

Section 06600

COMPRESSION-MOLDED Fiberglass Reinforced Plastic Grating and Structural Fabrications

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 Pultruded 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 plastic. Any firm not listed in this specification must clearly document a minimum of five years experience with similar projects with 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 instruction 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. 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 100 lbs. per square foot Uniform Load. Deflection shall not exceed .25 inch.
- C. FRP Structural Shapes shall be designed into structures that will support all applicable loads. Deflection shall not exceed L/D of 180.

1.06 Submittals

- A. Submit complete shop drawings and engineering data for all FRP materials and fabrications as required by this scope of work.
- B. Product data:
 - 1. Manufacturers catalog data with load charts for all FRP Gratings.
 - 2. Manufacturers 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 either Isophthalic-Polyester or Vinylester*) resins.
- B. All pultruded grating and structural shapes shall be constructed of strand roving, transverse mat, and a synthetic surface veil. Including ultraviolet (UV) light inhibitors.
- C. All structural shapes shall be flame retardant per ASTM E-84 Class 1 Flame Spread of less than 25.
- D. After fabrication of FRP, all cuts, holes, and abrasion shall be sealed to prevent corrosion.

2.02 FRP Grating and Stair Treads

- A. FRP grating to be molded fiberglass grating made with (*select resin system and description from catalog*).
- B. Grating shall be Kordek (*select part number from catalog*). Grating to be (*select corresponding thickness from catalog*) thick with a grid pattern of (*select corresponding grid pattern from catalog*).
- C. Color shall be (*select corresponding color for grating from catalog*).
- D. FRP Grating shall designed to support 100 lbs. per square foot Uniform Load. Deflection shall not exceed .25 inch.
- E. All molded grating shall have ultraviolet (UV) inhibitors.
- F. Grating and Stair Treads shall have integral embedded grit for slip resistance.
- G. Stair Treads shall have 1-3/4" safety yellow integral bull nosing.
- H. All platform grating shall be attached with 316 stainless steel grating clips. Minimum of 4 clips per piece.
- I. Manufacturers: Seasafe Inc., Lafayette LA, (800) 326-8842 or approved equal

2.03 FRP Grating Embedment Angle Frames

- A. All FRP Grating set in concrete openings shall have a FRP embed angle frame.
- B. Embed angle frame to be EBA-10, EBA-15, or EBA-20 as required for the grating specified above.
- C. Embed angle have continuous integral anchor.
- D. FRP embed angle frames shall be Vinylester.
- E. Manufacturers: Seasafe Inc., Lafayette LA, (800) 326-8842 or approved equal

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 of less than 25 and ASTM D-635 self-extinguishing.

B. The minimum physical properties shall be:

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

- C. All structural shapes shall be fabricated per the drawings with good 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 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 high-strength epoxy adhesives designed for FRP use and mechanical fasteners.
- 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., Lafayette LA, (800) 326-8842 or approved equal

2.05 FRP Stairs

- A. Fabricate 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 handrail as specified in section 2.06.
- E. Use 316 stainless steel bolts throughout.
- F. Manufacturers: Seasafe Inc., Lafayette LA, (800) 326-8842 or approved equal

2.06 FRP Handrail

- A. The handrail system shall be made from (*select either Isophthalic-Polyester or Vinylester*) resin.
- B. All handrail components shall be flame retardant per ASTM E-84 Class 1.
- C. Handrail 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 handrail to have a minimum 1/4" wall thickness.
- D. All handrail to be safety yellow.
- E. All post to rail connection to be fully bonded with an epoxy adhesive and shall have a 1-1/2" square solid internal connection plug for added strength and durability. All connections to have a smooth transition between post and rail.
- F. FRP handrail to standard 2-rail design unless noted otherwise.
- G. Manufacturers: Seasafe Inc., Lafayette LA, (800) 326-8842 or approved equal

2.07 FRP Ladders and Cages

- A. Ladders and cages shall be made from (*select either Isophthalic-Polyester or Vinylester*) resin.
- 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 1 inch diameter solid 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 4 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 quartz epoxy grit 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 bolts are to be 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 316 stainless steel rivets.
- I. Manufacturers: Seasafe Inc., Lafayette LA, (800) 326-8842 or approved equal

Part 3. Execution

3.01 Inspection

- A. Upon receipt of material at job site, the Contractor shall inspect all materials for shipping damage.

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 material.
- B. If FRP materials are not to be installed immediately, then store to prevent twisting, bending, breaking, or damage of any kind. Keep material covered to prevent unnecessary exposure to UV.

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 sealing resin to prevent corrosion.

End of Section