



Everlast ESP 2.1 Seawall Specification

(Note: Italics mean engineer must choose one of the material options presented as a primer. Additional evaluation and detailing will likely be required to determine the fitness for use of the various products presented.)

1.0 Materials

1.1 ESP 2.1 Vinyl Sheet Piling

Sheet pile profile shall be manufactured with an interlocking feature that ensures adjacent panels maintain alignment. The sheeting shall be co-extruded with a virgin capstock and high quality reground substrate. The sheet pile shall be free from visible cracks and other injurious defects. The manufacturer's extrusion facility shall have at least 10 years experience with the manufacturing of vinyl sheet piling and 25 years experience with the manufacturing of other PVC parts. An acceptable supplier of the vinyl sheet piling is Everlast Synthetic Products, LLC, 1000 Wyngate Parkway, Suite 100, Woodstock, GA 30189, 800-687-0036.

1.1.1 Substrate – shall be a high grade homopolymer vinyl compound having the following minimum properties:

• Color	Unspecified	-----
• Specific Gravity	1.43	ASTM D-792
• Cell Class	13344	ASTM D-1784

1.1.2 Capstock – shall be comprised of virgin capstock homopolymer vinyl compound having the minimum following properties:

• Color	Light Grey or Clay	-----
• Thickness	10 mils	
• Specific Gravity	1.43	ASTM D-792
• Standard Industrial Code(SIC#)	3084	-----
• Cell Class	14335431122	ASTM D-4216

1.1.3 Properties of Vinyl Sheet Pile Part shall have the following minimum properties unless otherwise noted:

• Tensile Yield	6,300 psi	ASTM D-638
• Tensile Modulus	380,000 psi	ASTM D-638
• Creep Stress	5,000 psi (<4.0% strain)	ASTM D-5262 ^A
	4,000 psi (<3.0% strain)	
• Interface Direct Shear	20° (SM Soil)	ASTM D-5321 ^B
• Interlock Flow Rate	1.90x10 ⁻⁴ (60 psf) ^C	GSI Certified Lab ^D
	5.40x10 ⁻⁴ (360 psf) ^C	
• Profile Width	18 inches (max. width)	Interlock to Interlock
• Profile Depth	5.25 inches (max. depth)	Outside to outside flange
• I (moment of inertia)	20.3 in ⁴ /ft	-----
• Z (section modulus)	7.7 in ³ /ft	-----
• R _g (radius of gyration)	5.6 in (major axis)	-----
	2.0 in (minor axis)	
• Thickness	0.23 inches	-----
• Weight	2.83 lbs/SF	-----

^A Supplier shall provide a minimum of 10,000 hrs. of creep data on finished vinyl sheet pile part with a sample thickness of 0.25 inches.

^B Supplier shall provide interface direct shear data on a finished sheet pile part.

^C Units for interlock flow rate are in cubic feet per second / ft. of interlock / LF of wall.

^D Supplier shall provide interlock flow rate data from a lab certified by the Geosynthetics Research Institute (GRI).

1.2 Wales – wales for support of composite sheet piling shall be one of the following:

- *FRP Channel as noted on plans*
- *Double Steel Channel as noted on the plans*
- *SYP Timber as noted on plans*
- *Reinforced Concrete as noted on plans*

1.3 Structural Cap – top cap for support of composite sheet piling shall be one of the following:

- *FRP Cap as noted on plans*
- *Steel Channel as noted on plans*
- *SYP Timber as noted on plans*
- *CIP Concrete as noted on plans*

1.4 Tie-Back System – anchors used to tieback the seawall shall be as noted on the drawings. Otherwise, the following anchor types are acceptable:

- *SYP Timber piles and drag*
- *Manta Ray or Platypus Earth Anchors*
- *A.B. Chance Earth Anchors*
- *Reinforced Concrete Deadmen*
- *EverComp sheet piling with FRP channel stiffener as noted on plans*

1.5 Tie Rods and Miscellaneous Hardware

All steel not entirely encased in concrete shall be either all stainless steel (SS304 or SS316) or all hot dip galvanized (A136) steel (A36 or 572). This includes tie rods, all-threads, couplers, washers, nuts, carriage bolts and lag screws. No mixing of steel types will be allowed. If tie-rods will be hot-dip-galvanized, first four(4) feet of the tie-rod(end closest to the water) shall be field coated with coal tar epoxy or other approved bitumastic coating.

1.6 Backfill

- Backfill material placed behind the sheeting shall be free-draining and restricted to GW, GP, SW or SP per ASTM D2487.
- Other backfill materials may be used if approved by the engineer or if otherwise noted on plans.

2.0 Delivery and Storage

Upon delivery of materials to site, contractor shall visually inspect all materials for defects or damage. If serious defect or damage is detected, contractor shall notify engineer immediately. Store bundled sheet piling on a relatively level surface with a slight pitch to allow water to drain. Contractor should not break bundled sheets until ready for immediate installation.

3.0 Submittals

- 3.1 Complete descriptions of sheet piling driving equipment including hammers, extractors, protection caps and other installation appurtenances shall be submitted for approval prior to commencement of work.
- 3.2 Material Certification – manufacturer shall provide Letter of Certification from a registered professional engineer assuring that the sheet pile meets requirements set forth in Section 1.1.

4.0 Installation

- 4.1 Install driving guide, template or wale system to aid in driving a straight and plumb wall. A “two level” template as well as front and rear wale/bracing system is strongly suggested for tough and/or deep driving situations.
- 4.2 Drive sheet piling (preferably in pairs) by “Driving in Steps” or “Gang Driving”. Direction of installation should be with the male side of the sheet when possible. Mandrel, helmet or drive shoes may be required if driving through hard soil strata or obstructions. Water jet by displacement of soil shall only be used with non-cohesive soils (sands & gravels). Water jet shall not be used if driving through clay, silts or immediately adjacent to an existing structure without the written approval from the engineer. Water may be introduced to induce lubrication and liquefaction during installation. It is very important that the contractor drives sheets to required embedment depth. Under no circumstances shall the contractor cut-off or install shorter sheets without written authorization from engineer or the owner. Adequate precautions shall be taken to ensure that piles are driven plumb. Sheet piling shall not

be driven more than ½ inch per foot out of plumb in the plane of the wall, nor more than 1/16 inch per foot “out” of plumb perpendicular to the plane of the wall, nor more than 1 inch per foot “in” of plumb perpendicular to the plane of the wall.

- 4.3 Piles driven out of interlock with adjacent piles or otherwise damaged shall be removed and replaced by new piles at the contractor’s expense.
- 4.4 Install wales, tie rods and deadmen as noted on the project plans.
- 4.5 Install drainage system and weep holes (if required).
- 4.6 Backfill behind sheet pile in level compacted lifts (12” max. lift thickness).
Compaction of backfill shall be 95% based on ASTM D698. Testing of compaction shall be taken a minimum of 4’ behind the wall. Maintain heavy equipment at least four feet from back of sheeting.

5.0 Payment

Payment for vinyl sheet pile wall shall be based on linear foot of bulkhead acceptably installed. Payment shall be full compensation for supply and installation of sheet pile, wales, cap, hardware, tie rods, anchoring system and backfill.