. FRP Weir panels shall be a nominal size of 1/4” thick x 9” high x 12’-0” standard length (other panel heights available) unless otherwise indicated in the drawings.
- b. FRP weir panel standard notches shall be 2-1/2 inches deep by 90 degrees on 6-inch centers unless otherwise indicated on the drawings.
- c. FRP weir panel standard splice plates shall be 1/4” thick x 9” high x 6” long unless otherwise indicated on the drawings.
- d. Panel mounting holes shall be oversized to provide for vertical and horizontal alignment of at least +/- 1” (2 inches total) and shall be placed at 24” on center (maximum) for round tanks and 12” on center (maximum) for straight tanks and covered with 5-inch diameter FRP weir washers, or unless otherwise indicated in the plans and specifications.
- e. Mounting hardware shall be stainless steel concrete anchors or bolt type fasteners.

D. FRP Scum Baffle Panels

- a. FRP Scum Baffle panels shall be a nominal size of 1/4” thick x 12” high x 12’-0” standard length (other panel heights available) unless otherwise indicated on the drawings.

- b. FRP scum baffle panel standard splice plates shall be 1/4" thick x 12" high x 6" long unless otherwise indicated on the drawings. Panel surface mounting holes shall be countersunk to accommodate flathead fasteners.
- c. Scum baffle support brackets shall be 3/8" thick x 6" deep x 6" high x 6" long FRP angles with adjustable mounting holes to provide for vertical and radial horizontal alignment of at least +/- 3/4" (1.5 inches total) to be installed on 48 inch maximum spacing.
- d. Mounting hardware shall be stainless steel concrete anchors or bolt type fasteners.

E. Hardware

- a. Shall be 316 stainless-steel for fasteners, anchorage, and other structural hardware provided by the manufacturer.
- b. Scum baffle support fasteners shall be nut and bolt type assembly with washers and 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.
- B. The Contractor shall protect FRP materials from cuts, scratches, gouges, abrasions, and impacts. When lifting crated 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.

### **3.02 Installation**

- A. Before placing and attaching components, the contractor shall confirm the alignment and location of weir and scum baffles. All bearing surfaces must be level, flat, clean, and free of debris.
- B. Before placement of weir and scum baffle panels, the contractor shall check alignment and location of concrete tank structure.
- C. The contractor shall modify uneven or sloped concrete surfaces to create a flat, level, or smooth surface for weir and scum baffle attachment.
- D. Erection shall proceed according to sequence shown on the approved drawings.
- E. Contractor shall fasten weir panels to the launder and scum baffle panels to supports as shown on the approved layout drawings. Unless noted otherwise, FRP weirs and scum baffle support brackets shall be attached to the launder or tank wall with approved concrete anchors or hex head fasteners for non-concrete applications. The FRP scum baffle panels shall be attached to each support with a nut, flat washer, lock washer and flathead bolt assembly. At panel side laps, fastening shall be through one splice plate and the two adjacent panels. Refer to manufacturer's instructions in the Enduro Installation - Operation - Maintenance Manual (IOM) and approved drawings for proper fastener selection and procedure.
- F. The contractor shall field cut materials only as directed by Enduro Composites and as shown on the manufacturer's drawings and according to Enduro IOM manual. Field modifications (cuts, copes, holes, etc.) unless shown on the drawings are not allowed without the manufacturer's written approval.
- G. The contractor shall seal field cut edges and field-drilled holes with Enduro approved material or with NSF approved material if applicable.
- H. The contractor shall adjust FRP weir and scum baffle panels for proper bearing and alignment.
- I. Contractor shall place and fasten other miscellaneous components or hardware as shown on the approved drawings.