



FRP Specifications

Section 06 74 13 Fiberglass Reinforced Polymer (FRP) Pultruded Grating/Treads and Fabrications

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SECTION 06 74 13

FIBERGLASS REINFORCED POLYMER (FRP) PRODUCTS AND FABRICATIONS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS:

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Sections, apply to work of this section.
- B. ANSI/ACMA/FGMC FRP Composites Grating Manual for Pultruded and Molded Grating and Stair Treads.

1.02 SUMMARY:

- A. This section includes FRP Products & Fabrications for FRP Pultruded Gratings and Stair Treads.

1.03 SCOPE OF WORK:

- A. Furnish all labor, materials, equipment and incidentals governed by this section necessary to install the fiberglass reinforced polymer (FRP) products as specified herein.

1.04 QUALITY ASSURANCE:

- A. The material covered by these specifications shall be furnished by an ISO 9001 certified manufacturer of proven ability who is regularly engaged in the manufacture, fabrication and installation of FRP systems.
- B. Substitution of any component or modification of system shall be made only when approved by the Architect or Design Engineer.
- C. Fabricator Qualifications: Firm experienced in successfully producing FRP fabrications similar to that indicated for this project, with sufficient production capacity to produce required units without causing delay in the work.
- D. In addition to requirements of these specifications, comply with manufacturer's instructions and recommendations for work.

1.05 DESIGN CRITERIA:

- A. The design criteria of the FRP pultruded grating, including connections, shall be in accordance with governing building codes and accepted standards in the FRP composites industry.
- B. Gratings: Design live loads of FRP gratings for walkway applications shall be 60 psf (2.87 kN/m²) uniformly distributed load per ASCE 7 or as required by the governing building code with a maximum deflection of 0.25" (6.4mm) at the center of a simple span.
- C. Stair Treads: Stair treads shall be designed for a uniform load of 100 psf (4.79 kN/m²) per ASCE 7 or a concentrated load of 300 lbs (1.33 kN) on an area of 4 sq. inches (2580.6 mm²) located in the center of the tread, whichever produces greater stress and deflect less than 0.25" (6.4 mm). The two loads do not act concurrently.
- D. Structural support members shall not deflect more than L/180 of span for structural members unless specifically stated otherwise in drawings and/or supplementary conditions. Connections shall be designed to transfer the design loads.
- E. Temperature exposure is limited to _____ °F (_____ °C) unless specifically stated otherwise in drawings and/or supplementary conditions.

1.06 SUBMITTALS:

- A. Shop drawings of all fabricated pultruded gratings and treads shall be submitted to the Design Engineer for approval in accordance with the requirements of Section _____. Fabrication shall not start until receipt of Design Engineer's approval marked "Approved As Submitted" or "Approved As Noted".
- B. Manufacturer's catalog data showing:
 - 1. Materials of construction
 - 2. Dimensions, spacings, and construction of grating, handrails and building panels.
- C. Detail shop drawings showing:
 - 1. Dimensions
 - 2. Sectional assembly
 - 3. Location and identification mark
 - 4. Size and type of supporting frames required
- D. Samples of each type of product shall be submitted for approval in accordance with the requirements of Section _____.

1.07 SHIPPING AND STORAGE INSTRUCTIONS:

- A. All gratings and components shall be shop fabricated and assembled into the largest practical size suitable for transporting.
- B. All materials and equipment necessary for the fabrication and installation of pultruded gratings and treads and appurtenances shall be stored before, during, and after shipment in a manner to prevent cracking, twisting, bending, breaking, chipping or damage of any kind to the materials or equipment, including damage due to over exposure to the sun. Any material which, in the opinion of the Design Engineer, has become damaged as to be unfit for use, shall be promptly removed from the site of work, and the Contractor shall receive no compensation for the damaged material or its removal.
- C. Identify and match-mark all materials, items and fabrications for installation and field assembly.

PART 2 – PRODUCTS

2.01 GENERAL:

- A. Materials used in the manufacture of the FRP products shall be raw materials in conformance with the specification and certified as meeting the manufacturer's approved list of raw materials.
- B. All raw materials shall be as specified by the contract.
- C. The visual quality of the pultruded shapes shall conform to ASTM D4385.
- D. FRP pultruded grating and treads shall be manufactured using a pultruded process utilizing _____ (select polyester, vinyl ester or phenolic) resin with flame retardant and ultraviolet (UV) inhibitor additives. Unless a phenolic resin system is utilized, a synthetic surface veil fabric shall encase the glass reinforcement. FRP shapes shall achieve a flame spread rating of 25 or less in accordance with ASTM test method E-84, the flammability characteristics of UL 94 V-0 and the self-extinguishing requirements of ASTM D635. (Polyester resin is available without flame retardant and UV inhibitor additives.)
- E. If required, after fabrication, all cut ends, holes and abrasions of FRP shapes shall be sealed with a compatible resin coating.
- F. FRP products exposed to weather shall contain an ultraviolet inhibitor. Should additional ultraviolet protection be required, a UV coating can be applied.
- G. Manufacturers:
 - 1. Strongwell
- H. Pultruded FRP products shall be manufactured and fabricated in the USA. Manufacturer shall provide a written Certificate of Compliance.
- I. The materials covered by these specifications shall be furnished by an ISO 9001 certified manufacturer.

2.02 PULTRUDED GRATINGS AND TREADS:

A. General

1. Grating shall be shipped from the manufacturer, palletized and banded with exposed edges protected to prevent damage in shipment.
2. Each piece shall be clearly marked showing manufacturer's applicable drawing number.
3. Grating shall be DURADEK® or DURAGRID® as manufactured by Strongwell.

B. Design

1. Walkway and platform grating panels shall be _____ inches deep. See Strongwell's *Fiberglass Grating* brochure for a list of available sizes.
2. The bearing bars shall be joined into panels by passing continuous length fiberglass pultruded cross rods through the web of each bearing bar. A continuous fiberglass pultruded bar shaped section shall be wedged between the two cross rod spacers mechanically locking the notches in the cross rod spacers to the web of the bearing bars. Continuous adhesive bonding shall be achieved between the cross rod spacers and the bearing web and between the bar shaped wedge and the two cross rod spacers locking the entire panel together to give a panel that resists twist and prevents internal movement of the bearing bars. Each stair tread shall utilize a box-shaped nosing on its lead edge to enclose cross rods and ensure a smooth vertical edge.
3. The top surface of all panels shall have a non-skid grit affixed to the surface by an epoxy resin followed by a baked-on top coat of epoxy resin.
4. Surface should have a Wear Index of less than 1.0 when tested to ASTM D4060 (Before and after 750 hours of UV exposure per ASTM D4329 cycle A).
5. Panels shall be fabricated to the sizes shown on the drawings.
6. Hold down clamps shall be type 316L stainless steel clips. Use 2 at each support with a minimum of 4 per panel.

SELECT ONE

-or-

Hold down clamps shall be type 316L stainless steel insert hold downs as provided by Strongwell. Use 2 at each support with a minimum of 4 per panel.

7. Color shall be _____ (chosen from manufacturer's standard colors).

OPTIONAL

8. All bearing bars that are to be exposed to UV shall be coated with polyurethane coating to provide additional UV protection.

C. Products

1. The Pultruded FRP grating and stair treads shall be fabricated from bearing bars and cross rods manufactured by the pultrusion process. The glass fiber reinforcement for the bearing bars shall be a core of continuous glass strand rovings wrapped with continuous strand glass mat. With the exception of grating and stair treads manufactured using phenolic resin, a synthetic surface veil fabric shall encase the glass reinforcement.
2. Fiberglass Grating and Stair Treads
 - a) Fiberglass grating and stair treads shall be made from a chemical resistant, fire retardant _____ (select polyester, vinyl ester or phenolic) resin system to meet the flame spread rating of 25 or less in accordance with ASTM E-84 testing, the flammability characteristics of UL 94 V-0 and satisfies the self-extinguishing requirements of ASTM D-635. UV inhibitors are added to the resin to reduce UV attack.
3. Grating with SAFPLATE®
 - a) Grating shall be the same as described above in this section.
 - b) SAFPLATE® shall be made from EXTREN® as manufactured by Strongwell.
 - c) SAFPLATE® shall be manufactured using a premium polyester, vinyl ester or phenolic resin with fire retardant additive to meet Class 1 flame spread rating of 25 or less as tested by ASTM E-84 and meet the self-extinguishing requirements of ASTM D-635. All plate shall contain a UV inhibitor.
 - d) SAFPLATE® shall be epoxy bonded to the grating, and a non-skid grit shall be affixed to the top surface of the assembly.
4. If required, all cut and machined edges, holes and abrasions shall be sealed with a resin or compatible coating with the resin matrix used in the bearing bars and cross rods.
5. All panels shall be fabricated to the sizes shown on the approved shop drawings.

PART 3 – EXECUTION

3.01 PREPARATION:

- A. Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions and directions for installation of anchorages, including concrete inserts, sleeves, anchor bolts and miscellaneous items having integral anchors that are to be embedded in concrete or masonry construction.
- B. Coordinate delivery of such items to project site.

3.02 INSPECTION AND TESTING:

- A. The Design Engineer shall have the right to inspect and test all materials to be furnished under these specifications prior to their shipment from the point of manufacture.
- B. All labor, power, materials, equipment and appurtenances required for testing shall be furnished by the Contractor at no cost to the Owner.

3.03 INSTALLATION, GENERAL:

- A. Fastening to in-place construction: Provide anchorage devices and fasteners where necessary for securing miscellaneous FRP fabrications to in-place construction; include threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts and other connectors as determined by the Design Engineer.
- B. Cutting, fitting and placement: Perform cutting, drilling and fitting required for installation of miscellaneous FRP fabrications. Set FRP fabrication accurately in location, alignment and elevation; with edges and surfaces level, plumb, true and free of rack; measured from established lines and levels.
- C. Provide temporary bracing or anchors in form work for items that are to be built into concrete masonry or similar construction.
- D. Penetrations through grating may require additional supports in order to meet design criteria. The Design Engineer shall follow manufacturer recommendations for each occurrence.

3.04 ALL FRP INSTALLATION:

- A. If required, all field cut and drilled edges, holes and abrasions shall be sealed with a catalyzed resin compatible with the original resin as recommended by the manufacturer.
- B. Install items specified as indicated and in accordance with manufacturer instructions.

End of Section 06600