FRP Specifications

Section 06600
Fiberglass Reinforced Polymer (FRP)
Secondary Containment System Products and Fabrications

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Table of Contents

SECTION 06600

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 a FRP Secondary Containment System.

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-9001:2008 certified manufacturer of proven ability with a minimum of 10-years of experience 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. Manufacturer Qualifications: Manufacturer with 10-years of experience in successfully producing FRP structural products similar to that indicated for this project, with sufficient production capacity to produce required units, and fabricate the secondary containment system, 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 volume of FRP secondary containment system shall be determined by the Design Engineer of record in accordance with the current Spill Prevention, Control and Countermeasure (SPCC) Rule as provided by The United States Environmental Protection Agency.

B. The design of the FRP secondary containment system shall be in accordance with the governing building codes and the Strongwell Design Manual considering the following minimum load conditions:

Wind Velocity _____ (example: 85 mph)
Exposure _____ (example: Exposure C)
Wind Importance Factor _____ (example: Iw = 1.0)
Design Hydraulic Loading _____ (example: 24" Liquid Height)

C. The FRP containment system panels and structural support members shall be designed to support the design loads with a total load deflection not exceeding L/100 of the member span length.

D. Structural connections shall be designed to transfer the design loads.

E. Reinforce and stiffen penetrations in containment panels in accordance with the manufacturer's recommendations.

F. Design the FRP secondary containment system 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).

1.06 SUBMITTALS:

A. Shop drawings of all fabricated FRP secondary containment systems shall be submitted to the Design Engineer of record 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

C. Detail installation drawings showing:
1. Plan dimensions
2. Section details
3. Location and identification marks of pieces
4. Size, type and location of supporting frames required

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 FRP secondary containment systems 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 secondary containment system 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 secondary containment systems shall be manufactured using a pultruded process utilizing polyester resin. A synthetic surface veil fabric shall encase the glass reinforcement.

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. 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-9001:2008 and ISO-14001:2004 certified manufacturer.

2.02 FRP DIVIDER WALL PANEL SYSTEM

A. Materials

1. Each panel, 3-way connector, hanger, 45º connector, toggle connector and end cap required to install the building panel shall be manufactured by the pultrusion process utilizing polyester ester with UV inhibitor additives. A synthetic surface veil shall be the outermost layer covering the exterior surface.

2. The following minimum mechanical properties shall apply:

Properties	ASTM Test Method	Units	Value
Flexural Strength, LW	D790	ksi N/mm^2	24.5 168.9
Flexural Strength, CW	D790	ksi N/mm^2	8.2 56.5
Flexural Modulus, LW	D790	ksi N/mm^2	885 6,101.9
Flexural Modulus, CW	D790	ksi N/mm^2	646 4,454.0
Tensile Strength	D638	ksi N/mm^2	31.1 214.4
Tensile Modulus	D638	ksi N/mm^2	2,486 17,140.4
Short Beam Shear	D2344	ksi N/mm^2	3.19 22.0

3. FRP secondary containment system panels shall be COMPOSOLITE®[1] as manufactured by Strongwell.

B. Connections

1. Panels utilize integrally molded longitudinal grooves into which a connector or toggle is inserted during assembly.

2. Corners are joined by bonded and bolted connections using FRP angles inside and outside of each corner. Support posts are located based on wall height, with wall splices joined by bonded and bolted connections using FRP splice plates.

3. Toggles are utilized to lock panels and connectors.

4. For permanent structures, adhesives are applied in the small grooves along the length of the panel. Toggles mechanically secure components (panels and connectors) and create even pressure until adhesive is cured.

C. Approved Manufacturers

1. Strongwell

[1] COMPSOLITE® is a registered trademark of Maunsell Structural Plastics Ltd. and used by Strongwell Corporation pursuant to license.

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