



## **FRP Specifications**

### **Section 06 70 00 Fiberglass Reinforced Polymer (FRP) Hollow Core Building Panels Products and Fabrications**

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## **SECTION 06 70 00**

### **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.

##### **1.02 SUMMARY:**

- A. This section includes FRP Products & Fabrications for FRP Hollow Core Building Panels.

##### **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 of DURASHIELD HC® fiberglass hollow core panels, the fiberglass support structure, and associated structural connections, shall be in accordance with the governing building code(s), the Strongwell Design Manual, and approved standards as applicable.
- B. Design live loads shall be in accordance with the governing building code as follows:  
Wall Panels shall be designed for the following wind load conditions using the methods in ASCE 7:  
Wind Velocity \_\_\_\_\_ (example: 85 mph)  
Exposure \_\_\_\_\_ (example: Exposure C)  
Wind Importance Factor \_\_\_\_\_ (example:  $I_w = 1.0$ )  
Maximum Deflection \_\_\_\_\_ (example:  $L/180$ )  
Roof Panels shall be designed for the following load conditions using the methods in ASCE 7 (the effect of ponding shall be considered):  
Design Snow Load \_\_\_\_\_ (example: 20 psf)  
Design Rain Load \_\_\_\_\_ (example: 15 psf)  
Design Live Load \_\_\_\_\_ (example: 20 psf)  
Maximum Deflection \_\_\_\_\_ (example:  $L/240$ )  
Floor Panels shall be designed for the following load conditions using the methods in ASCE 7:  
Design Live Load \_\_\_\_\_ (example: 60 psf for elevated walking surfaces that are not an emergency egress route)  
Maximum Deflection \_\_\_\_\_ (example: lesser of  $L/240$  or 0.25")
- C. Design the hollow core panels and support structure in accordance with the Strongwell Design Manual for in-service temperatures of \_\_\_\_\_ degrees Fahrenheit (example: 125 degrees) with ultimate stress retention of \_\_\_\_\_ (example: 85% for 125 degrees) and a modulus of elasticity retention of \_\_\_\_\_ (example: 90% for 125 degrees).
- D. Structural support members shall be designed to support the design loads with a total load deflection not exceeding \_\_\_\_\_ (example:  $L/240$ ) of the structural member span length.
- E. Structural connections shall be designed to transfer the design loads.
- F. Reinforce and stiffen penetrations in hollow core panels in accordance with the manufacturer's recommendations.

#### 1.06 SUBMITTALS:

- A. Shop drawings of all fabricated hollow core building panels 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 systems, sub-systems and structures 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 hollow core building panels 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. Hollow core building panels shall be manufactured using a pultruded process utilizing \_\_\_\_\_ (select polyester or vinyl ester) resin with flame retardant and ultraviolet (UV) inhibitor additives. 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 one mil minimum UV coating can be applied.
- G. All exposed surfaces shall be smooth and true to form, consistent with ASTM D4385.
- H. Manufacturers:
  - 1. Strongwell
- I. Pultruded FRP products shall be manufactured and fabricated in the USA. Manufacturer shall provide a written Certificate of Compliance.
- J. The materials covered by these specifications shall be furnished by an ISO 9001 certified manufacturer.

## 2.02 FRP HOLLOW CORE BUILDING PANELS

### A. Materials

1. Each panel shall be manufactured by the pultrusion process utilizing \_\_\_\_\_ (select premium polyester or vinyl ester) resin with flame retardant and UV inhibitor additives. A synthetic surfacing veil shall be an outermost layer covering the exterior surface. The FRP panel shall achieve a flame spread rating of 25 or less with ASTM E-84 test method, flammability characteristics of UL 94 V-0 and self-extinguishing requirements of ASTM D635.
2. Mechanical and physical properties shall meet or exceed the values listed in Table 4.

**Table 4 – Hollow Core Building Panel Properties (nominal)**

<b>Mechanical Property (Nominal)</b>	<b>ASTM Test Method</b>	<b>Units</b>	<b>Value</b>
Compressive Strength, LW	D695	psi N/mm <sup>2</sup>	50,000 344.8
Compressive Modulus, LW	D695	10 <sup>6</sup> psi 10 <sup>6</sup> N/mm <sup>2</sup>	3.5 24,141
Tensile Strength, LW	D638	psi N/mm <sup>2</sup>	58,000 400
Tensile Modulus, LW	D638	10 <sup>6</sup> psi 10 <sup>6</sup> N/mm <sup>2</sup>	3.5 24,141
Short Beam Shear	D2344	psi N/mm <sup>2</sup>	4,500 31.00

  

<b>Physical Property (nominal)</b>	<b>Units</b>	<b>Value</b>
Depth	in mm	1 25.4
Panel Width	in mm	12 304.8
Weight	lbs/linear ft kg/linear m	3.27 4.87
Area	in <sup>2</sup> mm <sup>2</sup>	3.914 2525
Section Modulus (S <sub>x</sub> )	in <sup>3</sup> /ft of width mm <sup>3</sup> /m of width	1.312 70,357
Moment of Inertia (I <sub>x</sub> )	in <sup>4</sup> /ft of width mm <sup>4</sup> /m of width	0.656 895,826
Coefficient of Thermal Expansion*	10 <sup>-6</sup> in/in/°F 10 <sup>-5</sup> mm/mm/°C	7.0 1.2
Flame Spread Rating (ASTM E-84)		Max 25
Water Absorption (ATM D-570)		<.6%

\* Typical Values



3. Fiberglass hollow core panels shall be DURASHIELD HC® as manufactured by Strongwell.

B. Connections

1. Panels will be designed for tongue-in-groove joint connections.
2. The panels are to be fastened to the super structure with epoxy adhesive and/or stainless steel or fiberglass fasteners as shown on the approved shop drawings.

C. Approved Manufacturers

1. Strongwell

## **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.

### **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's instructions.

**End of Section 06600**