

SPECIFICATION FOR FIBER REINFORCED POLYMER (FRP) COMPOSITE SHEET PILE COMPOSITE Z-200

1.1 SCOPE

This document addresses the use of fiber reinforced polymer (FRP) composite sheet pile.

1.2 REFERENCES

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM) TEST IDENTIFICATION:

ASTM D3039 Tensile Properties of Plastics

ASTM D790 Flexural Properties of Unreinforced and Reinforced Plastics

1.3 TERMINOLOGY

Fiber Reinforced Polymer (FRP) – A thermoset polymer matrix reinforced with a fiber or other material with a sufficient aspect ratio (length to thickness) to provide a discernable reinforcing function in one or more directions.

1.4 SUBMITTALS

The manufacturer shall submit to the contractor three (3) copies of their most recent product brochure for the FRP sheet pile product covered by this specification.

The submitted FRP sheet pile shall be manufactured in accordance with the requirements of this specification and shall be a standard commercial product. Additional or better features which are not specifically prohibited by this specification, but which are a part of manufacturer's standard commercial product, shall be included in the FRP sheet pile being furnished. A standard commercial product is one that has been sold or is currently offered for sale on the commercial market through advertisements or manufacturer's catalogs or brochures, and represents the latest production model.

1.5 QUALITY ASSURANCE

The manufacturer shall have in place a Quality Assurance Program that will ensure the FRP sheet pile is in conformance the intent of this specification. Each delivered section of FRP sheet pile shall be examined by an inspector of purchaser's designation for compliance with the appropriate requirements of this specification. This inspection shall encompass all visual examinations and dimensional measurements. Noncompliance with any specified requirements or presence of one or more major defects preventing or lessening maximum efficiency shall constitute cause for rejection.

2.1 MATERIALS

Polymer (resin) – The resin for the FRP sheet pile shall be either polyester or vinyl ester. Resin shall contain U.V. stabilizers to provide sufficient resistance to ultra violet light degradation. No other resins will be accepted for use on this project.

Reinforcement – The glass reinforcement shall be in the form of continuous roving, woven roving or stitched fabrics, and surface matting. The finished FRP sheet pile product shall meet the minimum section properties shown in Table I.

General Configuration – The FRP sheet pile shall be Z-shaped with a ball and socket interlock and meet the dimensional tolerances shown in Table II. The FRP sheet pile shall be gray in color unless otherwise stated in this specification document.

2.2 MANUFACTURING PROCESS

FRP sheet pile shall be manufactured using the pultrusion process. Pultrusion is defined as the continuous processing of raw materials by pulling resin-rich reinforcements through a heated steel die to form profiles of constant cross section of continuous length.

2.3 PROPERTIES

Table I – Section Properties

Property	Minimum Value
Modulus of Elasticity	3,000 ksi
Moment of Inertia	64 in ⁴ /ft
Section Modulus	16 in ³ /ft
Cross Sectional Area	4.9 in ² /ft

Table II – Dimensions/Tolerances and Weight

Specification	Value
Width / (tolerance)*	18.0” (+/- 0.10”)
Depth / (tolerance)	8.5” (+/- 0.05”)
Thickness / (tolerance)	0.260” (+/- 0.015”)
Weight (per lineal foot)	6.7 lbs/ft

* Measured from center of interlock to center of interlock

The following manufacturer is known to supply FRP sheet pile that complies with these requirements:

Composite Components, Inc.
P.O. Box 14295
North Palm Beach, FL 33408
Phone: (561) 848-2050

2.4 SHIPPING, STORAGE AND HANDLING

FRP sheet pile shall be shipped and stored in such a manner as to minimize scratching and damage. FRP sheet pile can be moved using traditional lifting and handling methods.

2.5 INSTALLATION

Installation shall be in accordance with manufacturer’s guidelines as noted in the installation guide.

2.5.1 FRP sheet pile shall be installed using traditional driving methods including vibratory hammers, impact hammers or water jets. Contractor should contact manufacturer for specific hammer recommendations.

- 2.5.2 Cutting and Drilling – FRP sheet pile can be cut using carbide edged masonry blades and drilled with carbide or cobalt tipped bits.
- 2.5.2 Repairability – If damaged, the FRP sheet pile may be repaired as per the manufacturer’s recommendations.
- 2.5.3 Bolts, Hardware, Wales, Tiebacks & Caps – As specified by project engineer and shown on plans.
- 2.5.4 Workmanship, Finish, and Appearance – FRP sheet pile shall be furnished in accordance with this specification shall be an acceptable match to approved samples in color and surface appearance. The product shall be free of defects that adversely affect performance or appearance.

3.1 METHOD OF MEASUREMENT

The quantity of FRP sheet pile to be paid for under the work specified will be the number of square feet installed in accordance with the plans and this specification.

4.1 BASIS OF PAYMENT

The unit price bid per square feet of FRP sheet pile shall include all costs for material, labor, equipment, fasteners and any other items required for completing the work including storage costs, disposal of unused materials and transportation costs.

END OF SECTION