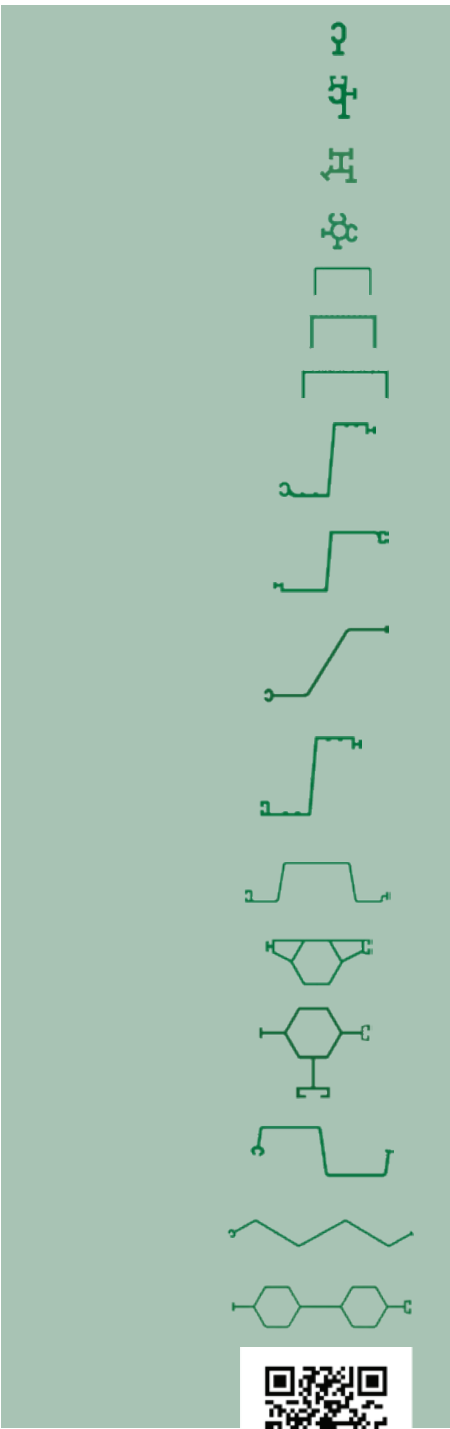


# ESC VINYL SHEET PILES CATALOG

2024 EDITION



## About ESC

Since the inception of ESC occurred in 1986, ESC have been looking to innovate piling solutions. The move into vinyl sheet piling is part of ESC's evolution to ensure the new demand for environmentally friendly systems is met.

ESC Group continues to achieve significant milestones as it goes beyond 35 years since its first sheet pile was driven at Magnetic Island, Australia in 1986.

Expansion into Asia happened in 1991 (firstly Singapore then Malaysia and onto China and Philippines) and set up in the Middle East in 2004. ESC arrived in the USA in 2012.

Now located in twenty (20+) countries and counting, ESC has so far established manufacturing and engineering offices in different regions throughout Asia, the Middle East and North America. This growth through project awards and market footprint spearheaded ESC's recognition and popularity in the global market helping it become one of the foremost trusted product and service providers with delivery of significant projects all over the world.

ESC, over the years, has evolved into an internationally certified organization with full capacity in Engineering and Design, Project Management, Research and Development, Manufacturing, Supply, and Construction.

Production is carried out in Statesville, North Carolina under Pietrucha ESC Inc, from Q2, 2024. All sales activities in North America and beyond will be carried out by ESC Steel LLC's vinyl sheet pile division ESC Vinyl Pile.

ESC Steel LLC/ESC Vinyl Pile is an integral part of the Group with locations in both North Carolina and Texas. The activities for the entire Continents of North and South America are coordinated from these offices along with those in Mexico and Brazil.



**Pietrucha ESC Inc.**





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# ESC VINYL SHEET PILES

Vinyl Sheet Piles or PVC Sheet Piles are an effective alternative to steel sheet piling for bulkheads, seawalls and cutoff walls. They are also superior to alternative materials like concrete and wood. The main advantage of vinyl sheet piles is the superior corrosion resistance when exposed to seawater, where no oxidation occurs. Vinyl sheet piles are also highly resistant to marine borers which make them superior to wooden solutions.

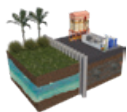
Browse through ESC's new range of sheet piles, manufactured in facilities in Europe in partnership with the Pietrucha Group. Soon to be manufactured in the USA. Vinyl Sheet Piling also known as Synthetic Sheet Piling, Plastic Sheet Piles, PVC Sheet Piles are becoming increasingly popular due to:

- **50+ year design life and warranty** - Due to their superior corrosion resistance, ESC Vinyl Sheet Piles can be used with confidence in their structural integrity and appearance even after 50 years.
- **Cost Efficiency** - both from installation and long term cost savings due to superior corrosion resistance and lower price per unit foot of material.
- **UV Resistance** - The PVC material is engineered with special compounds for resistance to harmful ultraviolet rays.
- **No toxic coatings** - No coatings are required, which may be detrimental to the environment.
- **Not Affected by Marine Borers** - Small mollusks or crustaceans in the ocean can cause devastating effects over a period of time to traditional timber piling. Vinyl Sheet Piling offers an attractive alternative that is unaffected by these organisms.
- **Easy Installation** - Compared to steel sheet piles, vinyl sheet piles can be up to 100 times lighter per square foot making it much easier to handle. Driving can also be completed under certain conditions by pressing down with an excavator or a impact vibrohammer.
- **Carbon Emissions** - Significantly lower than steel solutions.

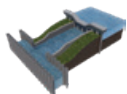


# Typical Applications

ESC Vinyl PVC Sheet Piles can be utilized for structures such as Embankments, Flood Walls or Levees, Stabilization of Dams, Protection of Piping and Ground Water Cut-off Walls.



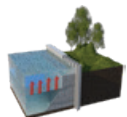
CONTAINMENT & CUTOFF SYSTEMS



WATER CONTROL



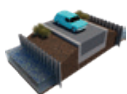
MARINE STRUCTURES



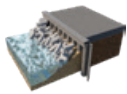
FLOOD CONTROL



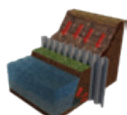
RETAINING WALL



EMBANKMENT WORKS  
ROAD CONSTRUCTION



REVTMENT WORKS



EROSION CONTROL

## Cutoff & Containment Barriers

ESC Vinyl Sheet Piles are frequently the optimal solution for fluid containment projects as they are made of an inert material that can exhibit superior chemical resistance and water corrosion resistance. The interlocks of the sheet pile can be co-extruded with a sealing membrane gasket that further improves cut-off performance. Alternatively, a hydrophilic sealant can be applied for swelling in contact with water. Applications include but are not limited to:

- Groundwater cut-off
- Chemical containment
- Fluid Seepage Barriers
- Protection of Foundation Structures

## Water Control Systems

Vinyl PVC Sheet Piles can be utilized for water control structures that function by altering the flow of water in a pond, drainage channel or stream. ESC sheet piles have been utilized for water control applications for decades. Examples of utilizing vinyl sheet piles relevant to water control systems include:

- Baffle Walls for water or waste water flow control
- Pond Linings
- River Weirs
- River Diversion
- Channel Linings for agricultural applications
- Mining drainage systems

## Marine Structures

Over the last 35 years ESC has been delivering sheet piling solutions to marine structures. Vinyl PVC Sheet Piles provide an excellent option for a long lasting structural solution due to their superior corrosion resistance, aesthetic finish and lightweight profile for easy handling and installation. The marine applications include:

- Marine Bulkheads & Seawalls
- Jetty Structures
- Tide Walls
- Groins
- Breakwaters
- Scour Protection and Erosion Control
- Wave Breaks
- Retaining Walls

## Flood Control

Vinyl PVC Sheet Piles can be utilized for flood protection structures:

- Flood Walls / Flood Levee
- Stabilization of Dams
- Protection of Piping

Vinyl Sheet Piles are frequently utilized to replace old corroded sheet pile structures as a superior alternative with superior corrosion resistance that is environmentally friendly.

# ESC VINYL SHEET PILING WITH GASKETS

## Geotechnical piling for special purposes

The tightness of locks in the vinyl sheet piling walls depends on the following factors:

- The shape of a lock, which can elongate or reduce the distance travelled by water.
- The width of a single vinyl sheet pile. The wider the section, the lower the number of locks per unit of length of the wall, e.g. by replacing 11.81in (300 mm) width piles with 23.86in (606 mm) piles, the leaking factor of the wall will be reduced by the factor of two.
- The PVC material is engineered with special compounds for resistance to harmful ultraviolet rays.
- The hydrostatic pressure affecting the wall. The higher the pressure, the lower the possibility of clogging of locks.
- The stress levels at the locks' contact area. The higher the tightness and the pressure on the locks' wall surfaces, the smaller the occurring gaps, therefore, rendering the flow of water through the lock limited.

### Sheet piling for special purposes

Some strategic investment projects require a guarantee of full water-tightness of the vinyl sheet piling constructions. In response to the needs expressed by customers, a specialized tightening solution based on the use of gaskets was specifically designed for this purpose.

The gaskets are made out of soft PVC and co-extruded into the locks during the manufacturing process. Their shape is determined by the type of the vinyl sheet piles.



### Comparison to Other Materials

TYPE OF PROFILE	VINYL (PVC)	STEEL	CONCRETE	WOOD
Cost	Low	High	Medium	Low
Weight	Light	Heavy	Very Heavy	Medium
Resistance to Corrosion	High	Low	N/A	N/A
Resistance to Chemicals & Sea Water Environment	High	Low	High	Low
Resistance to Cracking & Spalling	High	High	Medium	N/A
Environmentally Friendly	Yes	Yes	No	No
Aesthetics	High	Low	Medium	Medium
Installation	Easy	Easy	Difficult	Moderate
Design Flexibility	High	High	Moderate	High

### Material Standards

	ASTM	ISO	MIN. VALUE/ RANGE
Density		ISO 1183-3	86-92 lb/ft <sup>3</sup>
Flexural Strength	ASTM D790	ISO 178	9572.49 psi
Shore Durometer		ISO 868	75 Shore D
Modulus of Elasticity	ASTM D638	ISO 178/527-2	379998.9 psi
Tensile Strength	ASTM D638		6381.66 psi
Izod Impact Strength	ASTM D256		4.28 ft-lb/in <sup>2</sup>
Charpy Impact Strength		ISO 179-1	14.27 ft-lb/in <sup>2</sup>
Vicat Softening Temp.	ASTM D648	ISO 306	170 °F

## Installation Guidelines

Please refer to our Installation Guidelines manual which can be downloaded from our website for detailed and easy to understand information for safe and effective vinyl sheet pile installation.



All products manufactured to comply with the following Designation: D8427 – 21 Standard Specification for Rigid Poly Vinyl Chloride (PVC) Exterior Profiles Used for Sheet Piling

Standard and Hex Vinyl Profiles



Jagged	Z Type	Z Type	Z Type	Double U	Box	Box	Z Type	Wave	Hex	Hex			
Section	Width (W)	Height (H)	Thickness (T)	Cross Section Area	Section Modulus	Moment of Inertia	Allowable Moment	Ultimate Moment	Ultimate Stiffness	Impact Strength Charpy Test	Weight Per Pile	Weight Per Wall	Profile
	in	in	in	in²	in³/ft	in⁴/ft	ft-kips/ft	ft-kips/ft	ibf-in² x10⁶/ft	ft-lbs/ft²	lb/ft	lb/ft²	
	mm	mm	mm	cm²	cm³/m	cm⁴/m	kNm/m	kNm/m	kNm²/m	kJ/m²	kg/m	kg/m²	
ESC-GW600-5.5	23.9 608	3.5 88	0.22 5.5	6.4 41.1	1.6 87	2.8 385	0.43 1.9	0.86 3.8	1.1 9.9	≥ 14.3 ≥30	3.97 5.9	1.99 9.7	Jagged
ESC-M-HEX	19.6 500	4.72 120	0.2 5	8.7 56.2	4.6 245	10.7 1,470	1.2 5.4	2.4 10.8	4 38.2	≥ 14.3 ≥30	5.0 7.5	4.57 15.0	Hex
ESC-D-HEX	9.8 250	4.5 120	0.2 5	6 38.5	5.8 311	16 2,178	1.5 6.8	3.1 13.7	6 56.6	≥ 14.3 ≥30	3.70 5.5	4.54 22.2	Wave
ESC-GW300-5.5	11.8 300	4.5 115	0.22 5.5	4.6 29.7	5.9 320	13.5 1842	1.6 7	3.2 14.1	5.1 47.9	≥ 14.3 ≥30	2.89 4.3	2.92 14.3	Double U
ESC-GW460-5.5	18.1 460	5.1 130	0.22 5.5	6.6 42.9	6.7 360	18.5 2527	1.8 7.9	3.6 15.8	7 65.7	≥ 14.3 ≥30	4.17 6.2	2.75 13.4	Box
ESC-GW270-5.5	10.6 270	6.1 155.5	0.22 5.5	3.4 22.3	6.9 369	23.9 3266	1.8 8.1	3.6 16.3	9 84.9	≥ 14.3 ≥30	2.15 3.2	2.43 11.9	Z
ESC-GW610-6.4	23.9 606	7.1 180	0.25 6.4	9.7 62.6	11.4 613	40.4 5514	3 13.5	6.1 27	15.2 143.4	≥ 14.3 ≥30	6.45 9.6	3.05 14.9	Box
ESC-GW610-7.2	23.9 606	7.9 200	0.28 7.2	11.3 73.1	14.4 774	56.7 7743	3.8 17	7.7 34.1	21.4 201.3	≥ 14.3 ≥30	7.19 10.7	3.56 17.4	Box
ESC-T-HEX	9.8 250	8.6 219.5	0.3 7.5	9.3 59.7	15.2 815	89.2 12,175	4.0 17.9	8.1 35.9	33.6 316.5	≥ 14.3 ≥30	5.78 8.6	7.04 34.4	Hex
ESC-GW565-9.0	22.2 565	9.6 245	0.35 9	11.3 72.9	19.4 1042	93.5 12768	5.2 22.9	10.3 45.8	35.3 332	≥ 14.3 ≥30	7.06 10.5	3.8 18.6	Z
ESC-GW610-9.0	23.9 606	9.1 230	0.35 9	14.8 95.3	20.6 1109	93.4 12758	5.5 24.4	11 48.8	35.2 331.7	≥ 14.3 ≥30	9.14 13.6	4.64 22.6	Box
ESC-GW290-7.0	11.4 290	9.4 240	0.28 7	7.3 47.6	22 1228	110.3 15429	5.9 27	11.7 54	41.6 401.2	≥ 14.3 ≥30	4.64 6.9	4.78 23.6	Z
ESC-GW290-9.0	11.4 290	9.4 240	0.35 9	9.3 59.8	27.2 1462	137.2 18739	7.2 32.2	14.4 64.3	51.7 487.2	≥ 14.3 ≥30	5.78 8.6	6.09 29.7	Z
ESC-GW458-10.4	18 458	10 254	0.41 10.4	13.6 87.7	28.7 1542	151.7 20718	7.6 33.9	15.2 67.8	57.2 538.7	≥ 14.3 ≥30	8.47 12.6	5.65 27.6	Z
ESC-GW350-9.0	13.8 350	9.8 250	0.35 9	11.1 71.4	31.3 1685	155.3 21203	8.3 37.1	16.7 74.2	58.6 551.3	≥ 14.3 ≥30	6.92 10.3	6.01 29.4	Z
ESC-GW290-11.0	11.4 290	9.4 240	0.43 11	11.1 71.6	31.8 1711	160 21851	8.3 37.6	16.9 75.3	60.3 568.1	≥ 14.3 ≥30	6.92 10.3	7.28 35.5	Z
ESC-GW458-12.0	18 458	10 254	0.47 12	15.2 97.8	31.9 1717	168 22937	8.5 37.8	17 75.5	63.3 596.4	≥ 14.3 ≥30	9.48 14.1	6.3 30.7	Z

FRP and Composite Profiles



Section	Width (W)	Height (H)	Thickness (T)	Cross Section Area	Section Modulus	Moment of Inertia	Allowable Moment	Ultimate Moment	Ultimate Stiffness	Impact Strength Charpy Test	Weight Per Pile	Weight Per Wall	Profile
	in	in	in	in <sup>2</sup>	in <sup>3</sup> /ft	in <sup>4</sup> /ft	ft-kips/ft	ft-kips/ft	ibf-in <sup>2</sup> x10 <sup>6</sup> /ft	ft-lbs/ft <sup>2</sup>	lb/ft	lb/ft <sup>2</sup>	
	mm	mm	mm	cm <sup>2</sup>	cm <sup>3</sup> /m	cm <sup>4</sup> /m	kNm/m	kNm/m	kNm <sup>2</sup> /m	kJ/m <sup>2</sup>	kg/m	kg/m <sup>2</sup>	
ESC-GW300-FR	11.8 300	4.5 115	0.2 5	4.6 29.7	5.9 345	13.5 1,988	1.6 7.0	3.2 14.1	6.8 64.5	≥ 14.3 ≥30	2.9 4.4	3.0 14.8	Hybrid Double U
ESC-GC458-FR	18.0 457	8.0 203	0.25 6.4	6.6 42.6	12.9 696	51.79 7,072	14.61 65	29.41 130.8	235.6 2218	≥ 14.3 ≥30	6.14 9.1	4.10 20.0	Z
ESC-GC510-FR	20.0 508	10.0 254	0.34 8.7	11.21 72.30	22.7 1219	113.37 15,481	34.19 152.1	68.81 306.1	515.8 4856	≥ 14.3 ≥30	9.15 13.6	5.49 26.8	Z
ESC-GW350-FR	13.8 350	9.8 250	0.35 9	11.1 71.4	31.3 1685	155.3 21,203	8.3 37.1	16.7 74.2	96.8 912	≥ 14.3 ≥30	7.19 10.7	6.26 30.6	Hybrid Z
ESC-GC610-FR	24 610	14 356	0.43 10.9	16.6 107.1	37.1 1,994	259.92 35,494	78.95 351.2	158.9 706.8	1182.5 11134	≥ 14.3 ≥30	13.4 19.9	6.7 32.7	Z
ESC-GC760-FR	30.0 762	17 432	0.54 13.7	24.65 159.0	58.2 3,130	494.88 67,580	80.75 359.2	162.51 722.9	1746.7 16446	≥ 14.3 ≥30	21.5 32.0	8.6 42.0	Z

## Color Options

\*\* Minimum order for profiles in a color other than GREY – 5500 ft² / 550m²



Grey (Standard)



Olive Green or Brown



Any color (subject to minimum order quantity)

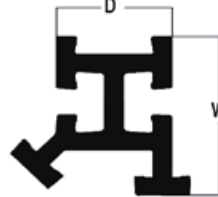
## Corners for Vinyl Sheet Piles



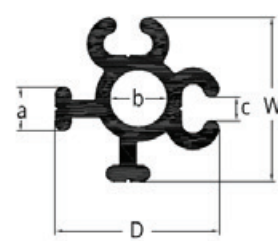
ESC-CORNER 300



ESC-CORNER 400



ESC-CORNER 450



ESC-CORNER 300 QUADRUPLE

Corner	Width (W)		Depth (D)		Weight		Tongue and Groove					
	A	B	C									
	in	mm	in	mm	lb/ft	kg/m	in	mm	in	mm	in	mm
ESC-Corner 300	1.8	45.7	0.61	15.6	0.38	0.57	-	-	-	-	-	-
ESC-Corner 400	3.8	96.5	2.3	58.8	1.88	2.80	-	-	-	-	-	-
ESC-Corner 450	3.02	73.71	2.0	50.8	2.19	3.20	-	-	-	-	-	-
ESC-Corner 300 Quadruple	2.2	57.0	2.2	57.0	1.06	1.58	0.61	15.5	0.79	20.0	0.33	8.4

Tolerance in accordance with the State technical assessment.

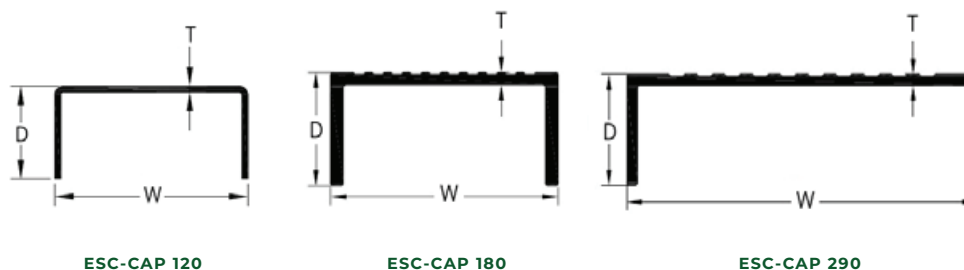
ESC custom manufacture corners in varying shapes/angles for your project requirements.

### Application for Type of Profile

TYPE OF PROFILE	CORNER 300	CORNER 400	CORNER 450	QUADRUPLE
ESC-GW270	X			X
ESC-GW300	X*			X
ESC-GW600	X			X
ESC-GW460	X			X
ESC-GW565		X	X	
ESC-GW610		X	X	
ESC-GW290		X	X	
ESC-GW458		X	X	
ESC-GW350FR		X	X	

\* Recommended

## Vinyl Sheet Pile Caps



	Width (W)		Depth (D)		Thickness (T)		Weight	
	in	mm	in	mm	in	mm	lb/ft	kg/m
ESC-CAP 120	5	127	2.4	61	0.16	4	0.77	1.15
ESC-CAP 180	7.1	180	3.5	90	0.39	10	2.62	3.95
ESC-CAP 290	11.4	290	3.5	90	0.39	10	3.70	5.50

Tolerance in accordance with the State technical assessment.

### Application for Type of Profile

TYPE OF PROFILE	ESC-CAP 120	ESC-CAP 180	ESC-CAP 290
ESC-GW270	X*	X	
ESC-GW300	X*	X	
ESC-GW600	X*	X	
ESC-GW460		X	
ESC-GW565			X
ESC-GW610			X
ESC-GW290			X
ESC-GW458			X
ESC-GW350FR			X

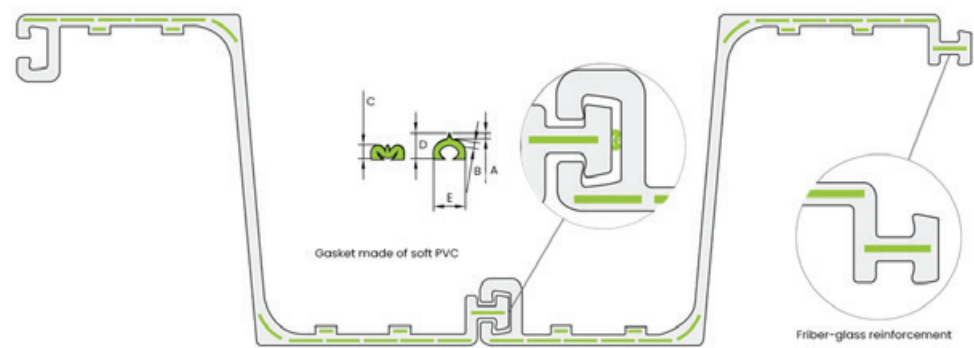
\* Recommended

## Accessories

- Sheet Pile Cap
- Ground Anchor
- Tie Rods
- Waling Channels/Beams
- Bumper Fender
- Installation Mandrel
- Driving Cap
- Driving Guide

# Superlock FRP ESC-GW-FR

SuperLock system is the new generation of composite sheet piling made of PVC reinforced with fiber glass. The new Superlock composite gives the best value for your money. SuperLock retains all the advantages of vinyl sheet piling combined with reinforced strength and stiffness allowing for a broader scope of applications which had traditionally been reserved to steel sheet piling.



Note: Gasket is provided on special order and does not come with standard and FRP profiles unless specifically ordered.

- An innovative composition of PVC and fiber-glass sealed together with a thermo-plastic matrix
- Composite material with significantly higher technical parameters than PVC and much broader scope of application.
- Strength and stiffness parameters comparable with light steel piling with all the advantages of PVC sheet piling.

	IMPERIAL (in)	METRIC (mm)
A	0.05	1.3
B	0.06	1.5
C	0.127	3.23
D	0.236	6
E	0.299	7.6

# Composite FRP ESC-GC-FR

ESC's Composite sheet piling is more corrosion resistant, lighter to handle and will more often provide significant cost-savings with supply, transportation and during installation. ESC's Composite piling is stronger than the standard vinyl profiles. They are an efficient, durable, and environmentally friendly alternative to steel, concrete and even timber sheet piling in the likes of flood walls, marine structures, seepage barriers and more.

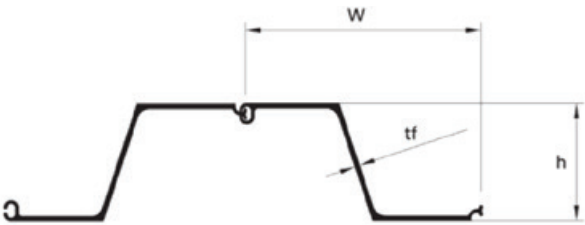
# OTHER ALTERNATIVES

## ALUMINUM SHEET PILES

ESC Aluminum sheet piles are generally used for bulkheads, water control structures, and seawalls. Aluminum sheet piling is an excellent option for projects that require serious protection from corrosive elements. Unlike steel, aluminum won't corrode due to sand and water. It won't chip like concrete or wood piles, making them a high-performing, low-maintenance sheet piling material for the marine environment.

Additionally, aluminum sheet piling is one of the most lightweight materials for marine construction needs.

Their interlocking corrugated sheets are ideal for many projects, and at ESC, we have the expertise to get you the best piling product at the best possible price.

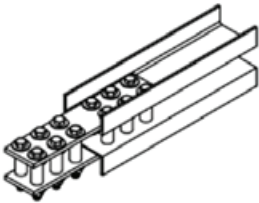


Series	Unit Width (w)	Height (h)	Flange (tf)	Unit Weight		Total Modulus	Moment of Inertia
	in	in	in	Section lb/ft	Wall lb/ft <sup>2</sup>	in <sup>3</sup> /ft	in <sup>4</sup> /ft
	mm	mm	mm	kg/m	kg/m <sup>2</sup>	cm <sup>3</sup> /m	cm <sup>4</sup> /m
ESC-APZ500	12.0	6.0	0.244	5.18	4.99	9.0	27
	304.8	152.4	6.2	7.7	24.33	484	3,687

\* Grade 6061-T6

## Aluminum Walers

ESC Aluminum Walers are generally used in combination with tie backs and anchor systems which adds support dispersed along the entire length of the structure. The ESC Waling System comes with the splice plates, bolts, nuts, and spacers required.



Waling Series	Channel Width (w)	Channel Height (h)	Unit Weight (Double Channel)	Moment of Inertia (Double Channel)	Section Modulus (Double Channel)
	in	in	lb/ft	in <sup>4</sup>	in <sup>3</sup>
	mm	mm	kg/m	cm <sup>4</sup>	cm <sup>3</sup>
ESC-WS6	6.0	2.0	7.15	31.59	10.55
	152.4	50.8	10.65	1,315	173
ESC-WS10	10.0	3.0	12.40	159.84	31.97
	254.0	76.2	18.446	6,653	524

\* Grade 6061-T6

# INSTALLATION METHOD

## Excavator Compression

In some cases of soft soil, utilising just the bucket of an excavator pressing and hammering against the vinyl sheet pile is sufficient to drive it to design depth. A steel pile head is typically used to protect the pile top and also distribute the excavator pressing load.



PITCHING



PRESSING



HAMMERING

## Excavator Mounted Vibrohammer

Suitable vibrohammers for the installation of vinyl sheet piles are typically in the small to medium range. Excavator mounted vibrohammers are an excellent option because of their versatility and the fact that generally the excavator is utilised in other activities prior to and/or after the sheet pile installation such as excavation or soil compaction. The operator has to be mindful of verticality during driving, since unlike the crane, the vibrohammer has to follow the hinge trajectory of the excavator. For tougher soil conditions a mandrel can be used in conjunction with this system—see “Mandrels” section of this installation guide.



## Crane Mounted Vibrohammer

Crane mounted vibrohammer is advantageous over excavator mounted vibrohammer installation as it can effectively handle much longer pile lengths. Also the vibrohammer can effectively rest its weight and force directly on top of the clamped sheet pile which results in better verticality. However, the cost for driving is typically higher than the excavator options due to the extra mobilisation cost of a crane. It must be noted however, that a mandrel is recommended for longer length piles as vinyl sheet piles cannot take the loads that steel can and they could buckle during driving.



### DROP HAMMER

A drop hammer is a mechanical simple driving method for driving vinyl sheet piles by lifting and releasing a falling drop hammer weight at low frequency.

### WATER JETTING

Water jetting may be used in conjunction with other installation methods where the soil is very compacted or cohesive. A high pressure jet of water (or sometimes air) is expelled from the base of the sheet pile loosening the soil as the sheet pile is driven through.

### MANUAL INSTALLATION

For extremely soft soils and low driving depths, simple manual tooling can be used to pitch and hammer down the sheet piles with just a few laborers.



# Installation Mandrel

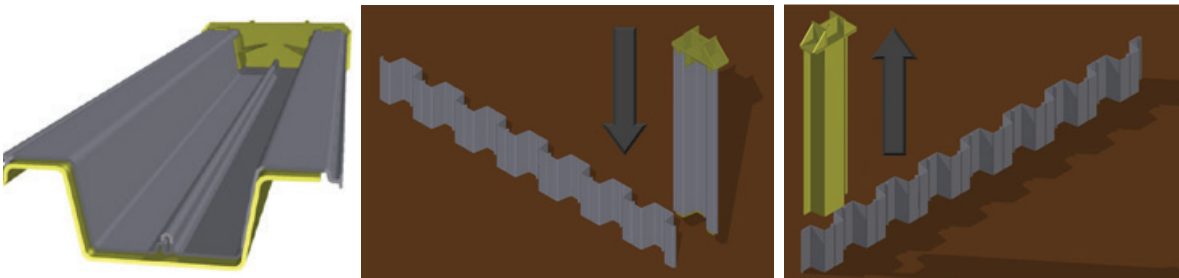
## SLEEVE MANDREL

A steel sleeve welded to a steel pile head that fits over the Z pile pair or single box pile. The sheet pile is typically horizontally slid onto the sleeve and clamped on by a screw. Then it is lifted over and driven down. Once the design depth is reached or further penetration is refused, the steel mandrel is withdrawn leaving the vinyl sheet pile in place.

**Equipment Required :** Vibrohammer (excavator or crane mounted), Crane or Excavator

**Suitable for :** Slightly more difficult soil conditions where driving the vinyl sheet pile directly is not possible. Also suitable for longer sheet piles with thinner profiles.

**Advantages :** Can penetrate more difficult soils without damaging the vinyl sheet pile.



# Anchoring

Vinyl Sheet Piles can be anchored for applications which have a retaining purpose higher than which a cantilevered sheet pile can resist. These are typically anchored via steel threaded bars that can be tensioned against anchor piles or blocks behind the slip plane of the soil. These anchor piles or blocks are typically made of reinforced concrete, PVC or timber. To effectively transmit the dispersed retained load to the anchor rods and pile/block a waling channel on the sheet pile side is used.

The design engineer typically specifies in the plan drawings how far back and the size and frequency of these anchors. It is important the installer ensures that there is safe access to the anchor attachments at both ends (and possibly in between if there is a turnbuckle in the middle).

ESC also design and supply earth anchors which uses a spade anchor that transfers the tensile forces onto the bearing layer of the soil.

It is very important that the tie backs or earth anchors are situated sufficiently far back from the slip plane or active wedge of the soil. This plane is the natural angle the dirt settles too if unsupported and the anchor must be behind that plane.



**SHEET PILING WITH 2 LEVELS OF ANCHORING**



**SHEET PILE WALL WITH TIEBACKS**

# Earth Anchors

The ESC Earth Anchor is a mechanical anchor with a wide range of structural applications in the civil, utility, and maritime industries for earth anchoring.

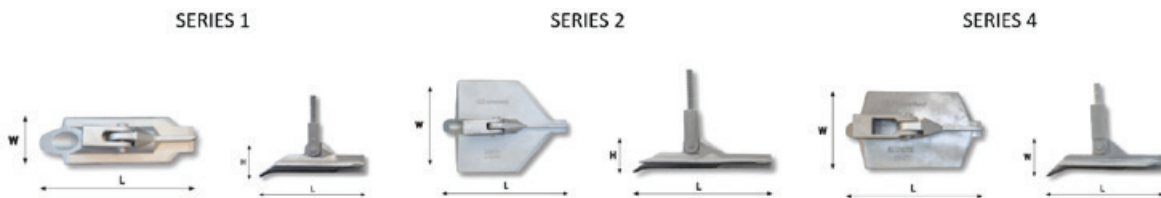
Due to the mechanism of installation and tilting, the ESC Earth Anchor has the advantage of achieving the anchor force “without soil disturbance” as compared to other methods.



Series	Width (w)	Length (l)	Height (h)	Weight	Surface Area	Fraction Strength	Yield Strength
	in	in	in	lbs	in <sup>2</sup>	lbf	lbf
	mm	mm	mm	kg	mm <sup>2</sup>	kN	kN
ESC-EA 1.0	1.22 31	4.5 121	1.88 48	0.88 0.4	0.0048 3.097	4.49 20	3.59 16
ESC-EA 1.2	1.77 45	6.26 159	2.80 71	2.2 1	0.01 6.5	10.11 45	6.97 31
ESC-EA 1.4	3.5 89	11.61 295	4.01 102	7.05 3.2	0.33 21.932	26.97 120	20.74 92.3
ESC-EA 2.2	7.01 178	14.48 368	4.4 112	14.33 6.5	0.075 48.58	49.458 220	37.09 165
ESC-EA 2.4	12.52 318	17.2 437	4.4 112	21.82 9.9	0.145 93.82	49.458 220	37.09 165
ESC-EA 2.8	18.5 470	26.61 676	5.19 132	62.83 28.5	0.359 231.878	49.458 220	37.09 165
ESC-EA 4.2	18.5 356	26.61 660	53.19 196	62.83 37.5	0.359 189.93	101.16 450	75.98 338
ESC-EA 4.4	18.89 480	25.98 660	8.66 220	105.8 48	0.369 238.312	101.16 450	75.98 338

\*All earth anchors come with a galvanized finish

\*Anchor rod sizes subject to earth anchor selection



# Small Retention System EcoLock

Small retention systems – an important element of flood and drought management in forest ecosystems.

The analyses conducted during the past fifty years have clearly shown that more and more regions will suffer from periodical water scarcity. Due to global climate change, unfavorable trends in the existing water balance were diagnosed in many areas, i.e. lowering of the ground water level and the water surface level in reservoirs, disappearance of forest lakes, drying out of the naturally damp forest ecosystems and the progressive degradation of peat soils.

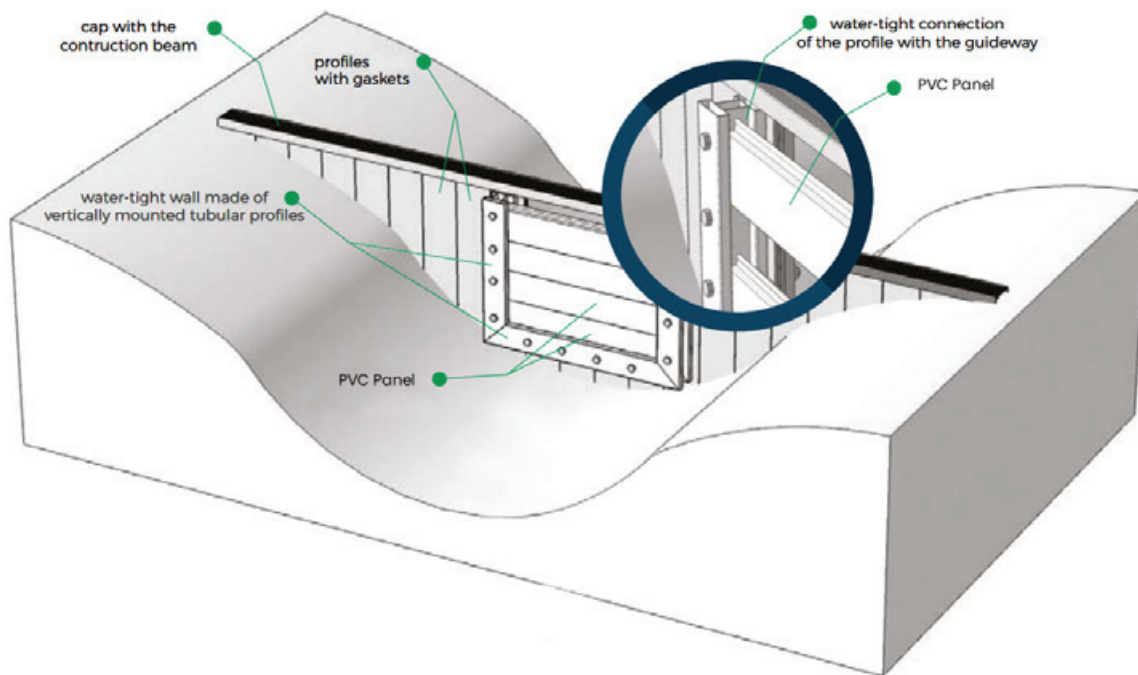
The vinyl small retention sluice gates offered by ESC are an advanced, durable and easy to maintain alternative to the traditional, wooden small retention systems. It is also an environmentally-friendly solution due to the use of recycled PVC construction components, with the possibility of re-processing.



The small retention sluice gates are made from tough polyvinyl chloride, modified with refining agents (e.g. toughness modifiers, UV and thermal stabilizers and mineral filling components). Thanks to the use of this closed-cycle recycling method, vinyl sheet piles are an environmentally friendly solution. Application of the ISO 9001:2008 standard has enabled ESC to provide and maintain high-quality products.

Five reasons to choose the small retention sluice gates manufactured by Pletrucha ESC.

- Easy to handle and maintain with light-weight mobile elements.
- Do not require maintenance works.
- Fast assembly using light equipment.
- Natural look in harmony with the surroundings.
- Highly resistant to the impact of mechanical, atmospheric and biological factors.



The small retention sluice gate system is made of tubular profiles in the shape of a honeycomb. This profile design guarantees high strength and at the same time lightweight transport and easy assembly in hard access spots. The profiles are connected with locks equipped with valves which guarantee 100% water-tightness of the construction. The smooth surface of the walls may be extruded in the form of a tree ring pattern to perfectly melt with the surrounding environment.

When the water level rises, the PVC tubular profiles assembled diagonally fill in with water. The weight of the water inside the profiles makes the locks fit tightly to create water-resistant sluice.

# Soil Reinforcement - Geogrids

ESC offers Specialized Geosynthetics also known as PolGrid geogrids. This is a product manufactured from polymetric material and is generally used in civil engineering projects to reinforce and stabilize soil and similar materials or to separate substrate layers with varying grain sizes.

Geogrids are a special type of geosynthetics and are utilized in civil designing to naturally support and stabilize the soil. Geogrids, interlock with aggregate and the varying sizes of the aggregates determine the geogrid sizing to be used.

A geosynthetic material is defined by the ISO 10318 Standard as a product of which one component is created from polymer (polyester, polypropylene, polyethylene, or nylon) has the type of a sheet, strip, or spatial form and is used in contact with soil (or other material) in geotechnical and structural designing activities.

Geogrids are made as openwork sheets, looking like an orthogonal grid with a significant degree of solidness, PolGrid geogrids do not have any intersections (it is a monolith).

## SAVING OF COST AND TIME

- The load-bearing limit of the construction is greatly improved by the placement of the geogrid which effectively blocks the aggregate and significantly reduces settlement. This geogrid increases the total strength of the construction and does not need any complicated preparatory earthwork, which reduces construction time. The subsequently improved load and pressure distribution in the road using geogrids effectively diminishes wheel ruts, even in bad soil situations.

## EASY AND FAST INSTALLATION

- Polgrid rolls are easily handled by two persons due to the fact that the width of polgrid sheets have been specially designed to make them easier to handle.
- This easy installation entails spreading the rolls of the geogrid on the provided soil substrate.
- Geogrid with packed integrated nodes do not need pre-tensioning or anchoring, and they work promptly whenever they are spread on or underneath the aggregate layers.
- Geogrids are well known for their durability and strength which ensures a significant reduction of installation damages.

## ENVIRONMENTALLY FRIENDLY SOLUTION

- Due to the significant savings on the aggregate, using PolGrid geogrids also means a sizeable reduction in CO<sub>2</sub> caused by structural developments.
- The utilization of the PolGrid geogrids significantly extends the life expectancy of asphalt.
- The PolGrid geogrids have shown high resilience to extreme weather conditions which lessen the road upkeep costs.

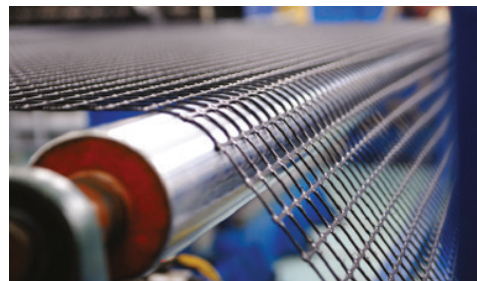


WITH GEOGRID

WITHOUT GEOGRID

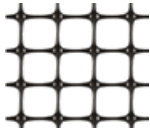
Geogrids allow for savings on the aggregate layer used to construct a given road, without any impact to its load-bearing capacity.

The manufacturing technology as well as the used materials guarantee high quality of the product and its unvarying technical parameters.



# Soil Reinforcement - Geogrids

## POLGRID BX



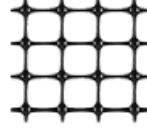
Polgrid BX 10/10  
Polgrid BX 15/15  
Polgrid BX 20/20  
Polgrid BX 25/25  
Polgrid BX 30/30  
Polgrid BX 40/40  
Polgrid BX 45/45

## POLGRID BX MAX



Polgrid BX 20/20 MAX  
Polgrid BX 30/30 MAX  
Polgrid BX 40/40 MAX

## POLGRID BXB



Polgrid BXB 30/30

## Polgrid Geogrids Application



### Asphalt Roads.

Reinforcement of aggregate substrate layers, reinforcement of embankments and dykes, geosynthetic layers at the base of embankments.



### Railways.

Reinforcement of substructures of the railway tracks, strengthening of railway embankments.



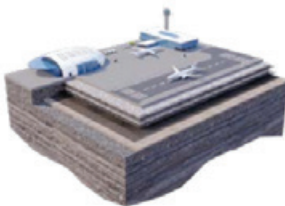
### Forrest roads and Technological Roads.

Construction of dirt roads with extended durability and resistant to the creation of wheel-ruts.



### Temporary Roads and working platforms.

Quick construction of temporary roads made of unbound aggregate, i.e. technological roads, access roads to windfarms, working platforms.



### Slopes and bridgeheads.

Geogrids are used in the construction of high slopes, bridgeheads and as in reinforced earthworks, i.e. construction of vertical retention walls with veneer.



### Warehouses, carparks

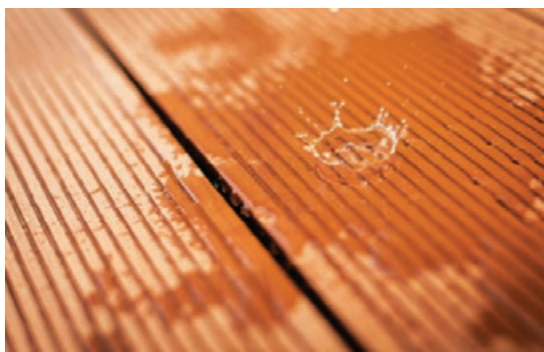
Reinforcement of subsoil requiring higher load-bearing capacity, i.e. under manoeuvring squares, warehouse storage yards, parking lots.

# TerraDeck

Stylish ambience that you will enjoy for many years.

## EXPERIENCE AND THE HIGHEST QUALITY

Pietrucha ESC have over 25 years' experience in the manufacturing of building and construction materials. We have developed a unique ShieldFix formula combining specially selected compatibilizer to WPC materials and mineral agents absorbing humidity. ShieldFix significantly increases the resistance of our decking boards to atmospheric conditions.



## SELECTED APPLICATIONS

- Swimming pools
- Terraces and porches
- Bridges, dais and scene floors
- Sun breakers, dividing walls of balconies
- Decorative elements of elevation
- Tables, benches, flowerbeds

## TERRADECK: BETTER CHOICE THAN WOOD!

- Higher durability and resistance to pressure.
- Resistance to frost, humidity, fungus, insects and rodents.
- Safe and nonflammable construction material.
- Does not require painting and complicated maintenance.

## THE PERFECT CHOICE

### Durable and resistant to the atmospheric conditions

- TerraDeck decking boards do not rot, bloat or erode, are resistant to delamination and buckling, keeping their original shape and parameters.
- UV, heat, frost and humidity resistant.
- Maintenance friendly.

### User friendly

- Non-slippery surface, both in wet and dry conditions.
- Easy to clean using standard methods.
- Environmentally friendly, partly manufactured from recycled material, 100% recyclable.
- Processing similar to wood but without splinters.

### The highest quality and a wide range of applications

- TerraDeck is an excellent quality, environmentally friendly wood substitute.
- Natural look resembling the wood surface and structure.
- Available in a wide range of colours.
- Solid and aesthetic finish.



## ADVANTAGES OF PVC BASED MATERIALS OVER THE PRODUCTS CONTAINING POLYPROPYLENE (PP)!

- Higher resistance to atmospheric conditions.
- In low temperatures, PP boards vitrify and as a result may become fragile and prone to cracking.
- Safer to use. Boards containing PP are more slippery.
- Natural look. TerraDeck looks like wood rather than like paraffin as in the case of PP-based products.

# Vinyl Fencing System

Pietrucha ESC is a manufacturer of a wide range of vinyl fencing, an advanced, durable and aesthetic solution with exceptional usage parameters.

Five reasons to choose the vinyl fences:

- No need to paint.
- Resistant to biological damage.
- Resistant to humidity, extreme temperatures and UV radiation.
- Aesthetic, modern look.
- Easy to assemble and maintain.



Vinyl fences are resistant to the impact of atmospheric conditions, including UV radiation, humidity or extreme temperatures. The elements of the system do not corrode as in the case of metal, do not rot as with timber.

## TECHNOLOGY

The vinyl fences are made of high quality vinyl polichloride (PVC) reinforced with special components enhancing the durability and resistance to ageing.

Thanks to the continuous monitoring and implementation of strict manufacturing procedures, we guarantee high and consistent quality of our products. An advanced machine park coupled with over 20years' experience in plastics processing guarantee the highest quality of the products manufactured by Pietrucha ESC.



## Photos



\* Special mention to The Pietrucha Group for the permission to publish selected photos from their library in some locations of this catalog.

# ESC Product Catalogs

You may download all our product catalogs on this <https://www.escsteel.com/construction-product-catalogs> or request via email: [info@escsteel.com](mailto:info@escsteel.com). If you are viewing online, you may click on the image below to download.



Vinyl Sheet Pile Installation Guide



ESC Capability Statement



Marine & Foundation Piling Catalog



Sheet Pile Installation Manual Catalog



Trench Shoring Catalog



Steel Structures Brochure



Marine Mooring Bollards Catalog



Port & Offshore Structures Capability Statement



Marine Fender Catalog



Project Case Study - Book I



Project Case Study - Book II



Project Case Study - Book III



Combination Walls Project Case Study



Steel Pipes Projects Case Study

VINYL SHEET PILE  
INSTALLATION GUIDE

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STATEMENT

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INSTALLATION  
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CATALOG

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CAPABILITIES

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CATALOG

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STRUCTURES

ESC PROJECT CASE  
STUDIES

COMBINATION WALL  
PROJECTS

STEEL PIPE PILING  
PROJECTS

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