

## Section 06600

### Fiberglass Reinforced Plastic Grating and Structural Systems

#### Part 1. General

##### 1.01 Related Documents

- A. Contract drawings, including general drawings and addenda drawings.
- B. General specification sections.

##### 1.02 Summary

- A. This section includes:
  - 1. FRP Grating and Stair Treads
  - 2. FRP Grating Embedment Angle Frames
  - 3. FRP Structural Fabrications
  - 4. FRP Stairs
  - 5. FRP Handrail
  - 6. FRP Ladders and Cages

##### 1.03 Scope of Work

- A. The Contractor shall furnish all labor, materials, equipment, and incidentals as required to properly install all of the FRP Products specified herein.

##### 1.04 Quality Assurance

- A. All FRP Products and Fabrications shall be supplied by an experienced firm who has continually engaged in the manufacture and/or fabrication of fiberglass reinforced plastics. Firms not listed in this specification must clearly document a minimum of five years experience with similar products of equal scope or design.
- B. The Installing Contractor shall: assure that all field dimensions are taken accurately and communicated properly to the FRP Fabricator, that other trades will not affect a proper installation of the FRP, and that all Manufacturer's instructions and recommendations are followed.
- C. No substitution of materials will be accepted unless they are submitted for review and the Architect/Engineer approves their use.

##### 1.05 Design Requirements

- A. All fabrication shall comply with OSHA – 29 CFR as it pertains to worker safety and walking-working surfaces for stairs, ladders, handrail, and platforms.
- B. FRP Grating shall be designed to support 65 lbs. per square foot Uniform Load. Deflection shall not exceed 0.250 inch.
- C. FRP Structural Shapes shall be designed to support all applicable loads. Deflection shall not exceed L/D of 180.

##### 1.06 Submittals

- A. Submit complete shop drawings and product data for all FRP materials and fabrications as required by this scope of work.
- B. Product data:
  - 1. Manufacturer's catalog data with load and deflection charts for all FRP Gratings.
  - 2. Manufacturer's catalog data for all FRP Structural Shapes.
- C. Shop drawings:
  - 1. Shop drawings shall show all FRP materials as required and include all dimensions, connections, fasteners, tolerances, assembly and installation details as required.

#### Part 2. Products

##### 2.01 General

- A. All FRP materials shall be manufactured with (*select from Seasafe's FRP Grating publications*) resin as selected by the designer.
- B. All structural shapes shall be constructed of continuous strand roving, continuous transverse mat, and a synthetic surface veil. Including ultraviolet (UV) inhibitors.
- C. All structural grating & shapes shall be flame retardant per ASTM E-84 Class 1 Flame Spread equal to or less than 25.
- D. All structural grating & shapes shall be Halogen-free.
- E. After fabrication of FRP, all cuts, holes, and abrasions shall be sealed to prevent corrosion.

## Section 2.02 Grating and Stair Treads

As a specifier, you have two options. Choose one of the following FRP gratings and insert the appropriate section:

- Open-Molded Grating (GatorGrate)**
- Pultruded Grating (GatorDeck)**

Open-Molded Grating (GatorGrate)	<p><b>2.02 FRP Grating and Stair Treads</b></p> <p>A. FRP Grating to be open-molded fiberglass grating made in one-piece by interweaving continuous, thoroughly wetted, fiberglass strand with a (<i>select resin system and description from catalog</i>) resin system with ultraviolet (UV) inhibitors.</p> <p>B. Grating shall be GatorGrate (<i>select designation number from catalog</i>) with thickness of (<i>select corresponding thickness from catalog</i>) and a grid pattern of (<i>select corresponding grid pattern from catalog</i>).</p> <p>C. Color shall be manufacturer's standard.</p> <p>E. FRP Grating shall be designed to support 65 lbs. per square foot Uniform Load. Deflection shall not exceed 0.250 inch.</p> <p>F. Stair Treads shall have gritted safety integral bull nosing.</p> <p>G. All platform grating shall be attached with type 316 stainless steel grating clips. Minimum of 4 clips per piece and 2 per structural support.</p> <p>H. Manufacturers: <b>Seasafe Inc., 209 Glaser Drive, Lafayette, LA. 70508 (800) 326-8842.</b></p>
Pultruded Grating (GatorDeck)	<p><b>2.02 FRP Grating and Stair Treads</b></p> <p>A. FRP Grating to be pultruded fiberglass grating, made with pultruded components using a (<i>select either Isophthalic-Polyester or Vinylester</i>) resin system with ultraviolet (UV) inhibitors and assembled using a locking cross-rod design that makes a permanently bonded mechanical connection between the cross-rod and the bearing bar. The grating shall meet ASTM E-84 Class 1 Flame Spread of less than 25 and ASTM D-635 self-extinguishing.</p> <p>B. Grating shall be GatorDeck (<i>select designation number from catalog</i>) with a thickness of (<i>select corresponding thickness from catalog</i>) and bearing bar centers spaced at (<i>select corresponding bearing bar spacing from catalog</i>).</p> <p>C. Color shall be <i>Safety Yellow or Gray</i>.</p> <p>D. Grating shall have a slip resistant epoxy grit surface.</p> <p>E. FRP Grating shall be designed to support 65 lbs. per square foot Uniform Load. Deflection shall not exceed 0.250 inch.</p> <p>F. Stair treads shall have an OSHA approved gritted nosing.</p> <p>G. All platform grating shall be attached with type 316 stainless steel grating clips. Minimum of 4 clips per piece and 2 per structural support.</p> <p>H. Manufacturers: <b>Seasafe Inc., 209 Glaser Drive, Lafayette, LA. 70508 (800) 326-8842.</b></p>

### 2.03 FRP Grating Embedment Angle Frames

- A. All FRP Grating set in concrete openings shall have a FRP embedment angle frame.
- B. Embedment angle frame to be EBA-10, EBA-15, or EBA-20 as required for the thickness of grating specified above.
- C. Embedment angle shall have a continuous integral anchor.
- D. FRP embedment angle frames shall be vinylester resin.
- E. Manufacturers: **Seasafe Inc., 209 Glaser Drive, Lafayette, LA. 70508 (800) 326-8842.**

### 2.04 FRP Structural Fabrications

- A. FRP structural shapes shall be (*select either Isophthalic-Polyester or Vinylester*) pultruded fiberglass shapes. All shapes shall meet ASTM E-84 Class 1 Flame Spread equal to or less than 25 and ASTM D-635 self-extinguishing.
- B. The minimum properties shall be:

Property	ASTM	Longitudinal Direction	Transverse Direction
Tensile Stress	D-638	30,000 psi	7,000 psi
Tensile Modulus	D-638	2.5 x 10 <sup>6</sup> psi	0.8 x 10 <sup>6</sup> psi
Compressive Stress	D-695	30,000 psi	15,000 psi
Compressive Modulus	D-695	2.5 x 10 <sup>6</sup> psi	1.0 x 10 <sup>6</sup> psi
Flexural Stress	D-790	30,000 psi	10,000 psi
Flexural Modulus	D-790	1.8 x 10 <sup>6</sup> psi	0.8 x 10 <sup>6</sup> psi
Modulus of Elasticity, E	Full Section	2.8 x 10 <sup>6</sup> psi	

- C. All structural shapes shall be fabricated per the drawings with commercial workmanship, closely fitted joints, and finished true to line and in accurate position to permit installation and proper joining of parts in the field.
- D. Use types 316 stainless steel bolts and washers.
- E. All joint surfaces to be bonded shall be abraded to remove surface gloss and be free of burrs or other foreign materials that would prevent proper adhesion.
- F. Use mechanical fasteners designed for FRP use.
- G. All pieces to have easily identified part numbers or piece marks.
- H. Shop assemble pieces into the largest practical assembly suitable for shipping.
- I. Manufacturers: **Seasafe Inc., 209 Glaser Drive, Lafayette, LA. 70508 (800) 326-8842.**

## 2.05 FRP Stairs

- A. Fabricate stringers and structural support as required, from FRP structural shapes as noted in section 2.04.
- B. Use OSHA standards for rise and run.
- C. Use Stair Treads as specified in section 2.02.
- D. Use FRP guardrail as specified in section 2.06.
- E. Use type 316 stainless steel hardware throughout.
- F. Manufacturers: **Seasafe Inc., 209 Glaser Drive, Lafayette, LA. 70508 (800) 326-8842.**

## 2.06 FRP Guardrail

### 2" Square Guardrail System

- A. The guardrail system shall be made from (*select either Isophthalic-Polyester or Vinylester*) resin, as selected by the Designer. All FRP structural shapes shall comply with Section 2.04.
- B. Maximum guardrail post spacing is 5'-0" on center.
- C. Guardrail posts and rail shall be 2" x 2" x 1/4" square tube. All posts and rails shall use the same tube size. All tubing for guardrail to have a minimum 1/4" wall thickness.
- D. All guardrail to be safety yellow.
- E. All post to rail connections to be fully bonded with an epoxy adhesive and shall have an internal connection plug for added strength and durability. All connections to have a smooth transition between post and rail.
- F. FRP guardrail to be standard two-rail design with kick plate unless otherwise noted.
- G. Manufacturers: **Seasafe Inc., 209 Glaser Drive, Lafayette, LA. 70508 (800) 326-8842.**

## 2.07 FRP Ladders and Cages

- A. Ladders and cages shall be made from (*select either Isophthalic-Polyester or Vinylester*) resin, as selected by the Designer. All FRP ladders and cages shall comply with Section 2.04.
- B. All ladder and cage components shall be flame retardant per ASTM E-84 Class 1.
- C. Ladder rails shall be 2" x 2" x 1/4" square tube. Ladder rungs shall be (*select either 1" diameter solid round with grit or 1 1/4" diameter fluted round.*)
- D. Ladders and cages are to be safety yellow.
- E. Ladder rungs are to penetrate inside wall of ladder rail tube and be countersunk into outside wall of ladder rail tube, providing support for the ladder rung in four places. This connection is to be fully bonded and with epoxy adhesives and pinned to prevent rung rotation.
- F. Ladder rungs to have slip-resistant grit surface or integral fluted surface.
- G. Ladder stand-off brackets are to be FRP and are to be installed at a maximum of 6'-0" on center. Ladder base mount brackets are to be FRP. All hardware is to be type 316 stainless steel.

- H. Ladder cages, if required per OSHA, shall be fabricated from FRP Hoops and Straps. FRP Hoops are to be 3" x 1/4" preformed FRP. Hoop spacing shall be a max. of 4'-0" on center. FRP Straps are to be 2" x 1/4" FRP and are to be spaced at 9" on center. Hoops and Straps are to be bonded with epoxy adhesives and riveted with type 316 stainless steel rivets.
- I. Manufacturers: **Seasafe Inc., 209 Glaser Drive, Lafayette, LA. 70508 (800) 326-8842.**

### **Part 3. Execution**

#### **3.01 Inspection**

- A. Upon receipt of material at job site, the Contractor shall inspect all materials for shipping damage. Any damages or material shortages to be noted on the shipping receipt/packing list and reported promptly to the Shipper no later than 30 days after receipt of materials.

#### **3.02 Handling and Storage**

- A. Handle all FRP materials with reasonable care to prevent damage. Use shipping pallets to move material. Do not drag FRP materials.
- B. If FRP materials are not to be installed immediately, then store to prevent twisting, bending, breaking, or damage of any kind.

#### **3.03 Installation**

- A. Installing Contractor to coordinate and verify that other construction trades and materials have been installed per the contract drawings, and, that they are accurate in location, alignment, elevation, and are plumb and level.
- B. Install FRP materials in accordance with the installation drawings supplied by the FRP Supplier.
- C. Install materials accurately in location and elevation, level, and plumb. Field fabricate as necessary for accurate fit.
- D. All field cuts, holes or abrasions must be sealed with approved sealant.
- E. If the scope of work requires the Contractor to perform additional tasks, which may damage the installed grating, the Contractor is responsible for covering the grating with plywood, or other suitable protective material.

**End of Specification**