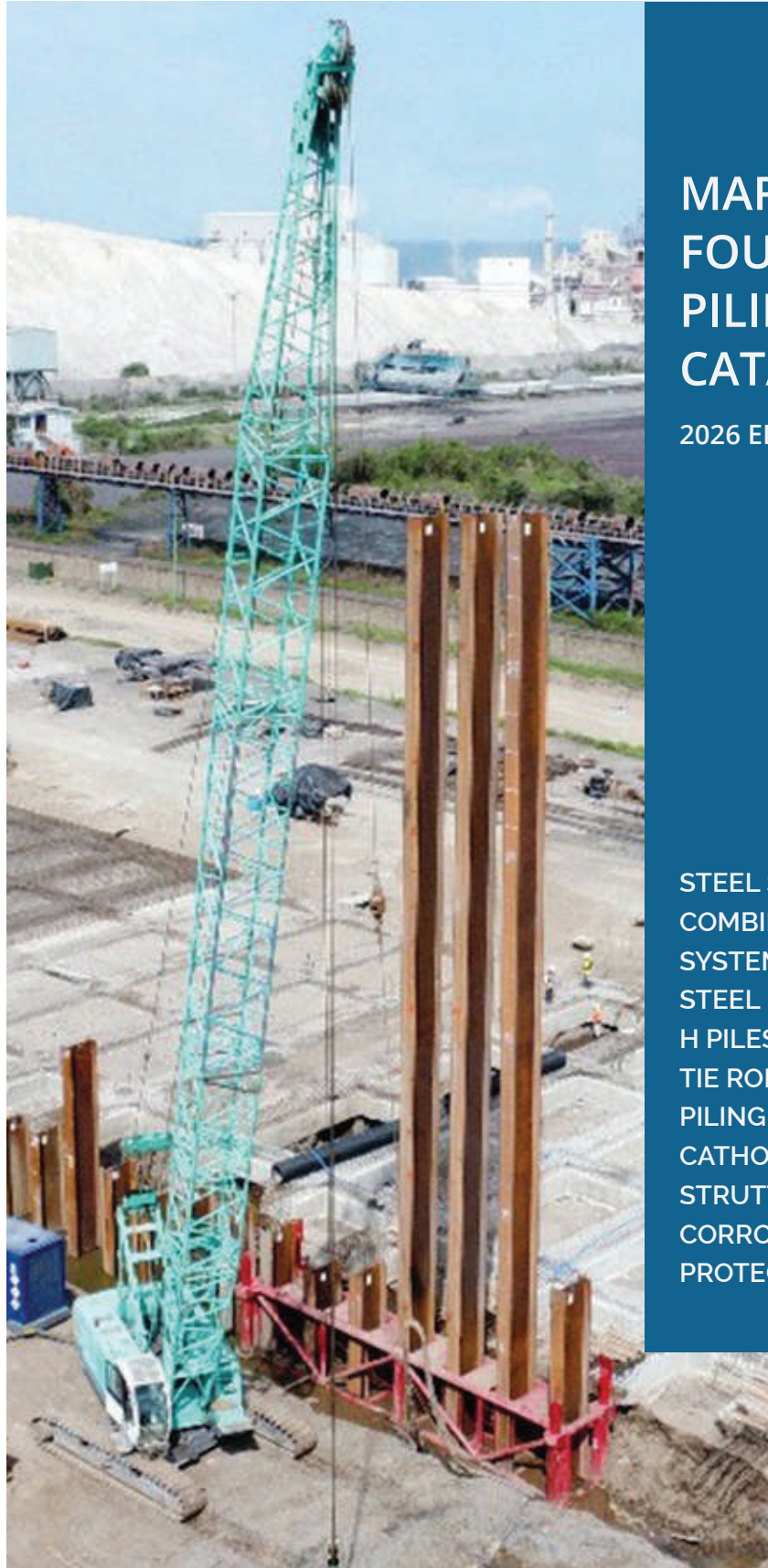


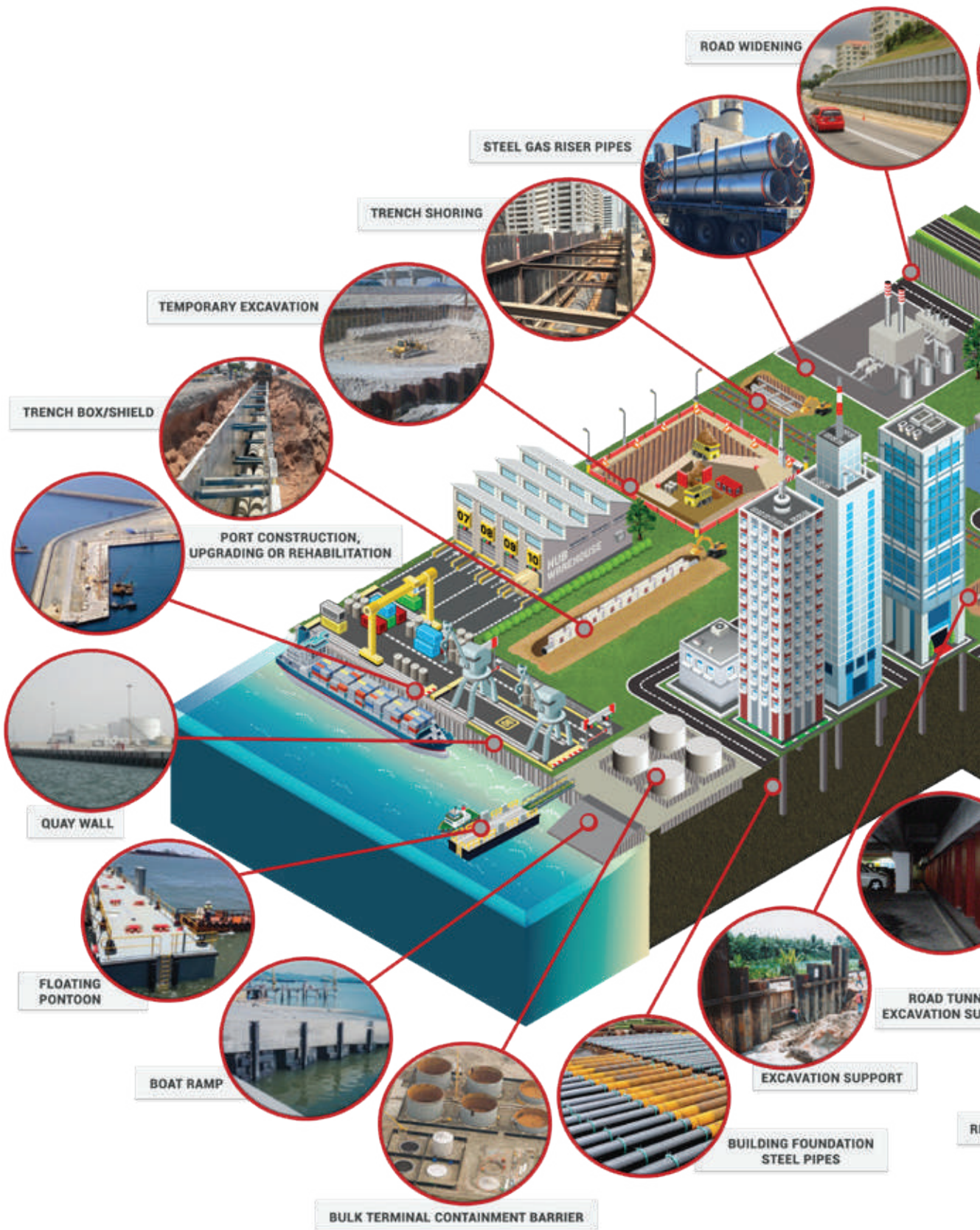


MARINE & FOUNDATION PILING CATALOG

2026 EDITION

STEEL SHEET PILES
COMBINED WALL
SYSTEMS
STEEL PIPE PILES
H PILES
TIE ROD SYSTEMS
PILING ACCESSORIES
CATHODIC PROTECTION
STRUTTING SYSTEM
CORROSION
PROTECTION COATINGS





ESC PRODUCT APPLICATIONS

Isometric Map

SUSPENSION BRIDGE ARCH



STEEL BRIDGE GIRDERS



FLOOD CONTROL VINYL SHEET PILE



BRIDGE ABUTMENT



SLOPE STABILISATION



WATERTIGHT COFFERDAM



AIRCRAFT HANGAR



MATERIAL OFFLOADING FACILITY



SHEET PILE PERMANENT BASEMENT WALL



PREFABRICATED STEEL BUILDINGS



SOLDIER PILE & TIMBER LAGGING



MARINE STEEL PIPE PILES



FLOOD LEVEE



STEEL DOLPHIN MONOPILES



SHIELD SUPPORT

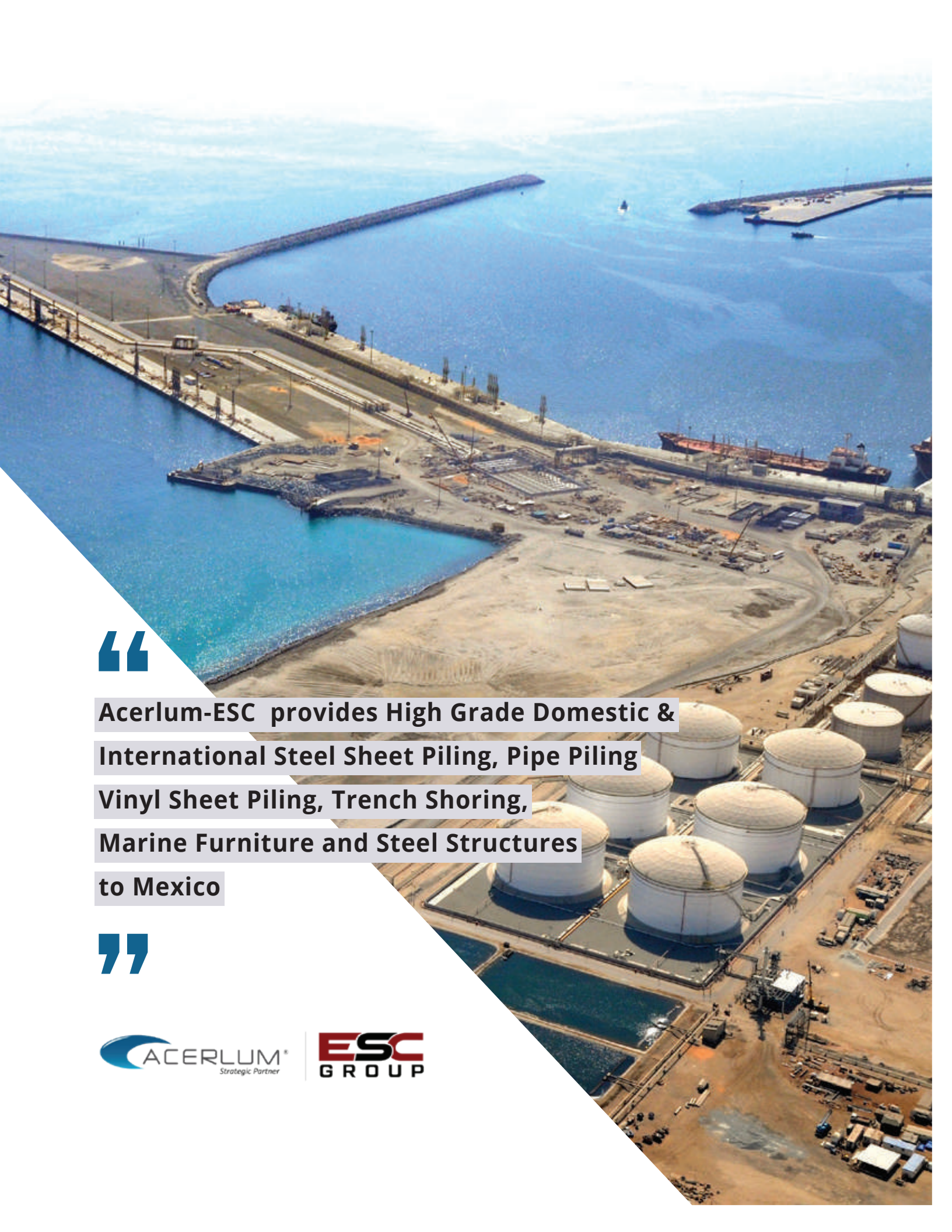


RIVER BEAUTIFICATION



Table of Contents

Introduction	06		
History of ESC	06		
About ESC	06		
Global Locations	07		
ESC Hot Rolled Sheet Piles	08		
ESC-HRZ Series	09		
FL Series	11		
PZ Series	12		
PZC Series	12		
Manufacturing Tolerances	13		
Steel Grades	13		
ESC Cold Rolled Sheet Piles	14		
Project References	15		
ESC-CRZ Series	16		
Further Domestic US Options	20		
ESC-Z Series	20		
ESC-EZ Series	20		
ESC-XZ Series	20		
ESC-DZ Series	21		
ESC-JZ Series	21		
Further Domestic US Options	22		
ESC-L Series	22		
ESC-S Series	22		
ESC Cold Formed Sheet Piles	23		
ESC T-Series Trench Sheets	23		
Aluminum Sheet Piles	23		
Manufacturing Tolerances	24		
Steel Grades	24		
ESC Sheet Piling Accessories	25		
ESC Steel Pipe Piles	26		
LSAW Pipe Piles	27		
SSAW Pipe Piles	28		
ERW Pipe Piles	28		
Product Tolerances	29		
Steel Grades	29		
Project References	30		
		ESC Pipe Combination Wall	31
		Project References	32
		Pipe-HRZ Series	33
		Pipe-CRZ Series	35
		Pipe-S Series	37
		Pipe-Pipe Series	37
		Pipe Pile Accessories	39
		ESC Steel H-Pile Combination Walls	40
		Project References	41
		H-HRZ Series	42
		H-ESZ Series	44
		H-CRZ Series	46
		ESC Tie Rod Systems	49
		System Options & Components	49
		Tie Rod Bar Sizes & Capacity	51
		Waling Channel	52
		Connection Options	53
		Corrosion Protection Options	54
		Accessories	55
		Coatings	56
		Connectors	57
		Strutting System	58
		Watertightness & Interlock Sealants	59
		ESC HP Piles	60
		Design & Production Standards	61
		Useful Equations	61
		Conversion Table	62
		ESC Product Catalogs	63



“

Acerlum-ESC provides High Grade Domestic & International Steel Sheet Piling, Pipe Piling Vinyl Sheet Piling, Trench Shoring, Marine Furniture and Steel Structures to Mexico

”



About ESC

History



ESC Group moves into its 40th year.

The inception of ESC occurred in 1986, when the founding partners envisaged a wide profile sheet pile unlike other traditional sheet piles. ESC's first sheet pile was driven in 1986, in Magnetic Island in the Great Barrier Reef, Australia.

About ESC

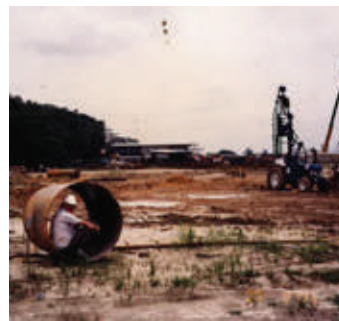
Then expansion into Asia in 1991 (firstly Singapore then Malaysia and onto China and more) and set up in the Middle East in 2004. ESC arrived in the USA in 2012.

With locations in more than 20 countries primarily in Asia, Middle East, and the Americas, ESC is well established in terms of engineering, manufacturing, and sales capabilities. We are an internationally recognized organization with high regard for and compliance with different international codes and standards. In our 30+ years of experience, ESC has developed full capacity in Engineering and Design, Project Management, Manufacturing, Supply, and Construction.

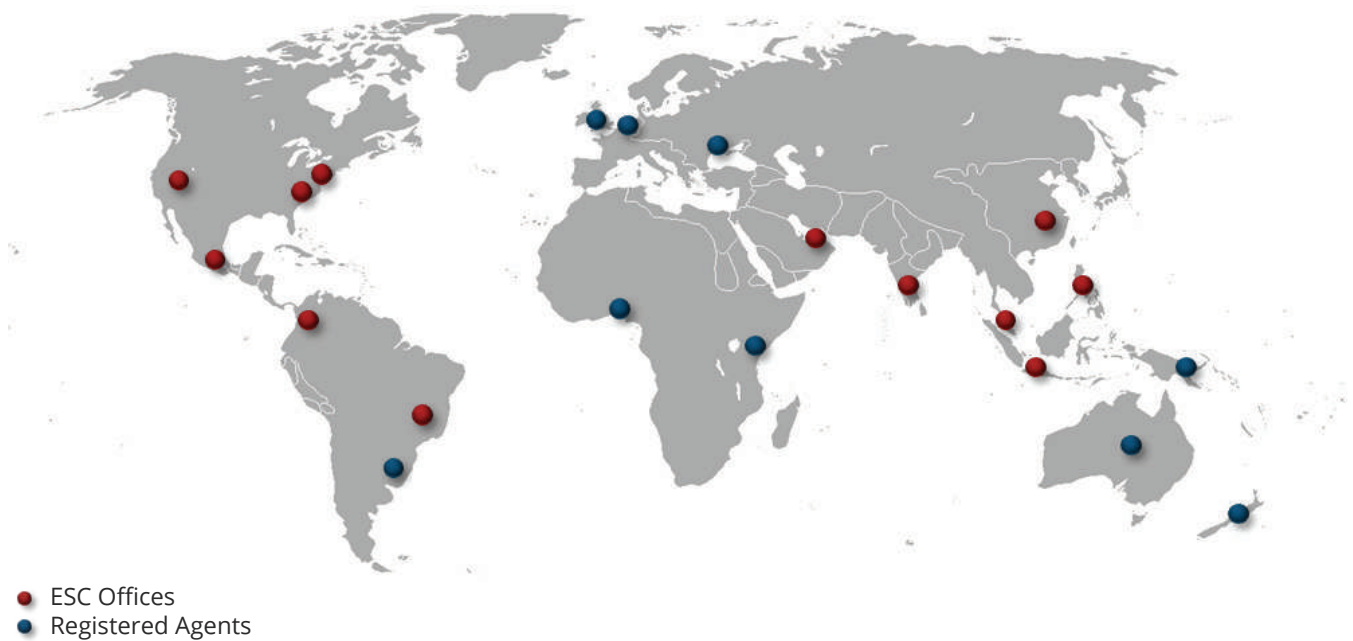
ESC, over the years, has evolved into an internationally certified organization with full capacity in Engineering and Design, Project Management, Research and Development, Manufacturing, Supply, and Construction.



Heading up operations in Mexico, ESC Group has joined forces with Acerlum to deliver comprehensive supply and engineering solutions across the region. This strategic partnership combines ESC Group's global expertise with Acerlum's local market knowledge, aiming to streamline project execution and enhance service delivery in Mexico's growing infrastructure and construction sectors.



ESC Global Locations



ESC Hot Rolled Sheet Piles

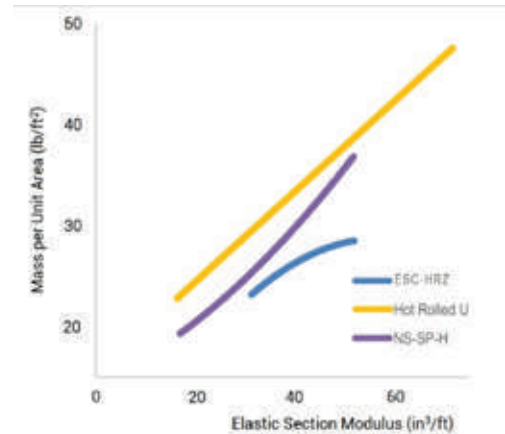
Introduction

The first Hot Rolled sheet pile was manufactured over 100 years ago. To manufacture Hot Rolled Sheet Pile Sections, the raw steel material is heated to over 2192°F (1200°C) upon which is formed to its respective sheet pile profile. Plastic deformation to the finished shape is easier due to the higher temperature during forming. Various interlocks configurations and thicknesses in different sections of the profile are possible.

Various construction configurations can be used for different applications. The interlocked sheet pile walls can be installed to create a rigid barrier for both earth and water. Bending forces and lateral pressures are also resisted by the combined profile. ESC can offer 4 different types of sheet pile which covers virtually all applications for both temporary and permanent usage.

The ESC Advantage

- ✓ Global Supply Network
- ✓ Unparalleled Technical Support
- ✓ Competitive Pricing
- ✓ Free of Charge Design
- ✓ Supplied project volumes between 8—20,000 MT+
- ✓ Full Suite of Sheet Pile Accessories



Note the lines shown above are trend-lines. The individual profiles may lie at points away from this line. Please see the relevant catalog page for exact specifications.

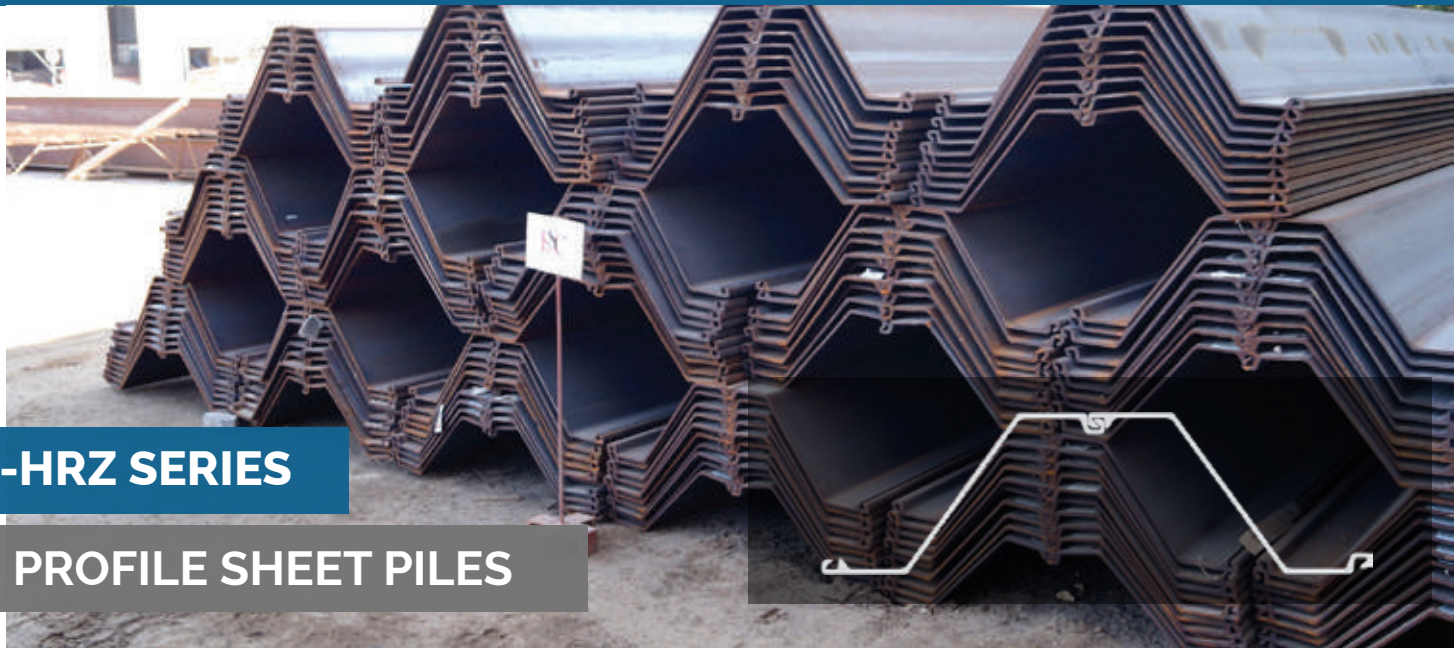
Sheet Pile Profiles



What Our Engineers Say?

"ESC can offer Hot Rolled Sheet Piles from around the world, to enable a responsive service and swift delivery to your project site."





ESC-HRZ SERIES

Z PROFILE SHEET PILES

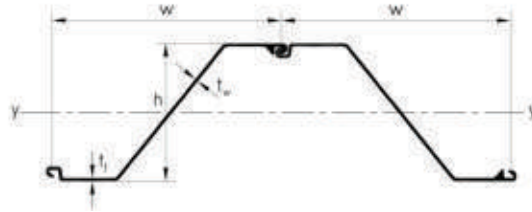
HOT ROLLED Z SHEET PILE FEATURES A DURABLE INTERLOCK THAT PROVIDES EFFECTIVE WATER TIGHTNESS CAPABILITIES

ESC is proud to present the Hot Rolled ESC-HRZ Profile Sheet Piles. The design features interlocks that are located symmetrically on both sides of the neutral axis. The web is continuous, thus the section modulus and shear load transfer are optimised. The ESC-HRZ sheet pile features a durable interlock that provides effective water tightness capabilities. The profile design has a very competitive strength to weight ratio. Due to a deep profile, the design features a higher Inertia resulting in reduced deflection. This higher inertia together with the option of higher steel grades (62.36 ksi/430 Mpa) provides the most economic solution that meets the performance requirements. The piles are usually shipped in pairs to accommodate faster installation and better alignment.



Order Options

Steel Grades	ASTM A572 Gr.50, Gr.55, Gr.60 & Gr.65 Other grades available
Lengths	19.7ft to 101.7ft Can be spliced to greater lengths Can be produced to project specific lengths
Delivery Options	Single or Pairs Pairs either loose, welded or crimped Lifting Hole By container (38.7ft or less) or Break Bulk Corrosion Protection Coatings



Interlocking Clutch



SECTION	WIDTH	HEIGHT	THICKNESS		CROSS SECTIONAL AREA	WEIGHT		ELASTIC SECTION MODULUS	MOMENT OF INERTIA	COATING AREA *(both side per pile)
	(w) in mm	(h) in mm	Flange (t _f) in mm	Web (t _w) in mm	in ² /ft cm ² /m	Per Pile lb/ft kg/m	Per Wall lb/ft ² kg/m ²	in ³ /ft cm ³ /m	in ⁴ /ft cm ⁴ /m	ft ² /ft m ² /m
ESC-HRZ12-770	30.338 770	13.554 344	0.335 8.5	0.335 8.5	14.42 93	48.9 72.8	19.4 94.5	23 1,250	157 31,300	6.43 1.68
ESC-HRZ13-770	30.338 770	13.554 344	0.355 9	0.355 9	15.1 97.4	51.2 76.2	20.3 99	24 1,300	164 22,430	6.43 1.96
ESC-HRZ14-770	30.338 770	13.593 345	0.374 9.5	0.374 9.5	15.78 101.8	53.5 79.6	21.2 103.4	25 1,360	171 23,370	6.43 1.96
ESC-HRZ17-700	27.58 700	16.548 420	0.335 8.5	0.335 8.5	14.42 93	49.3 73.3	21.4 104.7	32 1,740	266 36,430	6.46 1.97
ESC-HRZ18-700	27.58 700	16.587 421	0.355 9	0.355 9	15.1 97.4	51.5 76.7	22.4 109.6	34 1,810	277 38,000	6.46 1.97
ESC-HRZ19-700	27.58 700	16.587 421	0.374 9.5	0.374 9.5	15.78 101.8	53.9 80.2	23.5 114.6	35 1,880	289 39,580	6.46 1.97
ESC-HRZ20-700	27.58 700	16.627 422	0.394 10	0.394 10	16.46 106.2	56.2 83.7	24.5 119.5	36 1,950	300 41,160	6.46 1.97
ESC-HRZ24-700	27.58 700	18.085 459	0.441 11.2	0.441 11.2	18.93 122.1	64.4 95.8	28 136.9	45 2,440	408 55,950	6.73 2.05
ESC-HRZ26-700	27.58 700	18.124 460	0.481 12.2	0.481 12.2	20.34 131.2	69.2 103	30.1 147.1	48 2,600	437 59,840	6.73 2.05
ESC-HRZ27-700	27.58 700	18.163 461	0.5 12.7	0.5 12.7	21 135.5	71.5 106.4	31.1 152	50 2,680	450 61,640	6.73 2.05
ESC-HRZ28-700	27.58 700	18.163 461	0.52 13.2	0.52 13.2	21.75 140.3	74 110.1	32.2 157.3	51 2,760	465 63,740	6.73 2.05
ESC-HRZ36-700	27.58 700	19.661 499	0.591 15	0.441 11.2	123.45 151.3	79.8 118.7	34.7 169.6	67 3,600	655 89,750	7.15 2.18
ESC-HRZ38-700	27.58 700	19.7 500	0.63 16	0.481 12.2	24.99 161.2	85 126.5	37 180.7	71 3,800	693 94,980	7.15 2.18
ESC-HRZ40-700	27.58 700	19.739 501	0.67 17	0.52 13.2	26.52 171.1	90.2 134.3	39.3 191.8	74 4,000	732 100,220	7.15 2.18
ESC-HRZ42-700	27.58 700	19.661 499	0.709 18	0.552 14	28.23 182.1	96.1 143	41.8 204.2	79 4,230	770 105,540	7.12 2.17
ESC-HRZ44-700	27.58 700	19.7 500	0.749 19	0.591 15	29.76 192	101.3 150.7	44.1 215.3	83 4,440	810 110,940	7.12 2.17
ESC-HRZ46-700	27.58 700	19.739 501	0.788 20	0.63 16	31.29 201.9	106.5 158.5	46.4 226.5	86 4,640	848 116,160	7.12 2.17
ESC-HRZ48-700	27.58 700	19.818 503	0.867 22	0.591 15	31.47 203	107 159.3	46.6 227.6	89 4,790	879 120,470	7.12 2.17
ESC-HRZ50-700	27.58 700	19.858 504	0.906 23	0.63 16	32.92 212.4	112 166.7	48.8 238.2	92 4,970	915 125,360	7.12 2.17
ESC-HRZ52-700	27.58 700	19.897 505	0.946 24	0.67 17	34.43 222.1	117.1 174.3	51 249	96 5,160	952 130,400	7.12 2.17

*excludes internal section of interlock

ESC-HRZ SERIES

OTHER CONFIGURATIONS



Box King Piles (fabricated out of 4 Z Piles)



Box King Piles (fabricated out of 2 ESC-HRZ Piles & 1 Cold Formed U Pile)

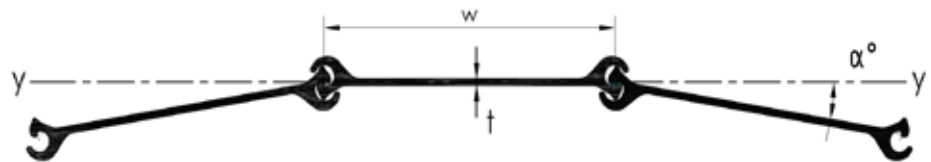


Jagged Wall



ESC-9E Hot Rolled Clutch Interlock (compatible with all ESC-HRZ Sheet Piles)

FL SERIES



The **FL Series** is a hot rolled straight web sheet pile profile. It features high interlocking clutch strength. It is ideal for circular structures and coffering. The FL Series Sheet Piles can be preassembled as one large cellular unit and dropped in a submerged location, where they can be driven in sequence.

Order Options

Steel Grades

SYW295, SYW390, SYW430
SY295, SY390
S355GP, S430GP
A572Gr50

Lengths

124.6ft maximum

Delivery Options

By container (38.7ft or less) or
Break Bulk

SECTION	WIDTH	HEIGHT	THICKNESS	CROSS SECTIONAL AREA	WEIGHT		ELASTIC SECTION MODULUS	MOMENT OF INERTIA	COATING AREA *(both side per pile)
	(w) in mm	(h) in mm	(t) in mm	in ² /ft cm ² /m	Per Pile lb/ft kg/m	Per Wall lb/ft ² kg/m ²	in ³ /ft cm ³ /m	in ⁴ /ft cm ⁴ /m	ft ² /ft m ² /m
FL1	19.69 500	1.77 45	0.37 9.5	7.42 157.2	41.46 61.7	25.27 123.4	1.66 89	2.89 396	4.56 1.39
FL2	19.69 500	1.85 47	0.5 12.7	9.28 196.7	51.88 77.2	31.62 154.4	2.25 121	4.16 570	4.63 1.41

FURTHER DOMESTIC US OPTIONS

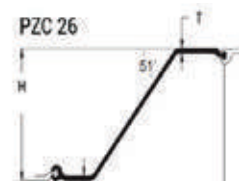
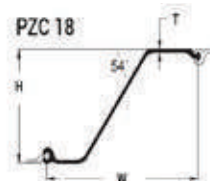
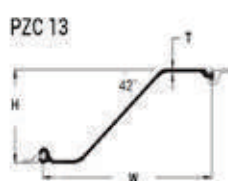
ESC-PZ SERIES



SECTION	WIDTH	HEIGHT	THICKNESS	CROSS SECTIONAL AREA	WEIGHT		ELASTIC SECTION MODULUS	MOMENT OF INERTIA	COATING AREA *(both side per pile)
	(w) in mm	(h) in mm	(t) in mm	in ² /ft cm ² /m	Per Pile lb/ft kg/m	Per Wall lb/ft ² kg/m ²	in ³ /ft cm ³ /m	in ⁴ /ft cm ⁴ /m	ft ² /ft m ² /m
ESC-PZ22	22.0 559	9.00 229	0.375 9.50	6.47 136.9	40.3 60.0	22.0 107.4	18.10 973	84.38 11,500	4.48 1.37
ESC-PZ27	18.0 457	12.00 305	0.375 9.50	7.94 168.1	40.5 60.3	27.0 131.8	30.20 1,620	184.20 25,200	4.48 1.37
ESC-PZ35	22.6 575	14.90 378	0.600 15.21	10.29 217.8	66.0 98.2	35.0 170.9	48.50 2,608	361.22 49,300	5.37 1.64
ESC-PZ40	19.7 500	16.10 409	0.600 15.21	11.77 249.1	65.6 97.6	40.0 195.3	60.70 3,263	490.85 67,000	5.37 1.64

*excludes internal section of interlock

ESC-PZC SERIES



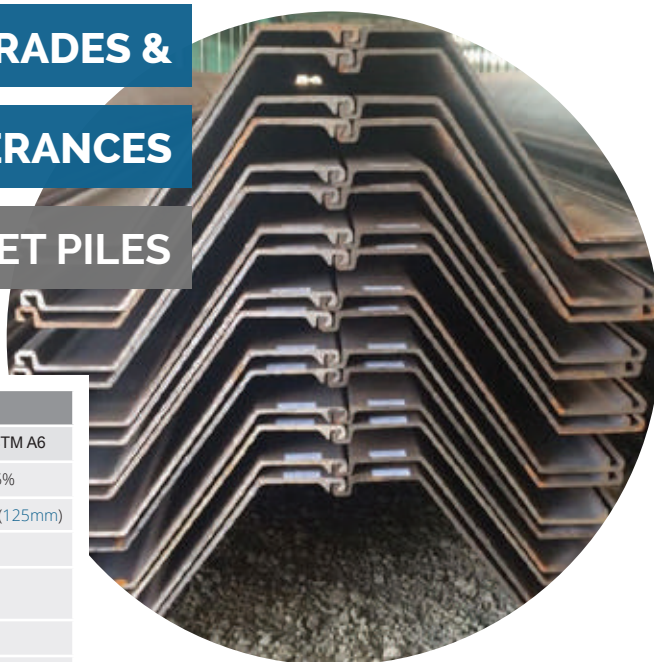
SECTION	WIDTH	HEIGHT	THICKNESS	CROSS SECTIONAL AREA	WEIGHT		MOMENT OF INERTIA	SECTION MODULUS	COATING AREA *(both side per pile)
	(w) in mm	(h) in mm	(t) in mm	in ² cm ²	Per Pile lb/ft kg/m	Per Wall lb/ft ² kg/m ²	in ⁴ /ft cm ⁴ /m	in ³ /ft cm ³ /m	ft ² /ft m ² /m
ESC-PZC12	27.88 708	12.52 318	0.335 8.5	13.64 88.0	46.4 69.1	20.0 97.6	139.7 19,080	22.30 1,200	5.60 1.71
ESC-PZC13	27.88 708	12.56 319	0.375 9.5	14.82 95.6	50.4 75.1	21.7 106.0	152 20,760	24.20 1,300	5.60 1.71
ESC-PZC14	27.88 708	12.60 320	0.420 10.7	16.15 104.2	55.0 81.80	23.7 115.5	164.3 24,440	26.00 1,400	5.60 1.71
ESC-PZC17	25.00 635	15.21 386	0.335 8.5	13.64 88.0	46.4 69.10	22.3 108.8	236.1 32,235	31.00 1,670	5.60 1.71
ESC-PZC18	25.00 635	15.25 387	0.375 9.5	14.82 95.6	50.4 75.10	24.2 118.2	225.5 34,890	33.50 1,800	5.60 1.71
ESC-PZC19	25.00 635	15.30 388	0.420 10.7	16.16 104.2	55.0 81.80	26.4 128.8	276.6 37,780	36.10 1,945	5.60 1.71
ESC-PZC25	27.88 708	17.66 449	0.560 14.2	20.40 131.6	69.4 103.3	29.9 145.9	404.1 55,190	45.70 2,455	6.15 1.87
ESC-PZC26	27.88 708	17.70 450	0.600 15.2	21.72 140.1	73.9 110.0	31.8 155.4	428.1 58,460	48.40 2,600	6.15 1.87
ESC-PZC28	27.88 708	17.75 451	0.645 16.4	23.22 149.8	79.0 117.6	34.0 166.1	455.1 62,150	51.3 2,755	6.15 1.87

*excludes internal section of interlock

STEEL GRADES &

MANUFACTURING TOLERANCES

HOT ROLLED SHEET PILES

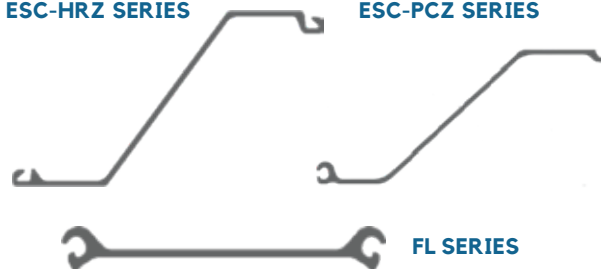


MANUFACTURING TOLERANCES

COMPONENT	ESC-HRZ SERIES		FL SERIES	
	BS EN10249-2	ASTM A6	BS EN10249-2	ASTM A6
Mass	± 5%	± 2.5%	± 5%	± 2.5%
Length	± 7.87" / 200mm	+ 5" (125mm)	± 7.87" / 200mm	+ 5" (125mm)
Height (≤ 7.87" / 200mm)	± 0.197" / 5.0mm		N/A	
Height (> 7.87" / 200mm & ≤ 11.81" / 300mm)	± 0.236" / 6.0mm		N/A	
Height (> 11.81" / 300mm)	± 0.276" / 7.0mm		N/A	
Thickness (≤ 0.335" / 8.5 mm)	± 0.0197" / 0.5 mm		± 0.0197" / 0.5 mm	
Thickness (> 0.355" / 8.5 mm)	± 6% of thickness		N/A	
Width of Single	± 2% of width		± 2% of width	
Width of Pair	± 3% of width		N/A	
Straightness	±0.2% of the length		±0.2% of the length	
Squareness of Ends	± 2% of the width		± 2% of the width	

ESC-HRZ SERIES

ESC-PCZ SERIES

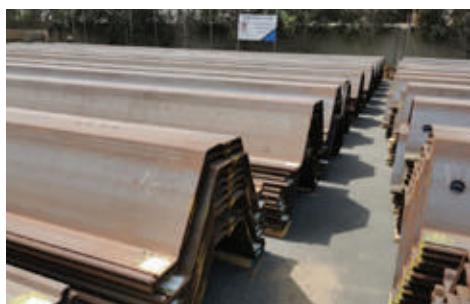


FL SERIES

STEEL GRADES

Other Steel Grades are available on request. The Yield Point provided is applicable to thicknesses less than or equal to 0.63in (16mm).

CLASSIFICATION			MINIMUM YIELD STRENGTH		ULTIMATE TENSILE STRENGTH		MINIMUM ELONGATION	CLASSIFICATION			MINIMUM YIELD STRENGTH		ULTIMATE TENSILE STRENGTH		MINIMUM ELONGATION
Region	Code	Grade	ksi	MPa	ksi	MPa	%	Region	Code	Grade	ksi	MPa	ksi	MPa	%
USA	ASTM A252	Grade 1	30	205	50	345	18	Europe	EN 10248	S240GP	35	240	49	340	26
	ASTM A252	Grade 2	35	240	60	415	14		EN 10248	S270GP	39	270	59	410	24
	ASTM A252	Grade 3	45	310	66	455	-		EN 10248	S320GP	46	320	64	440	23
	ASTM A572	Grade 42	42	290	60	415	20		EN 10248	S355GP	51	355	70	480	22
	ASTM A572	Grade 50	50	345	65	450	18		EN 10248	S430GP	62	430	71	490	20
	ASTM A572	Grade 55	55	380	70	485	17	China	GB/T 700	Q235B	34	235	73	500	26
	ASTM A572	Grade 60	60	415	75	520	16		GB/T 1591	Q345B	50	345	91	630	20
	ASTM A572	Grade 65	65	450	80	550	15		GB/T 1591	Q345C	50	345	91	630	21
Canada	CSA 40.21	260W	38	260	86	590	20		GB/T 1591	Q390B	57	390	94	650	20
	CSA 40.21	300W	44	300	90	620	20		GB/T 1591	Q420B	61	420	99	680	19
	CSA 40.21	350W	51	350	94	650	19	Japan	JIS A5528	SY295	43	295	71	490	17
	CSA 40.21	400W	58	400	100	690	16		JIS A5528	SY390	57	390	78	540	15



ESC Cold Rolled Sheet Piles

Introduction

The cold rolling process involves rolling the sheet pile profile continuously at room temperature. The profile thickness is constant along the width of the profile. Cold Rolling occurs in a continuous section which can be cut at any length. A wide range of widths and depths are achievable. Production schedules are much more flexible than Hot Rolling of Sheet Piles, which can lead to cost-savings due to lower stock requirements and greater project-specific profiles and lengths. ESC can offer one of the thickest sheet piles (0.629 in/16 mm) in the world that can be produced using the cold rolling process without any compromise in structural properties. ESC can offer 4 different types of cold rolled sheet pile profile which covers virtually all applications – for both temporary and permanent usage.

Frequently, ESC Cold Rolled Sheet Piles are used as an effective and equivalent alternative to a Hot Rolled Sheet Pile Profiles, with possible cost savings of over 20% with no compromise in design, quality or strength. ESC Cold Rolled Sheet Piles have successfully been used in most regions globally.

The ESC Advantage

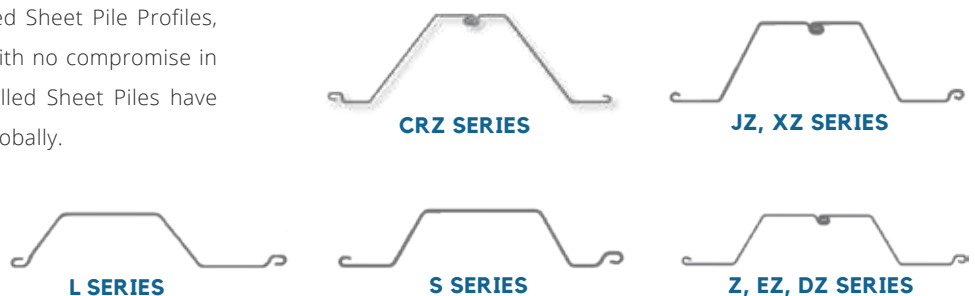
- ✓ Global Supply Network
- ✓ Unparalleled Technical Support
- ✓ Competitive Pricing
- ✓ Free of Charge Design
- ✓ Supplied project volumes between 8—20,000mT
- ✓ Full Suite of Sheet Pile Accessories

What Our Engineers Say?

"We at ESC offer an extremely wide range of Cold Rolled Sheet Pile profiles that are high quality and economical from a design and a price per unit weight perspective."

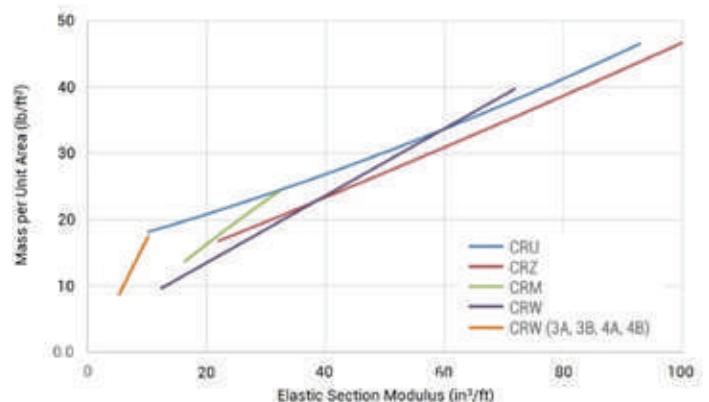


SHEET PILE PROFILES



WATCH OUR COLD ROLLED SHEET PILE PRODUCTION ANIMATION BY SCANNING THE QR CODE

Section Modulus Range vs Mass



Note the lines shown above are trend-lines. The individual profiles may lie at points away from this line. Please see the relevant catalog page for exact specifications.

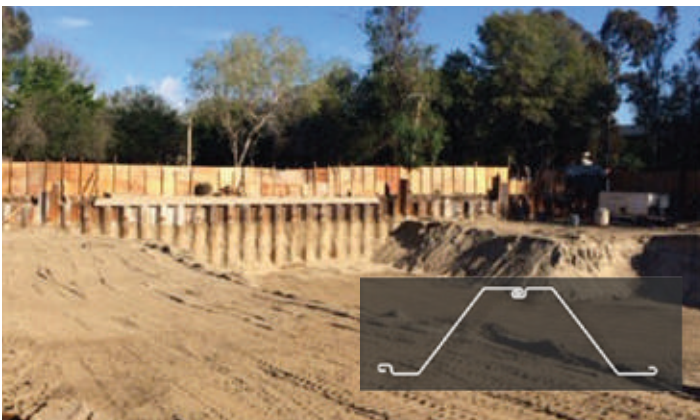
Project References



RETAINING WALL, VIRGINIA, USA



BROOKLYN TEMPORARY WORKS, USA



TIJUANA BASEMENT PARKING, MEXICO



UNDERGROUND PARKING LOT, MEXICO



JOHOR SLOPE PROTECTION, MALAYSIA



PAHANG BRIDGE ABUTMENT, MALAYSIA



SELANGOR SLOPE PROJECT, MALAYSIA



CONTAINMENT BARRIER, NETHERLANDS

ESC-CRZ SERIES

Z PROFILE SHEET PILES



HIGHEST STRENGTH TO WEIGHT RATIO SHEET PILE IN OUR PRODUCT LINE

ESC is proud to present its Cold Rolled ESC-CRZ Profile Sheet Piles. The design features interlocks that are located symmetrically on both sides of the neutral axis. The web is continuous, thus the section modulus and shear load transfer are optimised. The profile design has a very competitive strength to weight ratio. Due to a deep profile, the design features a higher Inertia resulting in reduced deflection. This higher inertia together with the option of higher steel grades (462.36 ksi/30 Mpa) provides the most economic solution that meets the performance requirements. The piles are usually shipped in pairs to accommodate faster installation and better alignment. A wide range of steel grades are available.

Order Options

Steel Grades

ASTM A572 Gr.50, Gr.55, Gr.60 & Gr.65
ASTM A690 Gr.50
ASTM A588 Gr.50
ASTM A871 Gr.60 & Gr.65
ASTM A1018 Gr.50, Gr.60, Gr.70 & Gr.80
Others available on request

Lengths

114.8ft maximum
Any project specific length can be produced

Delivery Options

Single or Pairs
Pairs either loose, welded or crimped
Lifting Hole
Grip Plate
By container (38.7ft or less) or Break Bulk
Corrosion Protection Coatings





Interlocking Clutch



SECTION	WIDTH	HEIGHT	THICKNESS		CROSS SECTIONAL AREA	WEIGHT		ELASTIC SECTION MODULUS	MOMENT OF INERTIA	COATING AREA *(both side per pile)
	(w) in mm	(h) in mm	Flange (t _f) in mm	Web (t _w) in mm	in ² /ft cm ² /m	Per Pile lb/ft kg/m	Per Wall lb/ft ² kg/m ²	in ³ /ft cm ³ /m	in ⁴ /ft cm ⁴ /m	ft ² /ft m ² /m
ESC-CRZ6-600	23.62 600	9.84 250	0.252 6.4	0.252 6.4	4.02 85.0	26.88 40.0	13.66 66.7	11.25 605	55.38 7,562	5.22 1.59
ESC-CRZ6-800	31.5 800	11.81 300	0.236 6.0	0.236 6.0	3.65 77.2	32.59 48.5	12.7 62.0	11.87 638	69.60 9,505	6.3 1.92
ESC-CRZ7-725	28.54 725	11.81 300	0.236 6.0	0.236 6.0	3.74 79.1	30.24 45.0	12.37 60.4	13.58 730	78.55 10,727	5.84 1.78
ESC-CRZ8-725	28.54 725	10.67 271	0.276 7.0	0.276 7.0	4.32 91.4	34.94 52.0	14.69 71.7	15.74 846	84.51 11,540	5.79 1.76
ESC-CRZ11-812	32.0 812.8	12.20 310	0.374 9.5	0.374 9.5	5.89 124.7	53.46 79.55	20.05 97.9	20.11 1,081	122.69 16,755	6.99 2.13
ESC-CRZ12-770	30.31 770	14.17 360	0.343 8.7	0.343 8.7	5.67 120.1	48.78 72.6	19.31 94.3	23.12 1,243	164.32 22,439	6.99 2.13
ESC-CRZ13-770	30.31 770	14.17 360	0.354 9.0	0.354 9.0	5.89 124.6	50.6 75.3	20.03 97.8	24.03 1,292	170.47 23,279	6.99 2.13
ESC-CRZ14	30.31 770	13.39 340	0.382 9.7	0.382 9.7	6.34 134.1	54.5 81.1	21.57 105.3	25.78 1,386	172.79 23,596	6.99 2.13
ESC-CRZ14-770	30.31 770	14.17 360	0.374 9.5	0.374 9.5	6.19 131.1	53.29 79.3	21.08 102.9	25.24 1,357	178.98 24,441	6.99 2.13
ESC-CRZ14-770-10.0	30.31 770	13.58 345	0.394 10.0	0.394 10.0	6.54 138.5	56.27 83.74	22.28 108.8	26.36 1,417	178.99 24,443	7.05 2.15
ESC-CRZ15-750	29.53 750	18.48 469.5	0.305 7.75	0.305 7.75	5.31 112.5	44.52 66.25	18.09 88.34	28.33 1,523	261.81 35,753	7.18 2.19
ESC-CRZ17-700-8.0	27.56 700	16.46 418	0.315 8.0	0.315 8.0	5.94 125.8	46.43 69.1	18.78 91.7	30.89 1,661	254.15 34,706	6.73 2.05
ESC-CRZ17-700-8.7	27.56 700	17.91 455	0.343 8.7	0.343 8.7	6.26 132.5	48.92 72.8	21.3 104.0	32.27 1,735	289.29 39,505	6.99 2.13
ESC-CRZ18-700	27.56 700	17.72 450	0.358 9.1	0.358 9.1	6.54 138.5	51.14 76.1	22.26 108.7	34.22 1,840	304.15 41,534	6.99 2.13
ESC-CRZ18-850	33.46 850	18.50 470	0.374 9.5	0.374 9.5	6.42 135.8	60.88 90.6	21.83 106.6	33.91 1,823	314.04 42,885	7.43 2.27
ESC-CRZ19-700	27.56 700	16.54 420	0.382 9.7	0.382 9.7	6.97 147.6	54.5 81.1	23.73 115.85	35.12 1,888	290.53 39,675	6.99 2.13
ESC-CRZ20-700	27.56 700	16.18 411	0.402 10.2	0.402 10.2	7.34 155.4	57.37 85.37	24.99 122.0	36.33 1,953	294.39 40,202	6.99 2.13
ESC-CRZ20-850	33.46 850	18.50 470	0.394 10.0	0.394 10.0	6.8 143.9	64.51 96.0	23.12 112.9	37.2 2,000	343.16 46,862	7.0 2.28
ESC-CRZ21-660	26.0 660.4	18.11 460	0.374 9.5	0.374 9.5	7.25 153.4	53.46 79.55	24.67 120.45	39.36 2,116	356.54 48,689	6.99 2.13
ESC-CRZ21-700	27.56 700	16.22 412	0.425 10.8	0.425 10.8	7.8 165.2	61.0 90.78	26.56 129.7	38.80 2,086	314.98 43,013	7.02 2.14

*excludes internal section of interlock

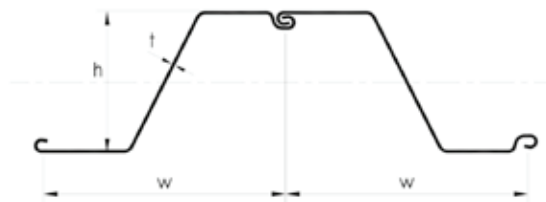


Interlocking Clutch



SECTION	WIDTH	HEIGHT	THICKNESS		CROSS SECTIONAL AREA	WEIGHT		ELASTIC SECTION MODULUS	MOMENT OF INERTIA	COATING AREA *(both side per pile)
	(w) in mm	(h) in mm	Flange (t _f) in mm	Web (t _w) in mm	in ² /ft cm ² /m	Per Pile lb/ft kg/m	Per Wall lb/ft ² kg/m ²	in ³ /ft cm ³ /m	in ⁴ /ft cm ⁴ /m	ft ² /ft m ² /m
ESC-CRZ22-559	22.01 559	9.84 250	0.374 9.5	0.374 9.5	6.46 136.8	40.32 60	22.0 107.4	18.62 1,001	91.79 12,535	5.28 1.61
ESC-CRZ24-609	24.0 609.6	19.69 500	0.374 9.5	0.374 9.5	7.85 166.2	53.46 79.55	26.73 130.49	46.0 2,473	452.87 61,843	6.99 2.13
ESC-CRZ24-700	27.56 700	18.5 470	0.425 10.8	0.425 10.8	8.23 174.1	64.31 95.7	28.0 136.7	45.27 2,434	418.94 57,210	7.41 2.26
ESC-CRZ26-700	27.56 700	19.29 490	0.457 11.6	0.457 11.6	8.85 187.3	69.15 102.9	30.11 147	48.77 2,622	470.65 64,271	7.41 2.26
ESC-CRZ26-700	27.56 700	19.29 490	0.469 11.9	0.469 11.9	9.08 192.1	70.96 105.6	30.89 150.8	49.89 2,682	481.45 65,746	7.41 2.26
ESC-CRZ26-711	28.0 711.2	17.32 440	0.48 12.2	0.48 12.2	9.26 196.1	73.55 109.46	31.52 153.9	49.55 2,664	429.3 58,624	7.51 2.29
ESC-CRZ27-457	17.99 457	12.99 330	0.374 9.5	0.374 9.5	7.9 167.3	40.32 60	26.89 131.3	30.3 1,629	196.93 26,893	5.28 1.61
ESC-CRZ28-686	27.0 685.8	17.72 450	0.48 12.2	0.48 12.2	9.6 203.3	73.55 109.46	32.69 159.6	53.23 2,862	471.64 64,407	7.51 2.29
ESC-CRZ28-700	27.56 700	19.29 490	0.488 12.4	0.488 12.4	9.45 200.1	73.92 110	32.18 157.1	51.89 2,790	500.44 68,339	7.41 2.26
ESC-CRZ28-700	27.56 700	18.5 470	0.512 13	0.512 13	9.91 209.8	77.48 115.3	33.73 164.7	52.68 2,832	487.45 66,565	7.41 2.26
ESC-CRZ31-660	26.0 660.4	18.5 470	0.48 12.2	0.48 12.2	9.97 211.1	73.55 109.46	33.95 165.75	57.51 3,092	532.23 72,681	7.51 2.29
ESC-CRZ33-635	25.0 635	19.29 490	0.48 12.2	0.48 12.2	10.37 219.6	73.55 109.46	35.31 172.38	61.94 3,330	597.6 81,607	7.51 2.29
ESC-CRZ33-700	27.56 700	19.69 500	0.472 12.0	0.472 12.0	6.60 139.6	51.54 76.7	33.39 163.0	61.1 3,285	607.28 82,929	8.1 2.45
ESC-CRZ36-700N	27.56 700	22.05 560	0.48 12.2	0.48 12.2	10.12 214.3	79.16 117.8	34.45 168.2	67.13 3,609	740.12 101,070	8.07 2.46
ESC-CRZ38-700	27.56 700	22.44 570	0.52 13.2	0.52 13.2	10.95 231.8	85.6 127.4	37.28 182	71.83 3,862	806.6 110,154	8.07 2.46
ESC-CRZ40-700N	27.56 700	22.83 580	0.543 13.8	0.543 13.8	11.45 242.4	89.5 133.2	38.98 190.3	74.64 4,013	853.0 116,486	8.07 2.46
ESC-CRZ42-700N	27.56 700	22.83 580	0.575 14.6	0.575 14.6	12.11 256.4	94.7 140.9	41.23 201.3	78.34 4,212	895.0 122,215	8.07 2.46
ESC-CRZ44-700N	27.56 700	21.26 540	0.567 14.4	0.567 14.4	12.83 271.5	100.3 149.2	43.65 213.1	82.66 4,444	879.6 120,120	8.66 2.64
ESC-CRZ46-700N	27.56 700	22.83 580	0.571 14.5	0.571 14.5	12.67 268.2	99.0 147.35	43.11 210.5	85.99 4,623	981.82 134,076	8.6 2.62
ESC-CRZ48-700	27.56 700	23.23 590	0.591 15.0	0.591 15.0	13.44 284.4	105.0 156.27	45.71 223.2	89.88 4,832	1,046.04 142,846	8.79 2.68

*excludes internal section of interlock



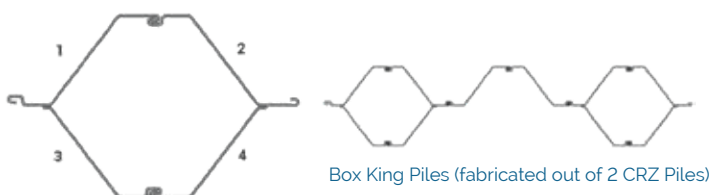
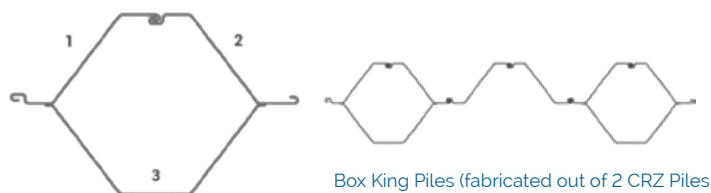
Interlocking Clutch



SECTION	WIDTH	HEIGHT	THICKNESS		CROSS SECTIONAL AREA	WEIGHT		ELASTIC SECTION MODULUS	MOMENT OF INERTIA	COATING AREA *(both side per pile)
	(w) in mm	(h) in mm	Flange (t _f) in mm	Web (t _w) in mm	in ² /ft cm ² /m	Per Pile lb/ft kg/m	Per Wall lb/ft ² kg/m ²	in ³ /ft cm ³ /m	in ⁴ /ft cm ⁴ /m	ft ² /ft m ² /m
ESC-CRZ48-580-14.5	22.83 580	21.26 540	0.571 14.5	0.571 14.5	14.43 305.5	93.5 139.1	49.11 239.8	89.99 4,838	957.54 130,760	8.1 2.47
ESC-CRZ50-580-14.0	22.83 580	22.83 580	0.551 14.0	0.551 14.0	13.92 294.6	90.1 134.13	47.37 231.3	93.69 5,037	1025.23 140,004	8.1 2.47
ESC-CRZ50-700	27.56 700	22.05 560	0.63 16.0	0.63 16.0	14.1 298.5	110.2 164.0	48.0 234.3	93.37 5,020	1,029.43 140,578	8.56 2.61
ESC-CRZ52-700	27.56 700	21.65 550	0.63 16.0	0.63 16.0	14.42 305.2	112.69 167.7	49.07 239.6	97.2 5,226	1,052.6 143,742	8.86 2.7

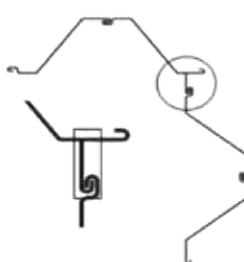
*excludes internal section of interlock

OTHER CONFIGURATIONS

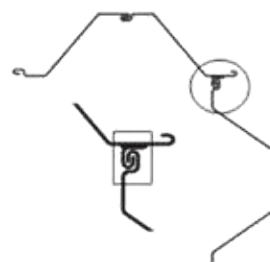


CORNER PILES

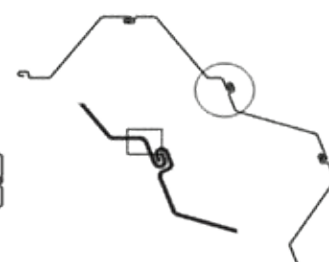
ESC is able to offer 3 options for Corner Pile configurations in the ESC-CRZ Series. Option 1 is frequently used when the installation contractor prefers to create their own corner piles on site depending on the as-driven layout. However this produces wastage on the offcut pile. Option 2 allows welding at the mill or on site and provides the installation contractor with more flexibility on corner pile location. Option 3 provides an option where no welding is required. Option 3 provides increased accuracy at corners that are deviated from the typical 90° corner.



OPTION 1
Cut & weld on section from
CRZ Sheet Pile



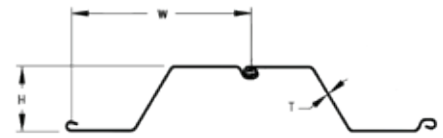
OPTION 2
ESC CR Interlock welded



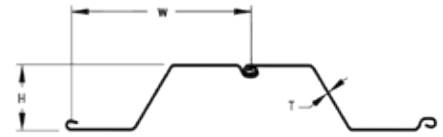
OPTION 3
Cold Form bending of flange

FURTHER DOMESTIC US OPTIONS

ESC-Z SERIES

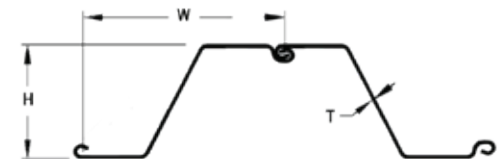


SECTION	WIDTH	HEIGHT	THICKNESS	CROSS SECTIONAL AREA	WEIGHT		ELASTIC SECTION MODULUS	MOMENT OF INERTIA	COATING AREA *(both side per pile)
	(w)	(h)	(t)		Per Pile	Per Wall			
	in	in	in	in ² /ft	lb/ft	lb/ft ²	in ³ /ft	in ⁴ /ft	ft ² /ft
	mm	mm	mm	cm ² /m	kg/m	kg/m ²	cm ³ /m	cm ⁴ /m	m ² /m
ESC-Z55	24.0 610	8.64 219	0.217 5.5	7.57 48.8	25.8 38.4	12.9 63.0	11.4 613	49.7 6,790	5.20 1.59
ESC-Z60	24.0 610	8.66 220	0.236 6.0	8.26 53.3	28.2 42.0	14.1 68.8	12.4 667	54.2 7,400	5.20 1.59
ESC-Z65	24.0 610	8.68 220	0.256 6.5	8.95 57.7	30.6 45.5	15.3 74.7	13.4 720	58.7 8,010	5.20 1.59
ESC-Z70	24.0 610	8.70 221	0.276 7.0	9.64 62.2	33.0 49.1	16.5 80.6	14.4 774	63.2 8,630	5.20 1.59
ESC-Z75	24.0 610	8.72 221	0.295 7.5	10.3 66.5	35.2 52.4	17.6 85.9	15.6 839	67.7 9,250	5.20 1.59



ESC-EZ SERIES

SECTION	WIDTH	HEIGHT	THICKNESS	CROSS SECTIONAL AREA	WEIGHT		ELASTIC SECTION MODULUS	MOMENT OF INERTIA	COATING AREA *(both side per pile)
	(w)	(h)	(t)		Per Pile	Per Wall			
	in	in	in	in ² /ft	lb/ft	lb/ft ²	in ³ /ft	in ⁴ /ft	ft ² /ft
	mm	mm	mm	cm ² /m	kg/m	kg/m ²	cm ³ /m	cm ⁴ /m	m ² /m
ESC-EZ75	25.0 635	10.72 272	0.295 7.5	11.3 73.0	38.5 57.4	18.6 90.4	19.20 1,030	103 14,100	5.6 1.71
ESC-EZ80	25.0 635	10.75 273	0.315 8.0	12.1 77.9	41.1 61.2	19.8 96.4	20.50 1,100	110 15,000	5.6 1.71
ESC-EZ88	25.0 635	10.78 274	0.344 8.75	13.2 85.1	44.9 66.8	21.6 105	22.4 1,200	121 16,500	5.6 1.71
ESC-EZ95	25.0 635	10.81 275	0.375 9.5	14.4 92.7	48.9 72.8	23.5 115	24.4 1,310	131 17,900	5.6 1.71

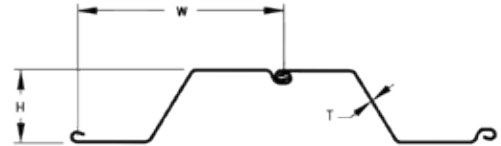


ESC-XZ SERIES

SECTION	WIDTH	HEIGHT	THICKNESS	CROSS SECTIONAL AREA	WEIGHT		ELASTIC SECTION MODULUS	MOMENT OF INERTIA	COATING AREA *(both side per pile)
	(w)	(h)	(t)		Per Pile	Per Wall			
	in	in	in	in ² /ft	lb/ft	lb/ft ²	in ³ /ft	in ⁴ /ft	ft ² /ft
	mm	mm	mm	cm ² /m	kg/m	kg/m ²	cm ³ /m	cm ⁴ /m	m ² /m
ESC-XZ85	25.0 635	14.06 357	0.335 8.5	13.6 87.9	46.4 69.0	22.3 109	30.2 1,630	212 29,000	6.03 1.84
ESC-XZ90	25.0 635	14.09 358	0.354 9.0	14.4 93.0	48.9 72.7	23.5 115	31.8 1,710	225 30,800	6.03 1.84

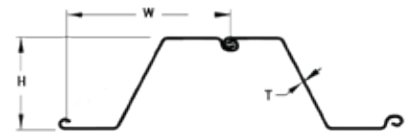
*excludes internal section of interlock

SECTION	WIDTH	HEIGHT	THICKNESS	CROSS SECTIONAL AREA	WEIGHT		ELASTIC SECTION MODULUS	MOMENT OF INERTIA	COATING AREA *(both side per pile)
	(w) in mm	(h) in mm	(t) in mm	in ² /ft cm ² /m	Per Pile lb/ft kg/m	Per Wall lb/ft ² kg/m ²	in ³ /ft cm ³ /m	in ⁴ /ft cm ⁴ /m	ft ² /ft m ² /m
ESC-XZ95	25.0 635	14.12 359	0.375 9.5	15.2 98.2	51.7 76.9	24.8 121	33.5 1,800	237 32,400	6.03 1.84
ESC-XZ100	25.0 635	14.15 360	0.394 10.0	15.9 103.0	54.2 80.7	26.0 127	35.3 1,900	250 34,200	6.03 1.84
ESC-XZ105	25.0 635	14.17 360	0.413 10.5	16.7 108.0	56.9 84.7	27.3 133	37.1 2,000	263 35,900	6.03 1.84



ESC-DZ SERIES

SECTION	WIDTH	HEIGHT	THICKNESS	CROSS SECTIONAL AREA	WEIGHT		ELASTIC SECTION MODULUS	MOMENT OF INERTIA	COATING AREA *(both side per pile)
	(w) in mm	(h) in mm	(t) in mm	in ² /ft cm ² /m	Per Pile lb/ft kg/m	Per Wall lb/ft ² kg/m ²	in ³ /ft cm ³ /m	in ⁴ /ft cm ⁴ /m	ft ² /ft m ² /m
ESC-DZ80	29.00 737	16.44 418	0.315 8.0	14.47 93.3	49.20 73	20.40 99	31.96 1,718	262.72 35,876	6.80 2.08
ESC-DZ85	29.00 737	16.46 418	0.335 8.5	15.35 99.0	52.20 78	21.60 106	33.86 1,820	278.67 38,055	6.80 2.08
ESC-DZ90	29.00 737	16.48 419	0.354 9.0	16.23 104.7	55.20 82	22.90 112	35.75 1,922	294.58 40,227	6.80 2.08
ESC-DZ95	29.00 737	16.50 419	0.375 9.5	17.15 110.6	58.40 87	24.20 118	37.72 2,028	311.22 42,500	6.80 2.08
ESC-DZ100	29.00 737	16.52 420	0.394 10.0	17.98 116.0	61.20 91	25.30 124	39.49 2,123	326.23 44,549	6.80 2.08
ESC-DZ105	29.00 737	16.54 420	0.413 10.5	18.85 121.6	64.20 95	26.50 130	41.35 2,223	341.98 46,700	6.80 2.08



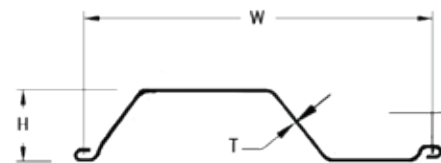
ESC-JZ SERIES

SECTION	WIDTH	HEIGHT	THICKNESS	CROSS SECTIONAL AREA	WEIGHT		ELASTIC SECTION MODULUS	MOMENT OF INERTIA	COATING AREA *(both side per pile)
	(w) in mm	(h) in mm	(t) in mm	in ² /ft cm ² /m	Per Pile lb/ft kg/m	Per Wall lb/ft ² kg/m ²	in ³ /ft cm ³ /m	in ⁴ /ft cm ⁴ /m	ft ² /ft m ² /m
ESC-JZ112	26.5 673	16.44 418	0.441 11.2	20.1 129.7	68.2 101	30.9 151	45.3 2,430	374 51,100	6.51 1.99
ESC-JZ120	26.5 673	16.47 418	0.472 12.0	21.5 138.7	73.0 109	33.0 161	48.5 2,610	401 54,700	6.51 1.99
ESC-JZ127	26.5 673	16.50 419	0.500 12.7	22.7 146.5	77.3 115	35.0 171	51.4 2,760	424 57,900	6.51 1.99

*excludes internal section of interlock

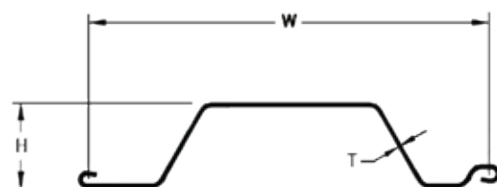
FURTHER DOMESTIC US OPTIONS

ESC-L SERIES



SECTION	WIDTH	HEIGHT	THICKNESS	CROSS SECTIONAL AREA	WEIGHT		ELASTIC SECTION MODULUS	MOMENT OF INERTIA	COATING AREA *(both side per pile)
	(w) in mm	(h) in mm	(t) in mm	in ² /ft cm ² /m	Per Pile lb/ft kg/m	Per Wall lb/ft ² kg/m ²	in ³ /ft cm ³ /m	in ⁴ /ft cm ⁴ /m	ft ² /ft m ² /m
ESC-L34	19.7 500	4.10 104	0.134 3.4	3.58 23.1	12.5 18.6	7.62 37.2	2.77 149	5.89 806	4.20 1.28
ESC-L41	19.7 500	4.12 105	0.164 4.1	4.39 28.3	15.0 22.4	9.17 44.7	3.30 178	7.02 961	4.20 1.28
ESC-L45	19.7 500	4.13 105	0.177 4.5	4.47 30.6	16.2 24.1	9.90 48.1	3.62 195	7.69 1,050	4.20 1.28
ESC-L50	19.7 500	4.15 106	0.197 5.0	5.29 34.1	18.90 28.2	11.50 56.3	4.14 223	9.82 1,340	4.20 1.28
ESC-L60	19.7 500	4.18 106	0.236 6.0	6.37 41.1	22.3 33.1	13.60 66.1	4.97 268	11.80 1,610	4.20 1.28
ESC-L65	19.7 500	4.20 107	0.256 6.5	6.90 44.5	24.1 35.8	14.70 71.6	5.38 290	12.80 1,750	4.20 1.28

ESC-S SERIES



SECTION	WIDTH	HEIGHT	THICKNESS	CROSS SECTIONAL AREA	WEIGHT		ELASTIC SECTION MODULUS	MOMENT OF INERTIA	COATING AREA *(both side per pile)
	(w) in mm	(h) in mm	(t) in mm	in ² /ft cm ² /m	Per Pile lb/ft kg/m	Per Wall lb/ft ² kg/m ²	in ³ /ft cm ³ /m	in ⁴ /ft cm ⁴ /m	ft ² /ft m ² /m
ESC-S64	27.75 705	5.91 150	0.250 6.35	9.97 64.4	33.9 50.4	14.7 71.7	7.89 424	24.0 3,280	5.90 1.80
ESC-S80	27.75 705	5.97 152	0.313 8.0	12.36 79.7	42.1 62.6	18.2 88.8	9.82 528	30.0 4,100	5.90 1.80

*excludes internal section of interlock



Scan the QR code to watch
Trench Pile Installation Video.

ESC-T SERIES

TRENCH SHEETS

THE PERFECT SOLUTION FOR SHALLOW EXCAVATIONS AND TRENCHES

ESC trench sheet products offer a highly efficient retention system for shallow excavations. ESC trench sheet can be used to support earth banks for the safety of construction workers, and are ideal for reinforcement of waterway banks and services trenches. The strength, speed and flexibility of light trench sheets makes it ideal for all forms of temporary and permanent works. The trench piles also offer good durability and ease of installation and extraction allows sustainable construction.

Order Options

Steel Grades

ASTM A572 Gr. 42, Gr.50, Gr.60 & Gr.65

ASTM A690 Gr.50

ASTM A588 Gr.50

ASTM A871 Gr.60 & Gr.65

ASTM A1018 Gr.50, Gr.60, Gr.70 & Gr.80

Others available on request

Lengths

39.3ft maximum

Any project specific length can be produced

Delivery Options

Lifting Hole

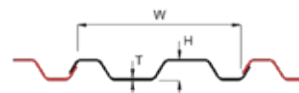
By container (38.7ft or less) or Break Bulk

SECTION	WIDTH	HEIGHT	THICKNESS	UNIT WEIGHT		SECTION MODULUS	MOMENT OF INERTIA
	(w) in mm	(h) in mm	(t) in mm	Section lb/ft kg/m	Wall lb/ft ² kg/m ²	in ³ cm ³	in ⁴ cm ⁴
ESC-T24iA	23 3/4 603.25	2 3/4 69.58	3/16 4.76	18.8 28.04	9.5 46.38	4.3 70.46	5.8 241.41
ESC-T24iB	23 3/4 603.25	2 3/4 69.58	1/4 6.35	25.1 37.35	12.7 62.01	5.6 91.77	7.6 316.34
ESC-T24iC	23 3/8 600.08	2 7/8 73.03	5/16 7.94	31.7 47.10	16.1 78.61	6.9 113.07	10.0 416.23
ESC-T30iA	30 762	3 3/4 95.25	1/4 6.35	33.5 49.85	13.4 65.42	10.2 167.15	18.4 765.87
ESC-T30iB	30 762	3 3/4 95.25	3/8 9.53	50.3 74.85	20.1 98.14	13.9 227.78	26.1 1,086.36
ESC-T32i	32 812.8	4 1/2 114.30	3/8 9.53	50.2 74.71	18.8 91.79	17.3 283.50	38.1 1,585.84



T SERIES

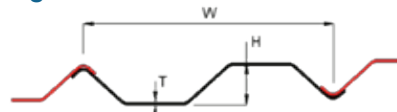
T30i



T24i



T32i

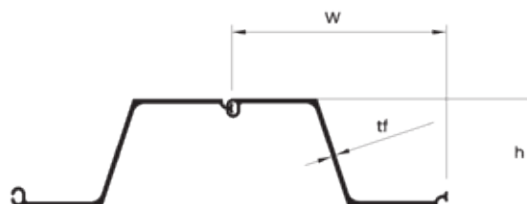


ALUMINUM SHEET PILES

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.

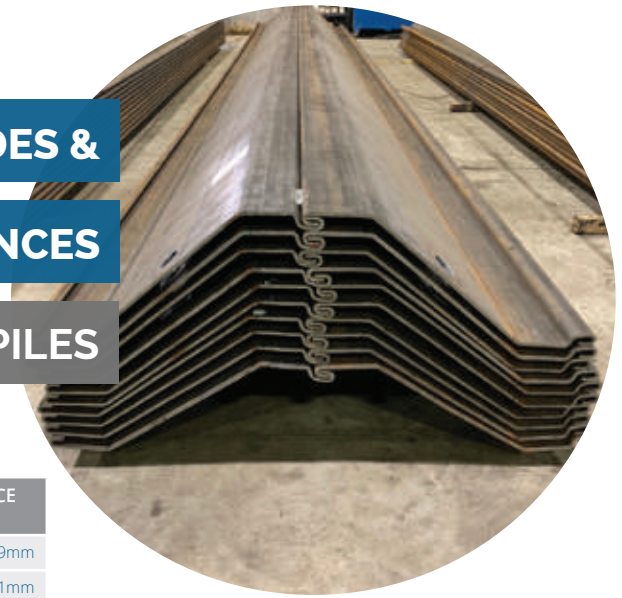


SERIES	UNIT WIDTH	HEIGHT	FLANGE	UNIT WEIGHT		TOTAL MODULUS	MOMENT OF INERTIA
	(w) in mm	(h) in mm	(tf) in mm	Section lb/ft kg/m	Wall lb/ft ² kg/m ²	in ³ /ft cm ³ /m	in ⁴ /ft cm ⁴ /m
APZ500	12.0 304.8	6.0 152.4	0.244 6.2	5.18 7.7	4.99 24.33	9.0 484	27 3,687

STEEL GRADES &

MANUFACTURING TOLERANCES

COLD ROLLED & COLD FORMED SHEET PILES



MANUFACTURING TOLERANCES

COMPONENT	BS EN1024-9	ASTM A6	NOMINAL THICKNESS	TOLERANCE
Mass	± 5%	±2.5%	0.197" / 5mm	± 0.0114" / 0.29mm
Length	± 2.0" / 50mm	+ 5.0" / 127mm	0.236" / 6mm	± 0.0122" / 0.31mm
Height (≤ 7.87" / 200mm)	± 0.157" / 4.0mm		0.315" / 8mm	± 0.0138" / 0.35mm
Height (> 7.87" / 200mm & ≤ 11.8" / 300mm)	± 0.236" / 6.0mm		0.354" / 9mm	± 0.0157" / 0.40mm
Height (> 11.8" / 300mm & ≤ 15.8" / 400mm)	± 0.315" / 8.0mm		0.393" / 10mm	± 0.0157" / 0.40mm
Height (> 15.8" / 400mm)	± 0.394" / 10.0mm		0.472" / 12mm	± 0.0169" / 0.43mm
Width of Single Pile	± 2% of width		0.512" / 13mm	± 0.0181" / 0.46mm
Width of Double Z or Wide U	± 3% of width		0.591" / 15mm	± 0.0181" / 0.46mm
Squareness of Ends	2% of width		N/A	
Straightness	±0.2% of the length			
Squareness of Ends	± 2% of the width			

SHEET PILE MARKING

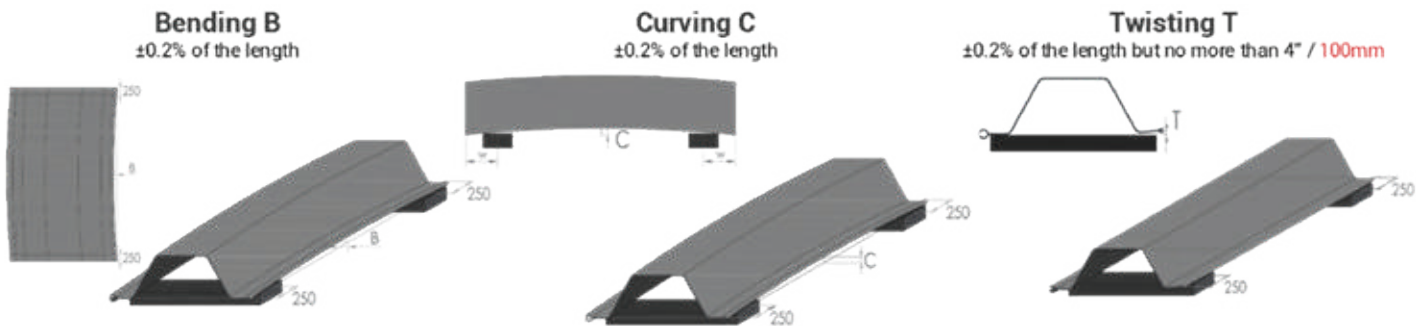
ESC is able to apply adhesive stickers to its products to provide useful information such as destination, order number, project identifier, client name and others. To enable good traceability, material heat number & pile specification is included as standard.



STEEL GRADES

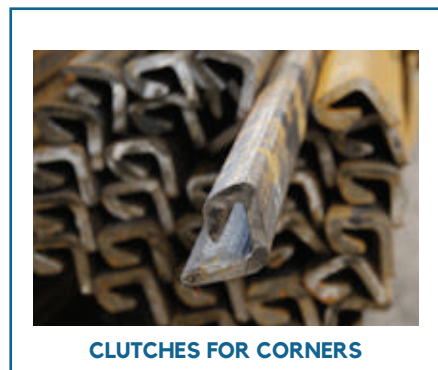
CLASSIFICATION		MECHANICAL PROPERTIES						CHEMICAL COMPOSITION % (MAX)				
		MINIMUM YIELD STRENGTH		ULTIMATE TENSILE STRENGTH		MINIMUM ELONGATION	IMPACT STRENGTH (CHARPY)	C	Si	Mn	P	S
		ksi	MPa	ksi	MPa	%						
ASTM A36-14	A36	36	250	58-80	400-550	23	-	0.26	0.40	-	0.040	0.050
ASTM A572-2013a	A572 Gr.42	42	290	≥ 60	≥415	20	-	0.21	0.40	1.35	0.040	0.050
	A572 Gr.50	50	345	≥ 65	≥450	18	-	0.23	0.40	1.30	0.040	0.050
	A572 Gr.55	55	380	≥ 60	≥485	17	-	0.25	0.40	1.35	0.030	0.030
	A572 Gr.60	60	413	≥ 75	≥517	16	-	0.26	0.40	1.35	0.040	0.050
	A572 Gr.65	65	450	≥ 80	≥550	15	-	0.23	0.40	1.35	0.030	0.030
ASTM A588	A588 Gr.50A	50	345	≥ 70	≥485	18	-	0.19	0.30-0.65	0.80-1.25	0.040	0.050
	A588 Gr.50B	50	345	≥ 70	≥485	18	-	0.20	0.15-0.50	0.75-1.35	0.040	0.050
ASTM A690	A690 Gr.50	50	345	≥ 70	>485	21	-	0.22	0.40	0.60-0.90	0.08-0.15	0.040
ASTM A871	A871 Gr.60 Type I	60	415	≥ 75	>520	16	15ft-lb [20J] @ 0°F [-18°C] for t<=0.5" [12mm] 15ft-lb [20J] @ -20°F [-29°C] for t>0.5" [12mm]	0.19	0.30-0.65	0.8-1.35	0.030	0.030
	A871 Gr.60 Type II	60	415	≥ 75	>520	16		0.20	0.15-0.50	0.75-1.35	0.030	0.030
	A871 Gr.60 Type IV	60	415	≥ 75	>520	16		0.17	0.25-0.50	0.50-1.20	0.030	0.030
	A871 Gr.65 Type I	65	450	≥ 80	>550	15	15ft-lb [20J] @ 0°F [-18°C] for t<=0.5" [12mm] 15ft-lb [20J] @ -20°F [-29°C] for t>0.5" [12mm]	0.19	0.30-0.65	0.80-1.35	0.030	0.030
	A871 Gr.65 Type II	65	450	≥ 80	>550	15		0.20	0.15-0.50	0.75-1.35	0.030	0.030
	A871 Gr.65 Type IV	65	450	≥ 80	>550	15		0.17	0.25-0.50	0.50-1.20	0.030	0.030
ASTM A1018	A1018 Gr.50 Class1	50	340	≥ 65	>450	16	-	0.23	-	1.50	0.040	0.040
	A1018 Gr.50 Class2	50	340	≥ 60	>410	16	-	0.15	-	1.50	0.040	0.040
	A1018 Gr.60 Class1	60	410	≥ 75	>520	14	-	0.26	-	1.50	0.040	0.040
	A1018 Gr.60 Class2	60	410	≥ 70	>480	14	-	0.15	-	1.50	0.040	0.040
	A1018 Gr.70 Class1	70	480	≥ 85	>590	10	-	0.26	-	1.65	0.040	0.040
	A1018 Gr.70 Class2	70	480	≥ 80	>550	10	-	0.15	-	1.65	0.040	0.040
	A1018 Gr.80	80	550	≥ 90	>620	10	-	0.15	-	1.65	0.025	0.035

MANUFACTURING TOLERANCES



ESC Sheet Piling Accessories Options

ESC is capable of supplying a wide range of accessories for Sheet Piles. All components that are welded are fabricated as per AWS D1.1 and other standards upon request by client. Featured are some of the typical components that can supplement ESC's sheet piling range.



ESC STEEL PIPE PILES

LSAW, SSAW & ERW PIPES

HIGH STRENGTH, ECONOMICAL AND EXCELLENT QUALITY STEEL PIPE PILES DELIVERED TO YOUR EXPECTATIONS

Pipe Piles can be utilised in a multitude of applications: such as building foundations, roads and railways, port construction and more. Utilising 3 different welding and forming processes, ESC can offer a wide range of Pipe Piles at various steel grades, thicknesses and sizes. With our expertise in logistics we have delivered Pipe Piles at over 100mT a piece and 328 ft (100 m) length directly to project sites halfway around the world.



16" to 168" Diameter
1-1/4" to 3.94" Thickness
Up to 328' Length

LSAW PIPE



14" to 120" Diameter
1/4" to 1" Thickness
Up to 328' Length

SSAW PIPE



0.84" to 24" Diameter
0.07" to 0.47" Thickness
Up to 79' Length

ERW PIPE

PRODUCTION STANDARDS

STANDARD	DESCRIPTION
API 5L	Specification of Line Pipe
API 2B	Specification for the Fabrication of Structural Steel Pipe
ASTM 252	Standard Specification for Welded and Seamless Steel Pipe Piles
ASTM A139	Standard Specification for Electric Fusion (Arc) Welded Steel Pipe
BS EN 10219	Cold Formed Welded Structural Hollow Sections of non-alloy and fine grain steels.
ISO 3183	Steel Pipe for Pipeline Transportation Systems

STEEL GRADES

STANDARD	DESCRIPTION
API 5L	X42, X46, X52, X56, X60, X65, X70
API 2W	Gr.50 & Gr.60
API 2H	Gr.42 & Gr.50
ASTM	A572 Gr.42, Gr.50, Gr.60 & Gr.65
Others	Available on request, contact ESC for further information.

QUALITY ASSURANCE GUARANTEED

COUPON TENSILE TESTING



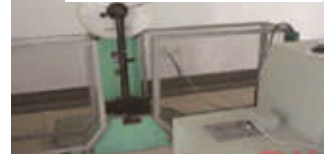
CHEMICAL ANALYSIS



ULTRASONIC TESTING



COUPON IMPACT TESTING



PRESSURE TESTING



PIPE AVAILABLE SIZES & MASS PER UNIT LENGTH (lb/ft/kg/m) ESC LSAW PIPE

LSAW PIPE THICKNESS (in/mm)																					
	1/4	8/27	3/8	7/16	1/2	9/16	5/8	11/16	3/4	7/8	1	1 1/4	1 3/8	1 1/2	1 3/4	2	1 1/3	2 3/4	3 3/20	3 1/2	3 15/16
	6.35	7.52	9.52	11.13	12.7	14.27	15.87	17.48	19.05	22.22	25.4	31.75	34.9	38.1	44.5	50.8	60	70	80	90	100
16			62.6	72.9	82.9	92.7	102.7	112.7	122.3	141.5	160.4	197.2	214.8	232.6	266.9	299.4					
406.4			93.2	108.5	123.3	138	152.8	167.7	182	210.5	238.7	293.4	319.7	346.1	397.2	445.5					
18			70.6	82.3	93.5	104.8	116.1	127.4	138.3	160.2	181.8	223.8	244.3	264.6	304.3	342.1					
457.2			105.1	122.4	139.2	155.9	172.7	189.6	205.8	238.4	270.5	333.1	363.5	393.8	452.9	509.1					
20			78.6	91.7	104.2	116.8	129.4	142.1	154.4	178.9	203.1	250.6	273.6	296.7	341.8	384.9	445.5				
508			117	136.4	155.1	173.8	192.6	211.5	229.7	266.2	302.3	372.9	407.2	441.5	508.7	572.8	662.9				
24	63.5	75.1	94.7	110.4	125.6	140.8	156.2	171.6	186.4	216.3	245.9	304.1	332.4	360.9	416.8	470.5	546.5	626			
609.6	94.5	111.7	140.9	164.3	186.9	209.5	232.4	255.3	277.4	321.9	365.9	452.5	494.6	537	620.2	700.1	813.2	931.5			
30	79.5	94	118.7	138.5	157.7	176.8	196.2	215.6	234.5	272.4	310.1	384.2	420.5	457.1	529.1	598.8	698.2	803			
762	118.3	139.9	176.7	206.1	234.7	263.1	292	320.9	349	405.4	461.4	571.8	625.8	680.2	787.4	891	1,039	1,195			
36	95.6	113	142.7	166.6	189.8	212.9	236.3	259.8	282.6	328.5	374.2	464.4	508.7	553.3	641.6	727.1	849.4	979.8	1,106.1		
914.4	142.2	168.2	212.4	247.9	282.4	316.8	351.7	386.6	420.6	488.9	556.9	691.1	757	823.4	954.7	1,082	1,264	1,458	1,646		
42	111.6	132	166.8	194.7	221.8	248.9	276.4	303.9	330.8	384.7	438.3	544.6	596.8	649.6	754	855.5	1,001.3	1,156.5	1,308.4	1,456.9	1,602
1,066.8	166.1	196.4	248.2	289.8	330.1	370.4	411.3	452.3	492.2	572.4	652.3	810.4	888.1	966.6	1,122	1,273	1,490	1,721	1,947	2,168	2,384
48			190.8	222.8	253.9	284.9	316.5	348.1	378.9	440.8	502.5	624.8	684.8	745.9	866.2	983.8	1,152.5	1,333.2	1,510.7	1,684	1,854.7
1,219.2			284	331.6	377.9	424	471	518	563.8	655.9	747.8	929.8	1,019	1,110	1,289	1,464	1,715	1,984	2,248	2,506	2,760
54			214.9	250.9	286	321	356.6	392.2	427	496.9	566.7	704.9	772.8	842	978.4	1,112.2	1,304.4	1,510	1,712.3	1,911.8	2,107.4
1,371.6			319.8	373.4	425.6	477.7	530.6	583.7	635.4	739.4	843.3	1,049	1,150	1,253	1,456	1,655	1,941	2,247	2,548	2,845	3,136
60				318.1	357	396.6	436.4	475.1	553	630.8	784.9	861.5	938.1	1,091.3	1,240.5	1,455.6	1,686.7	1,914.5	2,139	2,360.1	2,601.7
1,524				473.3	531.3	590.2	649.4	707	822.9	938.7	1,168	1,282	1,396	1,509	1,624	1,846	2,166	2,510	2,849	3,183	3,512
66				350.2	393.1	436.7	480.5	523.2	609.2	694.8	865.5	949.5	1,034.2	1,203.6	1,368.9	1,607.4	1,863.5	2,116.8	2,366.1	2,612.7	2,865.4
1,676.4				521.1	584.9	649.9	715.1	778.6	906.5	1,034	1,288	1,413	1,539	1,791	2,037	2,392	2,773	3,150	3,521	3,888	4,255
72				382.3	429.1	476.9	524.8	571.4	665.3	759.4	945.5	1,037.6	1,131	1,315.8	1,497.2	1,759.3	2,040.9	2,319.1	2,593.9	2,865.4	3,136
1,829				568.9	638.6	709.6	780.9	850.3	990.1	1,130	1,407	1,544	1,683	1,958	2,228	2,618	3,037	3,451	3,860	4,264	4,668
78				414.3	465.2	516.9	568.8	619.4	721.1	823.2	1,025.5	1,125.6	1,227.1	1,428	1,624.9	1,910.5	2,216.9	2,520.7	2,821.1	3,117.4	3,413.8
1,981.2				616.5	692.2	769.2	846.5	921.8	1,073	1,225	1,526	1,675	1,826	2,125	2,418	2,843	3,299	3,751	4,198	4,639	5,079
84				446.5	501.3	557.1	613.1	667.7	777.5	887.7	1,106.1	1,214.3	1,323.2	1,540.9	1,753.9	2,062.4	2,394.3	2,722.9	3,048.9	3,370.8	3,692.7
2,134				664.4	746	829	912.4	993.6	1,157	1,321	1,646	1,807	1,969	2,293	2,610	3,069	3,563	4,052	4,537	5,016	5,495
90				535.9	595.5	655.4	713.7	831.3	948.9	1,182.7	1,298.3	1,415.2	1,648.4	1,876.9	2,207.5	2,563.7	2,916.5	3,266.6	3,612.7	3,958.8	4,304.9
2,280				797.4	886.1	975.3	1,062	1,237	1,412	1,760	1,932	2,106	2,453	2,793	3,285	3,815	4,340	4,861	5,376	5,891	6,406
96				573.3	637.1	701.6	764.1	889.7	1,016.1	1,266	1,390.4	1,515.4	1,765.3	2,010	2,364.8	2,747.8	3,126.8	3,502.5	3,875.4	4,248.5	4,621.6
2,438.4				853.1	948.1	1,044	1,137	1,324	1,512	1,884	2,069	2,255	2,627	2,991	3,519	4,089	4,653	5,212	5,767	6,321	6,875
102				609.3	677.4	745.2	811.8	946.2	1,079.9	1,346.7	1,478.4	1,612.1	1,877.6	2,138.3	2,516.6	2,924.5	3,329.1	3,730.3	4,128.1	4,525.9	4,923.7
2,590.8				906.7	1,008	1,109	1,208	1,408	1,607	2,004	2,200	2,399	2,794	3,182	3,745	4,352	4,954	5,551	6,143	6,735	7,327
108				645.4	717	789.6	860.2	1,002	1,143.7	1,426.7	1,566.4	1,708.2	1,990.5	2,266.7	2,667.8	3,101.3	3,530.7	3,957.4	4,380.8	4,804.2	5,227.6
2,743.2				960.4	1,067	1,175	1,280	1,491	1,702	2,123	2,331	2,542	2,962	3,373	3,970	4,615	5,254	5,889	6,519	7,149	7,779
114					757.3	834	907.9	1,058.4	1,208.3	1,506.6	1,654.5	1,804.3	2,102.7	2,395	2,819.7	3,278	3,733	4,184.5	4,632.8	5,081.1	5,529.4
2,895.6					1,127	1,241	1,351	1,575	1,798	2,242	2,462	2,685	3,129	3,564	4,196	4,878	5,555	6,227	6,894	7,561	8,228
120					797.7	877.6	956.3	1,114.2	1,272.1	1,587.3	1,742.5	1,900.4	2,214.9	2,523.4	2,970.9	3,454.8	3,935.2	4,411.7	4,885.4	5,359.7	5,834.0
3,048					1,187	1,306	1,423	1,658	1,893	2,362	2,593	2,828	3,296	3,755	4,421	5,141	5,856	6,565	7,270	7,975	8,680
126					922	1,004	1,170	1,336.6	1,667.2	1,830.5	1,996.5	2,327.1	2,651	3,122.1	3,630.8	4,136.8	4,638.8	5,137.4	5,636.4	6,134.9	6,633.4
3,200					1,372	1,494	1,741	1,989	2,481	2,724	2,971	3,463	3,945	4,646	5,403	6,156	6,903	7,645	8,387	9,129	9,871
132					966.3	1,052.4	1,226.4	1,400.4	1,747.9	1,919.2	2,093.3	2,440	2,780.1	3,274.7	3,808.2	4,339.1	4,866.6	5,390.8	5,915.0	6,439.2	6,963.4
3,353					1,438	1,566	1,825	2,084	2,601	2,856	3,115	3,631	4,137	4,873	5,667	6,457	7,242	8,022	8,802	9,582	10,362
138					1,100.7	1,282.2	1,465	1,827.8	2,007.3	2,189.4	2,552.3	2,907.7	3,425.9	3,985	4,540.7	5,093.8	5,642.8	6,191.9	6,740.9	7,289.9	7,838.9
3,505					1,638	1,908	2,180	2,720	2,987	3,258	3,798	4,327	5,098	5,930	6,757	7,580	8,397	9,214	10,031	10,848	11,665
144					1,148.4	1,338.6	1,528.8	1,907.8	2,095.3	2,285.5	2,664.5	3,036.8	3,577.1	4,161.7	4,743	5,320.9	5,896.1	6,471.3	7,046.5	7,621.7	8,196.9
3,657.6					1,709	1,992	2,275	2,839	3,118	3,401	3,965	4,519	5,323	6,193	7,058	7,918	8,774	9,629	10,484	11,339	12,194
150									1,395.1	1,593.3	1,987.8	2,183.3	2,381.6	2,776.7	3,165.1	3,728.9	4,338.4	4,945.2	5,548.7	6,148.1	6,747.5
3,810									2,076	2,371	2,958	3,249	3,544	4,132	4,710	5,549	6,456	7,359	8,257	9,149	10,041
156									1,450.8	1,657.2	2,067.7	2,271.4	2,477.7	2,888.9	3,292.8	3,880.1	4,515.2	5,146.8	5,775.2	6,400.1	7,024.5
3,962									2,159	2,466	3,077	3,380	3,687	4,299	4,900	5,774	6,719	7,659	8,594	9,524	10,454
162									1,507.3	1,721.7	2,148.4	2,360.1	2,574.4	3,001.8	3,421.8	4,032	4,692.6	5,349.8	6,003.6	6,654.1	7,304.6
4,115									2,243	2,562	3,197	3,512	3,831	4,467	5,092	6,000	6,983	7,961	8,934	9,902	10,875
168									1,563.1	1,785.5	2,228.4	2,448.1	2,669.9	3,114	3,549.5	4,183.2	4,868.6	5,551.4	6,230.1	6,905.5	7,580.9
4,267									2,326	2,657	3,316	3,643	3,973	4,634	5,282	6,225	7,245	8,261	9,271	10,276	11,281



PIPE AVAILABLE SIZES & MASS PER UNIT LENGTH (lb/ft/kg/m) ESC SSAW PIPE

SSAW PIPE THICKNESS (in/mm)											SSAW PIPE THICKNESS (in/mm)										
OUTER DIAMETER (in/mm)	13/64	7/32	1/4	5/16	3/8	1/2	5/8	3/4	7/8	1		13/64	7/32	1/4	5/16	3/8	1/2	5/8	3/4	7/8	1
	5.16	5.56	6.35	7.93	9.53	12.70	15.88	19.05	22.20	25.40		5.16	5.56	6.35	7.93	9.53	12.70	15.88	19.05	22.20	25.40
	14	29.94	32.26	36.75	45.65	54.62	72.16					54				215	286	356.6	426.9	496.9	566.6
	355.6	44.56	48.01	54.69	67.93	81.28	107.4					1,371.6				319.9	425.5	530.7	635.3	739.5	843.1
	16		23.51	42.09	52.32	62.64	84.13					60				239	318	396.7	475	553.1	630.7
	406.4		34.99	62.63	77.86	93.21	125.2					1,524				355.7	473.3	590.3	706.9	823	938.6
	18		41.63	47.44	58.99	70.65	93.54	116.1				72					382.2	476.9	571.3	665.3	759
	457.2		61.95	70.6	87.78	105.1	139.2	172.8				1,828.8					568.7	709.6	850.1	990.1	1,129
	20		46.31	52.78	65.66	78.67	104.2	129.5				84					446.3	557.1	667.5	777.6	887.3
	508		68.91	78.54	97.71	117.1	155.1	192.6				2,133.6					664.2	828.9	993.2	1,157	1,320
	24		55.67	63.47	79.01	94.11	132.3	156.2	186.4			96						637.2	763.7	889.8	1016
	609.6		82.84	94.45	117.6	140	196.9	232.4	277.4			2,438.4						948.2	1,136	1,324	1,511
	30		69.73	79.51	99.02	118.8	157.7	196.3	234.5	272.4		108						717.4	859.9	1,002	1,144
	762		103.8	118.3	147.4	176.7	234.6	292.1	349	405.4		2,743.2						1,068	1,280	1,491	1,702
	36		83.77	95.54	119	142.8	189.8	236.4	282.6	328.6		120						797.6	958.1	1,114	1,272
	914.4		124.7	142.2	177.1	212.5	282.4	351.7	420.6	488.9		3,048						1,187	1,426	1,658	1,893
	42		97.82	111.6	139	166.9	221.7	276.4	330.7	384.7											
	1,066.8		145.6	166	206.9	248.3	329.9	411.4	492.1	572.5											
	48		127.6	159.1	190.9	253.9	316.5	378.8	440.8	502.2											
	1,219.2		189.9	236.7	284.1	377.8	471	563.7	656	747.3											

PIPE AVAILABLE SIZES & MASS PER UNIT LENGTH (lb/ft/kg/m) ESC ERW PIPE

ERW PIPE THICKNESS (in/mm)																				
	0.08	0.10	0.13	0.15	0.15	0.16	0.18	0.19	0.19	0.20	0.22	9/32	0.32	0.34	3/8	0.43	1/2	0.59	0.87	
	2.1	2.5	3.2	3.73	3.91	4.19	4.55	4.78	4.85	5.08	5.54	7.14	8.08	8.58	9.53	10.97	12.7	15.1	22	
OUTER DIAMETER (in/mm)	1.31 33.4	1.09 1.62	1.28 1.91	1.60 2.38	1.83 2.73	1.91 2.84	2.03 3.02	3.24												
	1.66 42.2	1.40 2.08	1.64 2.45	2.07 3.08	2.38 3.54	2.48 3.69	2.64 3.93	2.84 4.22	2.96 4.41	3.00 4.47	3.13 4.65									
	1.90 48.3	1.61 2.39	1.90 2.82	2.39 3.56	2.76 4.10	2.88 4.28	3.06 4.56	3.30 4.91	3.45 5.13	3.49 5.20	3.64 5.41									
	2 3/8 60.3	2.03 3.01	2.39 3.56	3.03 4.51	3.50 5.20	3.65 5.44	3.90 5.80	4.20 6.26	4.40 6.54	4.46 6.63	4.65 6.92	5.03 7.48	6.29 9.36							
	2 7/8 73		2.92 4.35	3.70 5.51	4.28 6.37	4.48 6.66	4.78 7.11	5.16 7.68	5.40 8.04	5.48 8.15	5.72 8.51	6.19 9.22	7.79 11.60							
	3.54 89.9		3.62 5.39	4.60 6.84	5.33 7.93	5.57 8.29	5.95 8.86	6.44 9.58	6.74 10.03	6.84 10.17	7.14 10.63	7.75 11.53	9.79 14.57							
	4 101.6		4.11 6.11	5.22 7.77	6.05 9.00	6.33 9.42	6.76 10.07	7.32 10.89	7.67 11.41	7.78 11.57	8.13 12.09	8.82 13.12	11.18 16.63	12.52 18.64						
	4 1/2 114.3		4.63 6.89	5.89 8.77	6.83 10.17	7.15 10.64	7.65 11.38	8.28 12.32	8.68 12.91	8.80 13.09	9.20 13.68	9.99 14.86	12.68 18.87	14.22 21.17	22.37					
	5 9/16 141.3		5.75 8.56	7.32 10.90	8.50 12.65	8.90 13.25	9.52 14.17	10.31 15.34	10.81 16.09	10.97 16.32	11.47 17.07	12.46 18.55	15.87 23.62	17.84 26.55	18.87 28.08	20.81 30.97				
	6 5/8 168.3		6.87 10.22	8.76 13.03	10.17 15.14	10.65 15.85	11.40 16.96	12.35 18.37	12.95 19.28	13.14 19.55	13.74 20.45	14.94 22.24	19.07 28.38	21.45 31.93	22.71 33.80	25.08 37.31	42.56			
	8 5/8 219.1			11.45 17.04	13.31 19.81	13.94 20.75	14.92 22.21	16.18 24.07	16.98 25.26	17.22 25.63	18.02 26.81	19.61 29.18	25.08 37.32	28.26 42.05	29.93 44.55	33.10 49.25	37.84 56.31	43.44 64.64		
	10 3/4 273							20.24 30.12	21.25 31.62	21.55 32.07	22.56 33.57	24.56 36.54	31.46 46.81	35.47 52.79	37.60 55.95	41.61 61.92	47.64 70.89	54.79 81.53	64.54 96.04	
	12 3/4 323.9										26.84 39.94	29.23 43.50	37.48 55.78	42.29 62.93	44.84 66.72	49.65 73.88	56.89 84.66	65.50 97.47	77.28 114.99	
	14 355.6						24.40 36.31	26.47 39.39	27.79 41.36	28.19 41.95	29.51 43.91	32.14 47.83	41.23 61.36	46.54 69.25	49.34 73.43	54.66 81.33	62.65 93.24	72.17 107.40	85.21 126.80	121.63 181.00
	16 406.4						27.93 41.56	30.30 45.09	31.82 47.34	32.28 48.03	33.79 50.28	36.80 54.77	47.24 70.30	53.34 79.37	56.57 84.18	62.68 93.27	71.89 106.98	82.86 123.31	97.92 145.72	140.15 208.56
	18 457						31.44 46.79	34.12 50.77	35.82 53.31	36.34 54.08	38.05 56.62	41.45 61.68	53.23 79.21	60.11 89.45	63.76 94.88	70.67 105.17	81.09 120.67	93.51 139.16	110.58 164.56	158.60 236.01
	19.7 500								39.23 58.38	39.80 59.22	41.67 62.00	45.40 67.56	58.32 86.78	65.87 98.02	69.88 103.98	77.46 115.27	88.91 132.30	102.56 152.62	121.34 180.57	174.28 259.34
	22 559								43.90 65.33	44.54 66.28	46.63 69.40	50.81 75.62	65.30 97.17	73.77 109.78	78.27 116.47	86.78 129.14	99.63 148.26	114.98 171.10	136.11 202.54	195.79 291.35
	24 610											55.50 82.58	71.34 106.15	80.60 119.94	85.52 127.26	94.84 141.12	108.90 162.06	125.71 187.08	148.87 221.53	214.38 319.02

STEEL GRADES &

PRODUCT TOLERANCES

STEEL PIPE PILES

PRODUCT TOLERANCES

STANDARD	API 5L	API 2B	ASTM A252	ASTM A139	BS EN 10219-2	ISO 3183
Outside Diameter D	±60" / 1422mm, ±0.5% or ≤0.157" / 4.0mm		±1%	N/A	±1% or ± 0.0394" / 10.0mm	For 6.63" / 168.3mm <D≤ 24.0" / 610mm , ± 0.75% For 24.0" / 610mm <D≤ 60" / 1422mm, ± 0.5% but ≤0.157" / 4.0mm
Wall Thickness t	<0.59" / 15.0mm, ±10% ≥0.59" / 15.0mm, ±0.059" / 1.5mm		-12.50%	±12.5%	±10% or ±0.0787" / 2.0mm	For 0.197" / 5.0mm < t ≤ 0.591" / 15.0mm, ±10% For >0.591" / 15.0mm ± 0.059" / 1.5mm
Straightness	0.2%L	≤3.175 in 3m length.	0.2%L	N/A	0.2%L	0.2%L
Out-of-roundness	D/t ≤ 75, D < 60" / 1,422mm ± 1.5%, ≤ 0.59" / 15.0mm	≤9.525 in 12m length. ≤L*0.001042 for total length	±2%	±1% within 4" / 100mm of ends	±2%	For D≤60" / 1422mm & D/t≤75, ± 1.5%D but ≤0.591"/15.0mm
Mass	+10%/-3.5%	For t≤50.8: ≤1%*OD (max 6.35) for T>50.8: ≤T/8 for OD≥1219.2: ≤12.7 provided if circumference tolerance ≤6.35	+15%/-5%	+10%, -5%(t≤0.188" / 4.78mm) or -5.5% (t>0.188" / 4.78mm)	±6%	+10%/-3.5% For Pipe Wt > 20t, +1.75%/-1.75%
Length L	± 7.87" / 200mm		± 1" / 25mm	±1/2" / 12.7mm	± 7.87" / 200mm	±19.7" / 500mm
Maximum Bead Weld Height	t≤0.512" / 13.0mm, 0.138" / 3.5mm t>0.512" / 13.0mm, 0.177" / 4.5mm		N/A	N/A	t≤0.559" / 14.2mm, 0.138" / 3.5mm t>0.56" / 14.2mm, 0.189" / 4.8	For t≤0.591" / 15.0mm, 0.059" / 1.5mm For 0.591" / 15.0mm<t≤0.984"/25.0mm, 10%t For t>0.984"/25.0mm, 0.098"/2.5mm
Maximum Bead Weld Height	t≤0.512" / 13.0mm, 0.138" / 3.5mm t>0.512" / 13.0mm, 0.177" / 4.5mm		N/A	N/A	t≤0.559" / 14.2mm, 0.138" / 3.5mm t>0.56" / 14.2mm, 0.189" / 4.8	For t≤0.591" / 15.0mm, 0.059" / 1.5mm For 0.591" / 15.0mm<t≤0.984"/25.0mm, 10%t For t>0.984"/25.0mm, 0.098"/2.5mm

Note that for diameters above 55.98 in (1,422 mm), the tolerances are to be agreed between the client and ESC as this size is excluded from the presented standards.

STEEL GRADES

CLASSIFICATION		MECHANICAL PROPERTIES						CHEMICAL COMPOSITION % (MAX)				
		MINIMUM YIELD POINT		ULTIMATE TENSILE STRENGTH		MINIMUM ELONGATION	IMPACT STRENGTH (CHARPY)	C	Si	Mn	P	S
		ksi	MPa	ksi	MPa	%						
API 5L / ISO 3183	L245 / B	36	245	≥ 60	≥415	23	-	0.26	-	1.20	0.030	0.030
	L290 / X42	42	290	≥ 60	≥415	23	-	0.26	-	1.30	0.030	0.030
	L320 / X46	46	320	≥ 63	≥435	22	-	0.26	-	1.40	0.030	0.030
	L360 / X52	52	360	≥ 67	≥460	21	-	0.26	-	1.40	0.030	0.030
	L390 / X56	57	390	≥ 71	≥490	19	-	0.26	-	1.40	0.030	0.030
	L 415 / X60	60	415	≥ 75	≥520	18	-	0.26	-	1.40	0.030	0.030
	L 450 / X65	65	450	≥ 78	≥535	18	-	0.26	-	1.45	0.030	0.030
	L 485 / X70	70	485	≥ 83	≥570	17	-	0.26	-	1.65	0.030	0.030
API 2W-06(2012)	API2WGr.50	50-75	345-517	≥ 65	≥448	18	-	0.16	0.05-0.50	1.15-1.60	0.030	0.010
	API2WGr.60	60-90	414-621	≥ 75	≥517	16	-	0.16	0.05-0.50	1.15-1.60	0.030	0.010
API 2H-2006	API2HGr.42	42	289	≥ 62-82	≥427-565	18	-	0.18	0.05-0.40	0.90-1.35	0.030	0.010
	API2HGr.50	50	345	≥ 70-90	≥483-620	16	-	0.18	0.50-0.40	1.15-1.60	0.030	0.010
ASTM A36-14	A36	36	250	≥ 58-80	≥400-550	23	-	0.26	0.40	-	0.040	0.040
ASTM A1018	A572Gr.42	42	290	≥ 60	≥415	20	-	0.21	0.40	1.35	0.040	0.050
	A572Gr.50	50	345	≥ 65	≥450	18	-	0.23	0.40	1.30	0.040	0.050
	A572Gr.55	55	380	≥ 70	≥485	17	-	0.25	0.40	1.35	0.030	0.030
	A572Gr.60	60	413	≥ 75	≥517	16	-	0.26	0.40	1.35	0.040	0.050
	A572Gr.65	65	450	≥ 80	≥550	15	-	0.23	0.40	1.35	0.030	0.030

Project References



CARNIVAL CRUISE LINE TERMINAL,
DOMINICAN REPUBLIC



PORT OF TEXAS, USA



COLLINS WHARF, AUSTRALIA



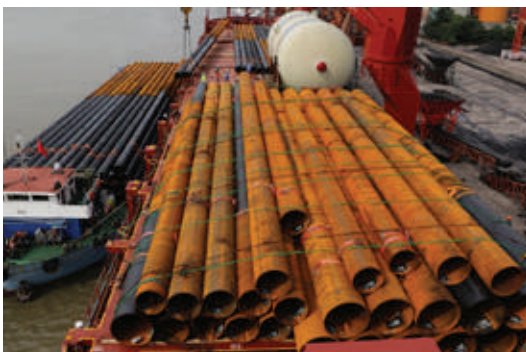
CRUISE SHIP DOCK,
DOMINICAN REPUBLIC



LOUISIANA GRAIN EXPORT TERMINAL,
UNITED STATES



PORT OF BROWNSVILLE, UNITED STATES



LOUISIANA PROJECT, USA



BUNGE PROJECT, LOUISIANA,
UNITED STATES



ESC PIPE COMBINATION WALL

PIPE-HRZ, PIPE-CRZ, PIPE-S

PIPE-PIPE SERIES

A Pipe Pile Combination Wall System consists of Steel Pipe Piles that withstand most of the loading and Infill Sheet Piles that transmit pressure loads to the Pipe Piles. Pipe Piles can range in sizing utilising LSAW, SSAW and ERW Pipes.

The Pipe Piles serve two purposes from a structural standpoint, the first being as a retaining member that resists horizontal hydrostatic and earth pressures. The second purpose is to act as a bearing pile, resisting vertical loads. Pipe Pile Combination Walls are generally utilised when a standard series of sheet piles do not have the strength to resist the required design loads. Integration with Tie Back Systems and other anchorages is simple and ESC can offer the full configuration as part of its piling solution package.

Frequently infill sheet piles are not required to be the same length as the king H piles – typically between 60 to 100% of the H Pile length.

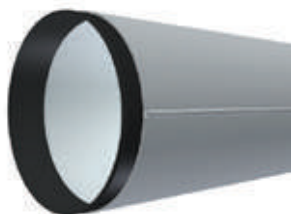
The ESC Advantage

- ✓ Design flexibility of LSAW, SSAW and ERW Pipes
- ✓ Comprehensive Range of Interlocks & Infill Sheet Piles
- ✓ Competitive Pricing
- ✓ Free of Charge Design
- ✓ Ability to supply small and large quantities
- ✓ Full Suite of Components: Tie Rods, Bollards and more

Pipe Pile Splicing

ESC is proud to present it's ESC-PSP Pipe-Pile Splicing Ring, which allows Pipe Piles to be delivered and installed in shorter lengths and spliced as they are driven on site. This can save logistical costs and handling costs.

1. The bottom of the upper Pipe Pile being spliced is pre-fitted and welded with the internal splicing ring that is welded on from the inside and outside.



2. The bottom Pipe Pile is also bevelled prior to driving. After driving, the top Pipe Pile is positioned over. The Splicing Ring contains a lead in which helps positioning.



3. The two Pipe Piles are then welded. The full weld preparation is present and the internal splicing ring also acts as a backing strip to enable full penetration single sided welding.



Combined Wall Profiles



PIPE-ESC-HRZ SERIES

PIPE-U (DOUBLE) SERIES



PIPE-U (TRIPLE) SERIES

PIPE-CRZ SERIES



PIPE-S SERIES

PIPE-PIPE SERIES



PIPE-PIPE INTERLOCKS

Project References

ESC has provided Pipe Pile Combined Wall Solutions to projects globally. Alongside the material fabrication and delivery, ESC has provided full geotechnical design in accordance with the client's specifications and also conformance to international design standards. [Contained in this catalog are only a few of the configurations possible with the Pipe Pile and Infill Sheet Pile profiles.](#) Please contact our engineering department at info@acerlum-esc.com to see if a more optimal design can be provided, free of charge. For the projects listed here, ESC has provided various components alongside the Pipe Pile and Sheet Pile materials. These include Tie Rod Systems, Corrosion Protection Coatings, Steel Bollards Anchorage Points and Waling Beams.



OT2 OIL TERMINAL PH1, UAE



VICTORIA HARBOUR EXTENSION, AUSTRALIA



WATCO BREAKWATER BERTHS, USA



OT2 OIL TERMINAL PH2, UAE



KAOSHIUNG PORT, TAIWAN



BARROW ISLAND, AUSTRALIA

ESC-HRZ INFILL SHEET PILES



SECTION	WIDTH	HEIGHT	THICKNESS		CROSS SECTIONAL AREA	WEIGHT	ELASTIC SECTION MODULUS	MOMENT OF INERTIA	COATING AREA *(both side per pile)
	(w) in mm	(h) in mm	Flange (t _f) in mm	Web (t _w) in mm	in ² cm ²	Per Pile lb/ft kg/m	in ³ /ft cm ³ /m	in ⁴ /ft cm ⁴ /m	ft ² /ft m ² /m
ESC-HRZ14-1540	60.676 1,540	13.593 345	0.374 9.5	0.374 9.5	15.78 101.8	107 159.2	128 2,094.4	864 35,990	12.86 3.92
ESC-HRZ19-1400	55.16 1,400	16.587 421	0.374 9.5	0.374 9.5	15.78 101.8	107.8 160.4	161 2,632	1,330 55,412	12.93 3.94
ESC-HRZ26-1400	55.16 1,400	18.124 460	0.481 12.2	0.481 12.2	20.33 131.2	138.4 206	222 3,640	2,011 83,776	13.45 4.10
ESC-HRZ38-1400	55.16 1,400	19.70 500	0.630 16	0.481 12.2	24.98 161.2	170.0 253	324.65 5,320	3,194 132,972	14.30 4.36

*excludes internal section of interlock

COMBINED WALL PROPERTIES ESC PIPE-HRZ COMBI WALL



Interlocking Clutch



COMBINATION SECTION (Pipe Pile/Sheet Pile)	PROPERTIES OF PIPE PILE				PROPERTIES OF COMBINED WALL					
	OUTER DIAMETER	PIPE THICKNESS	PIPE (w/ CLUTCH WEIGHT)	SYSTEM WIDTH	SYSTEM INERTIA	SECTION MODULUS	MASS PER UNIT AREA		CROSS SECTIONAL AREA	COATING BOTH SIDES OF WALL**
	in mm	in mm	lb/ft kg/m	in mm	in ⁴ /ft cm ⁴ /m	in ³ /ft cm ³ /m	MASS _{60%} * lb/ft ² kg/m ²	MASS _{100%} * lb/ft ² kg/m ²	in ² /ft cm ² /m	ft ² /ft m ² /m
ESC-P762/HRZ-1540	30.0 762	0.311 7.90	105.4 156.9	93.1 2,362	523 71,584	35 1,879	21.9 106.9	27.4 133.8	8.05 170.5	21.46 6.54
ESC-P762/HRZ19-1400	30.0 762	0.375 9.53	125.5 186.8	87.5 2,222	706 96,690	47 2,538	26.1 127.4	32.0 156.2	9.40 199.0	21.52 6.56
ESC-P914.4/HRZ26-1400	36.0 914.4	0.375 9.53	149.6 222.6	93.5 2,374	1110 152,031	62 3,325	29.9 145.8	37.0 180.5	10.86 229.9	23.62 7.20
ESC-P914.4/HRZ38-1400	36.0 914.4	0.500 12.70	196.5 292.4	93.5 2,374	1,533 210,041	85 4,594	38.3 187.1	47.0 229.7	13.82 292.6	24.48 7.46
ESC-P1066.8/HRZ14-1540	42.0 1,066.8	0.438 11.11	201.1 299.3	105.1 2,667	1,504 206,057	72 3,863	30.3 148.1	35.2 171.9	10.34 219.0	24.61 7.50
ESC-P1066.8/HRZ19-1400	42.0 1,066.8	0.500 12.70	228.5 340.1	99.6 2,527	1,848 253,153	88 4,746	34.4 172.7	40.6 198.1	11.91 252.3	24.67 7.52
ESC-P1066.8/HRZ26-1400	42.0 1,066.8	0.626 15.88	283.2 421.4	99.6 2,527	2,333 319,600	111 5,992	44.2 215.7	50.9 248.3	14.94 316.3	25.20 7.68
ESC-P1066.8/HRZ38-1400	42.0 1,066.8	0.751 19.05	337.5 502.2	99.6 2,527	2,871 393,284	137 7,373	53.0 258.8	61.2 298.9	17.99 380.8	26.05 7.94
ESC-P1219.2/HRZ14-1540	48.0 1,219.2	0.500 12.70	260.7 387.9	111.1 2,819	2,362 323,499	99 5,307	35.1 171.5	39.8 194.1	11.67 247.2	26.18 7.98
ESC-P1219.2/HRZ19-1400	48.0 1,219.2	0.626 15.88	323.3 481.1	105.6 2,679	3,111 426,199	130 6,991	44.1 215.5	49.0 239.4	14.40 305.0	26.25 8.00
ESC-P1219.2/HRZ26-1400	48.0 1,219.2	0.751 19.05	385.6 573.8	105.6 2,679	3,753 514,082	157 8,433	53.3 260.3	59.6 291.1	17.52 370.8	26.77 8.16
ESC-P1219.2/HRZ38-1400	48.0 1,219.2	0.876 22.23	447.6 666.1	105.6 2,679	4442 608,504	186 9,982	62.5 305.3	70.2 343.0	20.64 437.0	27.62 8.42
ESC-P1371.6/HRZ14-1540	54.0 1,371.6	0.563 14.29	328.1 488.3	117.1 2,972	3,535 484,311	131 7,062	40.2 196.4	44.6 217.9	13.11 277.6	27.76 8.46

*Mass_{60%} refers to a combined wall with a sheet pile length at 60% of the King Pipe Pile Length. Mass_{100%} refers to equal sheet pile and King Pipe Pile Lengths. Please refer to our 'Useful Equations' section for the formula to calculate other length combinations.

**Coating Area excludes internal area of pipe and interlocks

COMBINED WALL PROPERTIES ESC PIPE-HRZ COMBI WALL

Interlocking Clutch



COMBINATION SECTION (Pipe Pile/Sheet Pile)	PROPERTIES OF PIPE PILE					PROPERTIES OF COMBINED WALL				
	OUTER DIAMETER	PIPE THICKNESS	PIPE (W/ CLUTCH WEIGHT)	SYSTEM WIDTH	SYSTEM INERTIA	SECTION MODULUS	MASS PER UNIT AREA		CROSS SECTIONAL AREA	COATING BOTH SIDES OF WALL**
	in mm	in mm	lb/ft kg/m	in mm	in ⁴ /ft cm ⁴ /m	in ³ /ft cm ³ /m	lb/ft ² kg/m ²	lb/ft ² kg/m ²	in ² /ft cm ² /m	ft ² /ft m ² /m
ESC-P1371.6/HRZ19-1400	54.0 1,371.6	0.626 15.88	363.4 540.8	111.6 2,832	4,148 568,259	154 8,286	46.1 225.0	50.7 247.6	14.90 315.4	27.82 8.48
ESC-P1371.6/HRZ26-1400	54.0 1,371.6	0.751 19.05	433.7 645.4	111.6 2,832	4,989 683,437	185 9,966	55.6 271.6	61.6 300.7	18.09 383.0	28.32 8.64
ESC-P1371.6/HRZ38-1400	54.0 1,371.6	0.876 22.23	503.7 749.6	111.6 2,832	5,873 804,479	218 11,731	65.2 318.3	72.5 354.1	21.30 451.0	29.20 8.90
ESC-P1524/HRZ14-1540	60.0 1,524	0.626 15.88	403.5 600.4	123.1 3,124	5,082 696,111	170 9,135	45.6 222.8	49.8 243.2	14.63 309.8	29.33 8.94
ESC-P1524/HRZ19-1400	60.0 1,524	0.751 19.05	481.8 717.0	117.6 2,984	6,375 873,240	213 11,460	55.8 272.5	60.2 294.0	17.70 374.6	29.40 8.96
ESC-P1524/HRZ26-1400	60.0 1,524	0.876 22.23	559.8 833.1	117.6 2,984	7,438 1,018,949	249 13,372	65.7 320.6	71.3 348.2	20.96 443.6	29.92 9.12
ESC-P1524/HRZ38-1400	60.0 1,524	1.000 25.40	637.5 948.7	117.6 2,984	8,540 1,169,897	286 15,353	75.5 368.8	82.5 402.7	24.23 513.0	30.77 9.38
ESC-P1676.4/HRZ14-1540	66.0 1,676.4	0.688 17.46	486.8 724.4	129.1 3,276	7,057 966,666	215 11,533	51.3 250.3	55.2 269.7	16.23 343.6	30.87 9.41
ESC-P1676.4/HRZ19-1400	66.0 1,676.4	0.751 19.05	529.9 788.6	123.6 3,136	8,057 1,103,664	245 13,167	57.8 282.1	62.0 302.6	18.21 385.5	30.940 9.43
ESC-P1676.4/HRZ26-1400	66.0 1,676.4	0.876 22.23	616.0 916.7	123.6 3,136	9,391 1,286,499	285 15,348	67.9 331.7	73.3 357.9	21.54 456.0	31.46 9.59
ESC-P1676.4/HRZ38-1400	66.0 1,676.4	1.000 25.40	701.7 1044.2	123.6 3,136	10,760 1,473,958	327 17,585	78.1 381.3	84.7 413.6	24.89 526.9	32.32 9.85
ESC-P1828.8/HRZ14-1540	72.0 1,828.8	0.751 19.05	578.1 860.2	135.1 3,429	9,518 1,303,860	265 14,259	57.1 278.7	60.9 297.3	17.89 378.7	32.45 9.89
ESC-P1828.8/HRZ19-1400	72.0 1,828.8	0.813 20.64	625.2 930.3	129.6 3,289	10,759 1,473,824	300 16,118	63.9 312.1	67.9 331.6	19.96 422.5	32.51 9.91
ESC-P1828.8/HRZ26-1400	72.0 1,828.8	0.876 22.23	672.1 1,000.2	129.6 3,289	11,610 1,590,426	324 17,393	70.0 341.7	75.1 366.8	22.49 467.2	33.04 10.07
ESC-P1828.8/HRZ38-1400	72.0 1,828.8	1.000 25.40	765.9 1,139.7	129.6 3,289	13,283 1,819,618	370 19,900	80.4 392.7	86.7 423.5	25.48 539.4	33.89 10.33
ESC-P1981.2/HRZ26-1400	78.0 1,981.2	0.876 22.23	728.2 1,083.7	135.6 3,441	14,098 1,931,285	363 19,496	71.8 350.8	76.8 374.8	22.55 477.4	34.610 10.55
ESC-P1981.2/HRZ38-1400	78.0 1,981.2	1.000 25.40	830.0 1,235.1	135.6 3,441	16,115 2,207,507	415 22,285	82.5 403.0		26.026 550.9	
ESC-P2133.6/HRZ26-1400	84.0 2,133.6	0.876 22.23	784.4 1,167.2	141.6 3,594	16,860 2,309,534	403 21,649	73.6 359.2	78.3 382.1	22.99 486.8	36.19 11.03
ESC-P2133.6/HRZ38-1400	84.0 2,133.6	1.000 25.40	894.2 1,330.6	141.6 3,594	19,258 2,638,145	460 24,730	84.5 412.5	90.3 440.7	26.5 561.4	37.040 11.29

*Mass_{60%} refers to a combined wall with a sheet pile length at 60% of the King Pipe Pile Length. Mass_{100%} refers to equal sheet pile and King Pipe Pile Lengths. Please refer to our 'Useful Equations' section for the formula to calculate other length combinations.

**Coating Area excludes internal area of pipe and interlocks

ESC-CRZ INFILL SHEET PILES



SECTION	WIDTH	HEIGHT	THICKNESS	CROSS SECTIONAL AREA	WEIGHT	ELASTIC SECTION MODULUS	MOMENT OF INERTIA	COATING AREA *(both side per pile)
	(w) in mm	(h) in mm	(t) in mm	in ² cm ²	Per Pair lb/ft kg/m	in ³ cm ³	in ⁴ cm ⁴	ft ² /ft m ² /m
ESC-CRZ14-1540	60.63 1,540	13.58 345	0.39 10.0	33.08 213.4	112.55 167.48	129.87 2,129	904.35 37,642	14.11 4.3
ESC-CRZ19-1400	55.12 1,400	16.57 421	0.37 9.5	32.04 206.7	108.02 160.74	158.91 2,605	1,325.87 55,187	14.30 4.36
ESC-CRZ26-1400	55.12 1,400	18.11 460	0.48 12.2	42.38 273.4	143.40 213.4	221.80 3,636	2,012.65 83,773	14.76 4.5
ESC-CRZ38-1400	55.12 1,400	22.05 560	0.51 13.0	50.20 323.9	170.88 254.28	330.07 5,411	3,642.36 151,607	17.59 5.36
ESC-CRZ48-1400	55.12 1,400	23.23 590	0.59 15.0	61.71 398.1	210.03 312.54	412.79 6,767	4,804.62 199,984	17.59 5.36

*excludes internal section of interlock

COMBINED WALL PROPERTIES ESC PIPE-CRZ COMBI WALL



Interlocking Clutch



COMBINATION SECTION (Pipe Pile/Sheet Pile)	PROPERTIES OF PIPE PILE			PROPERTIES OF COMBINED WALL						
	OUTER DIAMETER	PIPE THICKNESS	PIPE (w/ CLUTCH WEIGHT)	SYSTEM WIDTH	SYSTEM INERTIA	SECTION MODULUS	MASS PER UNIT AREA		CROSS SECTIONAL AREA	COATING BOTH SIDES OF WALL**
	in mm	in mm	lb/ft kg/m	in mm	in ⁴ /ft cm ⁴ /m	in ³ /ft cm ³ /m	MASS _{60%} * lb/ft ² kg/m ²	MASS _{100%} * lb/ft ² kg/m ²	in ² /ft cm ² /m	ft ² /ft m ² /m
ESC609.6/ESC-CRZ14-1540	24 609.6	0.25 6.35	73.56 109.47	88.31 2,243	300.75 41,198	25.15 1,352	19.45 94.96	26.66 130.18	7.74 163.91	22.77 6.94
ESC609.6/ESC-CRZ19-1400	24 609.6	0.37 9.52	104.76 155.89	82.80 2,103	472.14 64,677	39.47 2,122	24.87 121.44	32.30 157.72	9.39 198.86	22.97 7.00
ESC609.6/ESC-CRZ26-1400	24 609.6	0.50 12.7	137.73 204.95	82.99 2,108	657.70 90,096	54.98 2,956	32.71 159.7	42.40 207.04	12.36 261.81	23.49 7.16
ESC762/ESC-CRZ14-1540	30 762	0.31 7.92	109.06 162.29	94.29 2,395	521.27 71,407	34.86 1,874	22.73 110.97	29.48 143.95	8.57 181.57	24.31 7.41
ESC762/ESC-CRZ19-1400	30 762	0.37 9.52	128.80 191.67	88.78 2,255	694.39 95,122	46.44 2,497	26.44 129.1	33.37 162.93	9.71 205.63	24.51 7.47
ESC762/ESC-CRZ26-1400	30 762	0.50 12.7	169.80 252.68	88.98 2,260	948.50 129,932	63.43 3,410	34.83 170.05	43.87 214.2	12.79 271.06	25.03 7.63
ESC914.4/ESC-CRZ14-1540	36 914.4	0.37 9.52	152.85 227.45	100.28 2,547	901.73 123,525	50.26 2,702	26.61 129.91	32.96 160.92	9.60 203.29	25.89 7.89
ESC914.4/ESC-CRZ19-1400	36 914.4	0.44 11.13	176.69 262.93	94.76 2,407	1,144.24 156,745	63.76 3,428	30.83 150.53	37.32 182.22	10.87 230.32	26.08 7.95
ESC914.4/ESC-CRZ26-1400	36 914.4	0.50 12.7	201.88 300.41	94.96 2,412	1,360.15 186,322	75.80 4,075	36.68 179.1	45.15 220.45	13.18 279.14	26.61 8.11
ESC1066.8/ESC-CRZ14-1540	42 1,066.8	0.44 11.13	204.80 304.76	106.30 2,700	1,492.31 204,426	71.29 3,833	30.97 151.22	36.96 180.47	10.78 228.3	27.46 8.37
ESC1066.8/ESC-CRZ19-1400	42 1,066.8	0.50 12.7	231.94 345.15	100.79 2,560	1,823.43 249,785	87.10 4,683	35.57 173.68	41.67 203.49	12.15 257.52	27.66 8.43
ESC1066.8/ESC-CRZ26-1400	42 1,066.8	0.62 15.87	288.50 429.31	100.98 2,565	2,297.77 314,763	109.76 5,901	44.79 218.71	52.76 257.61	15.41 326.58	28.18 8.59
ESC1219.2/ESC-CRZ19-1400	48 1,219.2	0.50 12.7	264.02 392.88	106.77 2,712	2,506.27 343,325	104.76 5,632	37.18 181.52	42.94 209.65	12.53 265.47	29.23 8.91

*Mass_{60%} refers to a combined wall with a sheet pile length at 60% of the King Pipe Pile Length. Mass_{100%} refers to equal sheet pile and King Pipe Pile Lengths. Please refer to our 'Useful Equations' section for the formula to calculate other length combinations.

**Coating Area excludes internal area of pipe and interlocks

COMBINED WALL PROPERTIES ESC PIPE-CRZ COMBI WALL

COMBINATION SECTION (Pipe Pile/Sheet Pile)	PROPERTIES OF PIPE PILE					PROPERTIES OF COMBINED WALL				
	OUTER DIAMETER	PIPE THICKNESS	PIPE (w/ CLUTCH WEIGHT)	SYSTEM WIDTH	SYSTEM INERTIA	SECTION MODULUS	MASS PER UNIT AREA		CROSS SECTIONAL AREA	COATING BOTH SIDES OF WALL**
	in mm	in mm	lb/ft kg/m	in mm	in ⁴ /ft cm ⁴ /m	in ³ /ft cm ³ /m	lb/ft ² kg/m ²	lb/ft ² kg/m ²	in ² /ft cm ² /m	ft ² /ft m ² /m
ESC1219.2/ESC-CRZ26-1400	48 1,219.2	0.62 15.87	328.58 488.96	106.97 2,717	3,142.95 430,541	131.37 7,063	46.78 228.4	54.29 265.11	15.87 336.22	29.76 9.07
ESC1219.2/ESC-CRZ38-1400	48 1,219.2	0.75 19.05	390.99 581.83	106.97 2,717	3,882.45 531,842	162.27 8,724	55.62 271.6	64.38 314.34	18.83 398.93	32.58 9.93
ESC1219.2/ESC-CRZ48-1400	48 1,219.2	0.75 19.05	400.73 596.33	108.42 2754	3,958.51 542,262	165.45 8,895	58.77 286.96	70.00 341.8	20.41 432.36	33.56 10.23
ESC1371.6/ESC-CRZ19-1400	54 1,371.6	0.56 14.3	331.74 493.66	112.80 2,865	3,719.38 509,504	138.18 7,429	42.40 207.05	47.86 233.68	13.98 296.17	30.81 9.39
ESC1371.6/ESC-CRZ26-1400	54 1,371.6	0.62 15.87	368.66 548.6	112.99 2,870	4,164.20 570,439	154.71 8,318	48.55 237.05	55.67 271.82	16.28 344.84	31.33 9.55
ESC1371.6/ESC-CRZ38-1400	54 1,371.6	0.75 19.05	439.10 653.43	112.99 2,870	5,095.47 698,010	189.31 10,178	57.78 282.13	66.07 322.59	19.33 409.53	34.15 10.41
ESC1371.6/ESC-CRZ48-1400	54 1,371.6	0.75 19.05	448.85 667.93	114.45 2,907	5,152.11 705,769	191.41 10,291	60.73 296.55	71.37 348.51	20.82 441.07	35.14 10.71
ESC1524/ESC-CRZ19-1400	60 1,524	0.62 15.87	406.73 605.25	118.78 3,017	5,306.60 726,932	177.44 9,540	47.84 233.57	53.01 258.86	15.50 328.32	32.38 9.87
ESC1524/ESC-CRZ26-1400	60 1,524	0.75 19.05	487.22 725.03	118.98 3,022	6,362.91 871,631	212.77 11,439	58.06 283.48	64.82 316.49	18.97 401.82	32.91 10.03
ESC1524/ESC-CRZ38-1400	60 1,524	0.81 20.65	526.58 783.6	118.98 3,022	7,023.10 962,069	234.84 12,626	63.69 310.97	71.56 349.4	20.95 443.75	35.73 10.89
ESC1524/ESC-CRZ48-1400	60 1,524	0.81 20.65	536.32 798.1	120.43 3,059	7,053.60 966,247	235.85 12,680	66.42 324.33	76.53 373.7	22.34 473.3	36.71 11.19
ESC1676.4/ESC-CRZ19-1400	66 1,676.4	0.69 17.48	490.65 730.13	124.76 3,169	7,346.02 1,006,304	223.31 12,006	53.61 261.75	58.54 285.82	17.12 362.73	33.96 10.35
ESC1676.4/ESC-CRZ26-1400	66 1,676.4	0.75 19.05	535.34 796.63	124.96 3,174	8,025.43 1,099,374	243.96 13,116	59.89 292.42	66.32 323.85	19.41 411.26	34.48 10.51
ESC1676.4/ESC-CRZ38-1400	66 1,676.4	0.81 20.65	578.73 861.21	124.96 3,174	8,814.93 1,207,525	267.95 14,406	65.64 320.49	73.13 357.07	21.41 453.59	37.30 11.37
ESC1676.4/ESC-CRZ48-1400	66 1,676.4	0.81 20.65	588.48 875.71	126.42 3,211	8,823.33 1,208,676	268.21 14,420	68.22 333.1	77.85 380.13	22.73 481.63	38.29 11.67
ESC1828.8/ESC-CRZ19-1400	72 1,828.8	0.75 19.05	581.43 865.22	130.79 3,322	9,866.87 1,351,626	274.95 14,782	59.48 290.41	64.18 313.37	18.78 397.9	35.53 10.83
ESC1828.8/ESC-CRZ26-1400	72 1,828.8	0.81 20.65	630.89 938.82	130.98 3,327	10,704.32 1,466,345	298.27 16,036	65.90 321.77	72.04 351.75	21.09 446.87	36.06 10.99
ESC1828.8/ESC-CRZ38-1400	72 1,828.8	1.00 25.4	771.22 1,147.65	130.98 3,327	13,172.29 1,804,423	367.03 19,733	80.26 391.91	87.41 426.82	25.61 542.49	38.88 11.85
ESC1828.8/ESC-CRZ48-1400	72 1,828.8	1.00 25.4	780.96 1,162.15	132.44 3,364	13,132.39 1,798,957	365.94 19,674	82.57 403.17	91.76 448.06	26.82 568.28	39.86 12.15
ESC1981.2/ESC-CRZ26-1400	78 1,981.2	0.87 22.22	733.47 1,091.48	136.97 3,479	13,941.31 1,909,769	358.59 19,279	72.00 351.55	77.87 380.23	22.81 483.19	37.60 11.46
ESC1981.2/ESC-CRZ38-1400	78 1,981.2	1.00 25.4	835.38 1,243.12	136.97 3,479	15,977.81 2,188,741	410.97 22,095	82.37 402.19	89.20 435.56	26.13 553.68	40.42 12.32
ESC1981.2/ESC-CRZ48-1400	78 1,981.2	1.00 25.4	845.12 1,257.62	138.42 3,516	15,910.12 2,179,468	409.22 22,001	84.55 412.84	93.35 455.79	27.29 578.24	41.40 12.62
ESC2133.6/ESC-CRZ26-1400	84 2,133.6	0.87 22.22	789.59 1,174.99	142.99 3,632	16,679.50 2,284,863	398.37 21,418	73.68 359.79	79.31 387.26	23.23 492.21	39.17 11.94
ESC2133.6/ESC-CRZ38-1400	84 2,133.6	0.87 22.22	789.59 1,174.99	142.99 3,632	16,815.86 2,303,542	401.63 21,593	75.07 366.55	81.62 398.52	23.91 506.55	41.99 12.8
ESC2133.6/ESC-CRZ48-1400	84 2,133.6	0.87 22.22	799.34 1,189.49	144.45 3,669	16,742.52 2,293,496	399.88 21,499	77.23 377.12	85.67 418.29	25.04 530.56	42.98 13.1

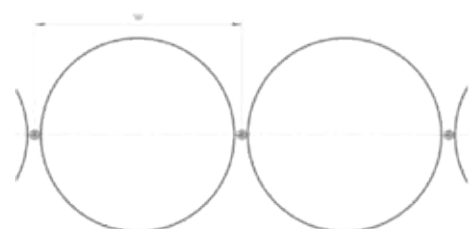
ESC-S INFILL SHEET PILES



SECTION	WIDTH	HEIGHT	THICKNESS	CROSS SECTIONAL AREA	WEIGHT	ELASTIC SECTION MODULUS	MOMENT OF INERTIA	COATING AREA *(both side per pile)
	(w) in mm	(h) in mm	(t) in mm	in ² cm ²	Per Pair lb/ft kg/m	in ³ cm ³	in ⁴ cm ⁴	ft ² /ft m ² /m
ESC-S8	56.69 1,440	16.30 414	0.31 7.75	7.16 151.8	80.10 119.2	115.90 1,900	23.18 965	12.43 3.79
ESC-S10	56.69 1,440	16.38 416	0.38 9.75	8.86 187.8	99.05 147.4	143.96 2,360	28.52 1,187	12.43 3.79
ESC-S12	56.69 1,440	16.65 423	0.46 11.75	10.74 227.6	120.09 178.7	179.95 2,950	35.22 1,466	12.53 3.82

*excludes internal section of interlock

COMBINED WALL PROPERTIES ESC PIPE-PIPE COMBI WALL



Interlocking Clutch Options



ESC-PHK

ESC-PCR

ESC-PB

ESC-PPP

ESC-PPT

ESC-PT

PIPE-PIPE SYSTEM	OUTER DIAMETER	WALL THICKNESS	COMBINED SYSTEM WIDTH*	CROSS SECTIONAL AREA	PILE WEIGHT	COMBINED WEIGHT	COMBINED SECTION MODULUS	MOMENT OF INERTIA	COATING BOTH SIDES OF WALL**
	in mm	in mm	in mm	in ² /ft cm ² /m	lb/ft kg/m	lb/ft ² kg/m ²	in ³ /ft cm ³ /m	in ⁴ /ft cm ⁴ /m	ft ² /ft m ² /m
ESC-PB609.6 x 12.7	24 609.6	0.50 12.7	31.10 790	16.57 351.1	125.60 186.9	56.34 275.1	81.97 4,407	980.60 134,329	7.55 2.30
ESC-PB609.6 x 15.9	24 609.6	0.63 15.9	31.10 790	20.04 424.5	156.17 232.4	68.12 332.6	100.87 5,423	1210.26 165,789	7.55 2.30
ESC-PB609.6 x 9.5	24 609.6	0.37 9.5	31.10 790	13.07 276.9	94.68 140.9	44.40 216.8	62.46 3,358	747.10 102,342	7.55 2.30
ESC-PB762 x 12.7	30 762	0.50 12.7	37.09 942	16.94 358.8	157.72 234.7	57.59 281.2	108.74 5,846	165.80 22,713	9.19 2.80
ESC-PB762 x 15.9	30 762	0.63 15.9	37.09 942	20.60 436.5	196.29 292.1	70.08 342.2	134.22 7,216	2006.86 274,913	9.19 2.80
ESC-PB762 x 9.5	30 762	0.37 9.5	37.09 942	13.24 280.5	118.74 176.7	45.02 219.8	82.58 4,440	1234.77 169,146	9.19 2.80
ESC-PB914.4 x 12.7	36 914.4	0.50 12.7	43.11 1,095	17.20 364.4	189.77 282.4	58.51 285.7	135.91 7,307	2438.63 334,059	10.50 3.20
ESC-PB914.4 x 15.9	36 914.4	0.63 15.9	43.11 1,095	21.01 445.1	236.34 351.7	71.48 349	168.11 9,038	3016.54 413,225	10.50 3.20
ESC-PB914.4 x 19.1	36 914.4	0.75 19.1	43.11 1,095	24.79 525.3	282.64 420.6	84.36 411.9	199.63 10,733	3582.12 490,701	10.50 3.20
ESC-PB1066.8 x 12.7	42 1,066.8	0.50 12.7	49.09 1,247	17.40 368.7	221.83 330.1	59.19 289	163.35 8,782	3419.62 468,441	12.14 3.70
ESC-PB1066.8 x 15.9	42 1,066.8	0.63 15.9	49.09 1,247	21.32 451.7	276.46 411.4	72.54 354.2	202.37 10,880	4234.91 580,124	12.14 3.70
ESC-PB1066.8 x 19.1	42 1,066.8	0.40 10.1	49.09 1,247	25.22 534.4	330.76 492.2	85.81 419	233.15 12,535	4381.22 600,167	12.14 3.70
ESC-PB1219.2 x 12.7	48 1,219.2	0.50 12.7	55.12 1,400	17.56 372	253.88 377.8	59.74 291.7	190.97 10,267	4569.08 625,902	13.78 4.20
ESC-PB1219.2 x 15.9	48 1,219.2	0.61 15.5	55.12 1,400	21.56 456.8	316.51 471	114.38 558.5	236.85 12,734	5666.26 776,200	13.78 4.20
ESC-PB1219.2 x 19.1	48 1,219.2	0.75 19.1	55.12 1,400	25.54 541.2	378.87 563.8	86.94 424.5	281.99 15,161	6746.93 924,237	13.78 4.20

* System Width is indicative for the ESC-PB Series, Other interlock options will have different widths. Contact us at info@acerlum-esc.com for more details.



COMBINED WALL PROPERTIES **ESC PIPE-PIPE COMBI WALL**

PIPE-PIPE SYSTEM	OUTER DIAMETER	WALL THICKNESS	COMBINED SYSTEM WIDTH*	CROSS SECTIONAL AREA	PILE WEIGHT	COMBINED WEIGHT	COMBINED SECTION MODULUS	MOMENT OF INERTIA	COATING BOTH SIDES OF WALL**
	in mm	in mm	in mm	in ² /ft cm ² /m	lb/ft kg/m	lb/ft ² kg/m ²	in ³ /ft cm ³ /m	in ⁴ /ft cm ⁴ /m	ft ² /ft m ² /m
ESC-PB1371.6 x 15.90	54 1,371.6	0.63 15.93	61.10 1,552	21.75 460.9	356.63 530.7	33.08 161.5	271.50 14,597	7307.92 1,001,085	15.42 4.70
ESC-PB1371.6 x 19.1	54 1,371.6	0.75 19.1	61.10 1,552	16.46 348.8	359.59 535.1	87.86 429	323.55 17,395	8740.68 1,197,354	15.42 4.70
ESC-PB1371.6 x 22.2	54 1,371.6	0.87 22.2	61.10 1,552	29.84 632.3	490.90 730.5	101.60 496.1	374.85 20,153	10089.34 1,382,101	15.42 4.70
ESC-PB1524 x 15.90	60 1,524	0.63 15.9	67.09 1,704	21.91 464.3	396.75 590.4	74.59 364.2	306.10 16,457	9160.05 1,254,802	16.73 5.10
ESC-PB1524 x 19.1	60 1,524	0.75 19.1	67.09 1,704	26.03 551.5	475.04 706.9	88.60 432.6	365.25 19,637	10485.33 1,436,346	16.73 5.10
ESC-P1524 X 22.2	60 1,524	0.87 22.2	67.09 1,704	30.12 638.2	553.06 823	102.54 500.7	423.47 22,767	12661.22 1,734,414	16.73 5.10
ESC-PB1676.4 x 19.1	66 1,676.4	0.75 19.1	72.32 1,837	26.21 555.3	523.15 778.5	89.21 435.6	407.06 21,885	13,391.35 1,834,432	18.37 5.60
ESC-PB1676.4 x 22.2	66 1,676.4	0.87 22.2	72.32 1,837	30.36 643.2	340.37 506.5	103.34 504.6	472.22 25,388	15,899.38 2,177,997	18.37 5.60
ESC-PB1676.4 x 25.4	66 1,676.4	1.00 25.4	72.32 1,837	34.49 730.7	708.36 1054.1	117.41 573.3	536.59 28,849	17,652.54 2,418,156	18.37 5.60
ESC-PB1828.8 x 19.1	72 1,828.8	0.75 19.1	79.09 2,009	26.37 558.6	571.27 850.1	89.74 438.2	448.99 24,139	16,112.73 2,207,223	20.01 6.10
ESC-PB1828.8 x 22.2	72 1,828.8	0.87 22.2	79.09 2,009	30.55 647.3	665.35 990.1	104.02 507.9	521.08 28,015	18,700.18 2,561,668	20.01 6.10
ESC-PB1828.8 x 25.4	72 1,828.8	1.00 25.4	79.09 2,009	34.73 735.8	759.02 1,129.5	117.00 571.3	592.41 31,850	21,260.15 2,912,349	20.01 6.10
ESC-PB1961.2 x 22.2	77 1,961.2	0.87 22.2	85.12 2,162	30.68 650	720.79 1,072.6	104.59 510.7	384.03 20,647	22,015.62 3,015,838	21.65 6.60
ESC-PB1961.2 x 25.4	77 1,961.2	1.00 25.4	85.12 2,162	34.93 740.1	823.20 1,225.0	118.95 580.8	648.32 34,856	25,205.63 3,452,826	21.65 6.60
ESC-PB2133.6 x 22.2	84 2,133.6	0.87 22.2	91.10 2,314	30.87 654	777.57 1,157.1	105.10 513.2	619.06 33,283	25,918.77 3,550,517	23.29 7.10
ESC-PB2133.6 x 25.4	84 2,133.6	0.87 22.2	91.10 2,314	35.12 744	887.31 1,320.4	119.56 583.8	704.14 37,857	29,488.74 4,039,554	23.29 7.10

* System Width is indicative for the ESC-PB Series, Other interlock options will have different widths. Contact us at info@acerlum-esc.com for more details.



TUG HARBOUR PROJECT, AUSTRALIA



PORT REHABILITATION PROJECT, PHILIPPINES

ESC PIPE PILING

ACCESSORIES



Project References

ESC can supply a wide range of welded accessories and markings for Pipe Piles. Shear Keys can be welded internally and externally to provide more rigid embedment. All components are welded as per AWS D1.1 and other standards upon request by client. Featured are some of the typical components that are fabricated or applied to ESC Pipe Piles. Compliance to specific international standards or project requirements can be applied.



MARKINGS



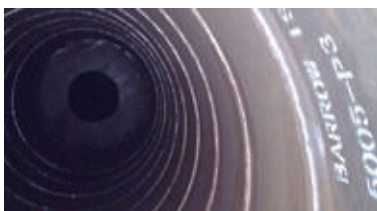
TIE ROD WELDED CONNECTOR



LIFTING LUG



FENDER FLANGE CONNECTION



INTERNAL SHEAR KEY



EXTERNAL SHEAR KEY



ESC H COMBINATION WALL

H-HRZ, H-CRZ, H-S SERIES

VIEW OUR PROJECT
SHOWCASE VIDEO

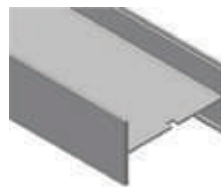
A H Pile Combination Wall System consists of Steel H Piles that withstand most of the loading and Infill Sheet Piles that transmit pressure loads to the H Piles. H Piles can range in sizing from traditional Hot Rolled Beam to fabricated I Beam designed by ESC.

The H Piles serve two purposes from a structural standpoint, the first being as a retaining member that resists horizontal hydrostatic and earth pressures. The second purpose is to act as a bearing pile, resisting vertical loads. H Pile Combination Walls are generally utilised when a standard series of sheet piles do not have the strength to resist the required design loads. Integration with Tie Back Systems and other anchorages is simple and ESC can offer the full configuration as part of its piling solution package. Steel grades can be found in the Cold Formed Sheet Pile Steel Grade section of the catalog. Frequently infill sheet piles are not required to be the same length as the king H piles – typically between 60 to 100% of the H Pile length.

The ESC Advantage

- ✓ Design flexibility of Hot Rolled and Fabricated Beams
- ✓ Comprehensive Range of Interlocks & Infill Sheet Piles
- ✓ Competitive Pricing
- ✓ Free of Charge Design
- ✓ Ability to supply small and large quantities
- ✓ Full Suite of Components: Tie Rods, Walings and more

1. Both Ends of the H Pile are slotted in the flange prior to installation.



2. The ESC-HSP Splicing Assembly is fitted over the bottom end of the top H Pile and fully welded on.



3. Upper H Pile is lifted over and positioned on the already installed H Pile through the flange slot.



4. Once fully aligned, the bottom H Pile is fully welded to the ESC-HSP Splicing Assembly.



H-Pile Splicing

ESC is proud to present its ESC-HSP H-Pile Splicing Assembly, which allows H Piles to be delivered and installed in shorter lengths and spliced as they are driven on site. This can save logistical costs and handling costs.

What Our Engineers Say?

"H Piles can be driven in the most difficult driving conditions due to the high radius of gyration of the section which provides superior stiffness. They can be used in a wide range of applications."



Combined Wall Profiles



H-HRZ SERIES



H-CRZ SERIES

Project References



FUJAIRAH BREAKWATER BERTH, UAE



FUJAIRAH BREAKWATER BERTH, UAE



WATCO BREAKWATER BERTHS, USA



JOHOR BAHRU COMBI WALL, MALAYSIA



OHAU CHANNEL DIVERSION,
NEW ZEALAND



LARKIN LOT BOUNDARY PROTECTION,
MALAYSIA



AL JAZEERAH PORT, UAE

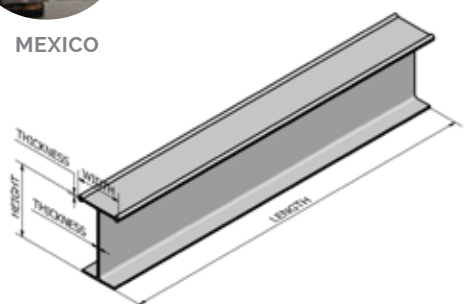
Delivery Tolerances

COMPONENT	H50/20A TO H70/30C	All other ESC H Pile
STANDARD	EN10248	BS EN10249
Mass	± 5%	± 5%
Length	± 7.87" / 200mm	± 1.97" / 50mm
Height	± 0.276" / 7.0mm	± 0.394" / 10.0mm
Thickness (≤12.5mm)	+0.0787" / 2.0mm & -0.0394" / 1.0mm	± 0.0181" / 0.46mm
Thickness (>12.5mm)	+0.0984" / 2.5mm & 0.0591" / -1.5mm	± 0.0181" / 0.46mm
Width	± 2% of width	± 2% of width
Squareness of Ends	2% of width	2% of width
Bending	0.2% of length	0.2% of length
Curving	0.2% of length	0.2% of length
Twisting	0.2% of length but no more than 4" / 100mm	0.2% of length but no more than 4" / 100mm

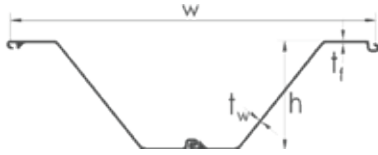


HAWAII

MEXICO



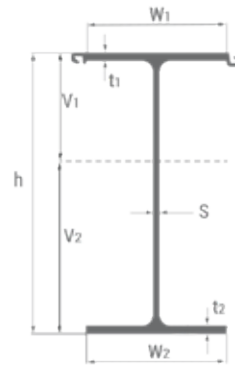
ESC-HRZ INFILL SHEET PILES



SECTION	WIDTH	HEIGHT	THICKNESS		CROSS SECTIONAL AREA	WEIGHT	ELASTIC SECTION MODULUS	MOMENT OF INERTIA	COATING AREA *(both side per pile)
	(w) in mm	(h) in mm	t _f in mm	t _w in mm	in ² cm ²	Per Pair lb/ft kg/m	in ³ cm ³	in ⁴ cm ⁴	ft ² /ft m ² /m
ESC-HRZ14-1540	60.676 1,540	13.593 345	0.374 9.5	0.374 9.5	15.78 101.8	107 159.2	128 2,094.4	864 35,990	12.86 3.92
ESC-HRZ19-1400	55.16 1,400	16.587 421	0.374 9.5	0.374 9.5	15.78 101.8	107.8 160.4	161 2,632	1,330 55,412	12.93 3.94
ESC-HRZ26-1400	55.16 1,400	18.124 460	0.481 12.2	0.481 12.2	20.33 131.2	138.4 206	222 3,640	2,011 83,776	13.45 4.10

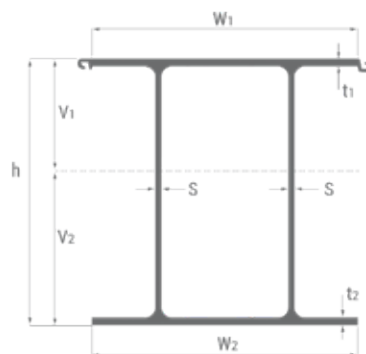
*excludes internal section of interlock

ESC H PILES WITH HOT ROLLED Z INTERLOCK



SINGLE H PILE... - 1 SERIES												
King Pile Section	h	W1	W2	S	t1	t2	CROSS SECTIONAL AREA	MASS	SECTION MODULUS	MOMENT OF INERTIA	COATING (FRONT)	COATING (BACK)
	in mm	in mm	in mm	in mm	in mm	in mm	in ² cm ²	lb/ft kg/m	in ³ cm ³	in ⁴ cm ⁴	ft ² /ft m ² /m	ft ² /ft m ² /m
ESC-880A-1H	32.28 820	18.11 460	18.70 475	0.63 16	0.79 20	0.87 22	53.35 344.2	184.11 273.97	593.65 9,732	9,876.27 411,083	2.17 0.66	10.47 3.19
ESC-880B-1H	32.87 835	18.11 460	18.50 470	0.71 18	0.87 22	0.87 22	57.38 370.2	197.82 294.38	619.88 10,162	10,741.34 447,090	2.17 0.66	10.53 3.21
ESC-880C-1H	33.94 862	18.11 460	18.19 462	0.79 20	0.79 20	0.87 22	59.04 380.9	203.45 302.75	646.23 10,594	11,352.85 472,543	2.17 0.66	10.66 3.25
ESC-1080A-1H	42.76 1,086	18.11 460	18.62 473	0.87 22	0.79 20	0.79 20	68.18 439.9	234.62 349.13	860.77 14,111	19,236.70 800,695	2.17 0.66	12.20 3.72
ESC-1080B-1H	42.72 1,085	18.11 460	18.31 465	0.87 22	0.87 22	0.94 24	72.01 464.6	247.62 368.48	949.77 15,570	208,50.38 867,862	2.17 0.66	12.11 3.69
ESC-1080C-1H	42.87 1,089	18.11 460	18.31 465	0.87 22	1.02 26	1.02 26	76.24 491.9	262.00 389.88	1,015.22 16,643	22,703.48 944,994	2.17 0.66	12.11 3.69
ESC-1080D-1H	43.03 1,093	18.11 460	18.39 467	0.94 24	1.10 28	1.10 28	82.41 531.7	283.00 421.13	1,097.51 17,992	24,530.41 1,021,037	2.17 0.66	12.14 3.7
ESC-1180A-1H	43.62 1,108	18.11 460	18.70 475	1.02 26	1.10 28	1.10 28	86.57 558.5	297.18 442.23	1,151.56 18,878	25,947.70 1,080,029	2.17 0.66	12.27 3.74
ESC-1180B-1H	43.62 1,108	18.11 460	18.78 477	1.02 26	1.18 30	1.18 30	89.40 576.8	306.81 456.56	1,208.53 19,812	27,164.37 1,130,671	2.17 0.66	12.27 3.74
ESC-1180C-1H	43.94 1,116	18.11 460	18.27 464	1.10 28	1.26 32	1.26 32	95.09 613.5	326.15 485.34	1,273.74 20,881	28,956.61 1,205,270	2.17 0.66	12.24 3.73
ESC-1180D-1H	43.98 1,117	18.11 460	18.58 472	1.10 28	1.34 34	1.34 34	98.24 633.8	336.89 501.32	1,341.94 21,999	30,374.52 1,264,288	2.17 0.66	12.27 3.74

ESC H PILES WITH HOT ROLLED Z INTERLOCK



DOUBLE H PILE... - 2 SERIES												
King Pile Section	h	W1	W2	S	t1	t2	CROSS SECTIONAL AREA	MASS	SECTION MODULUS	MOMENT OF INERTIA	COATING (FRONT)	COATING (BACK)
	in mm	in mm	in mm	in mm	in mm	in mm	in ² cm ²	lb/ft kg/m	in ³ cm ³	in ⁴ cm ⁴	ft ² /ft m ² /m	ft ² /ft m ² /m
ESC-880A-2H	32.28 820	36.69 932	37.60 955	0.63 16	0.87 22	0.87 22	106.44 686.7	364.78 542.82	1,190.54 19,517	19704.15 820,152	3.71 1.13	12.14 3.7
ESC-880B-2H	33.19 843	36.69 932	38.35 974	0.71 18	0.87 22	0.87 22	113.18 730.2	387.72 576.96	1,274.84 20,899	21542.47 896,669	3.71 1.13	12.34 3.76
ESC-880C-2H	34.09 866	36.69 932	39.25 997	0.71 18	0.87 22	0.87 22	115.24 743.5	394.76 587.44	1,340.29 21,972	23108.30 961,844	3.71 1.13	12.57 3.83
ESC-1080A-2H	42.17 1,071	36.69 932	37.44 951	0.87 22	0.79 20	0.94 24	137.90 889.7	471.89 702.22	1,788.09 29,313	38398.80 1,598,285	3.71 1.13	13.75 4.19
ESC-1080B-2H	42.56 1,081	36.69 932	37.44 951	0.87 22	0.94 24	0.94 24	144.10 929.7	492.95 733.56	1,913.88 31,375	41524.43 1,728,384	3.71 1.13	13.78 4.2
ESC-1080C-2H	42.32 1,075	36.69 932	36.81 935	0.87 22	1.10 28	1.10 28	154.12 994.3	527.07 784.33	2,090.23 34,266	45205.51 1,881,603	3.71 1.13	13.68 4.17
ESC-1080D-2H	42.05 1,068	36.69 932	36.69 932	0.87 22	1.26 32	1.26 32	164.53 1,061.50	562.48 837.02	2,273.29 37,267	48816.88 2,031,920	3.71 1.13	13.65 4.16
ESC-1180A-2H	43.23 1,098	36.69 932	38.54 979	0.94 24	1.18 30	1.18 30	169.69 1,094.80	580.04 863.16	2,367.11 38,805	51585.81 2,147,172	3.71 1.13	13.98 4.26
ESC-1180B-2H	43.70 1,110	36.69 932	38.58 980	1.02 26	1.18 30	1.18 30	177.13 1,142.80	605.40 900.89	2,445.00 40,082	53834.52 2,240,771	3.71 1.13	14.04 4.28
ESC-1180C-2H	43.31 1,100	36.69 932	39.29 998	1.02 26	1.34 34	1.34 34	188.50 1,216.10	644.03 958.38	2,667.35 43,727	57807.54 2,406,141	3.71 1.13	14.04 4.28
ESC-1180D-2H	43.74 1,111	36.69 932	39.65 1,007	1.10 28	1.34 34	1.34 34	196.32 1,266.60	670.67 998.02	2,749.21 45,069	60260.66 2,508,248	3.71 1.13	14.14 4.31



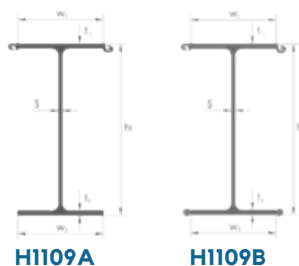
ESZ INFILL SHEET PILES



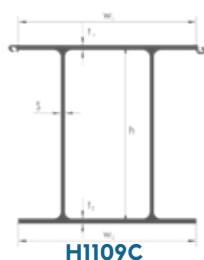
SECTION	WIDTH	HEIGHT	THICKNESS		CROSS SECTIONAL AREA	WEIGHT	ELASTIC SECTION MODULUS	MOMENT OF INERTIA
	(w) in mm	(h) in mm	t _f in mm	t _w in mm	in ² cm ²	Per Double lb/ft kg/m	in ³ cm ³	in ⁴ cm ⁴
ESZ26-1400 Profile	55.16 1,400	18.124 460	0.5122 13	0.394 10	38.2 246.4	130 193.4	222 3,640	2,012 83,734

*Water side coating is about 1.95m² per 1m long for 1pc Dual ESZ26-1400 infilling pile.

ESC H PILES WITH HOT ROLLED INTERLOCK



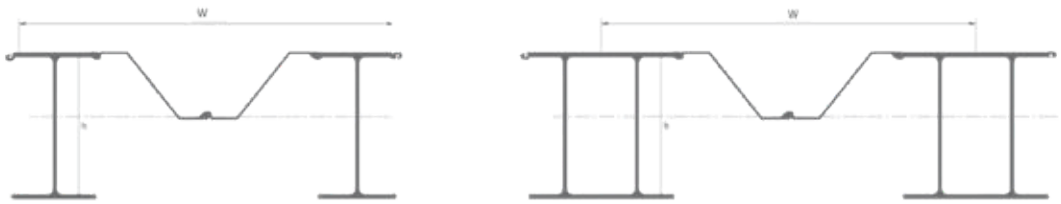
SINGLE H PILE												
H Pile Section	h	W ₁	W ₂	S	t ₁	t ₂	CROSS SECTIONAL AREA	MASS	SECTION MODULUS	MOMENT OF INERTIA	COATING (FRONT)	COATING (BACK)
	in mm	in mm	in mm	in mm	in mm	in mm	in ² cm ²	lb/ft kg/m	in ³ cm ³	in ⁴ cm ⁴	ft ² /ft m ² /m	ft ² /ft m ² /m
H1109A	43.695 1,109	18.163 461	18.163 461	0.827 21	1.596 40.5	1.596 40.5	95.67 617.20	325.6 484.5	1,413 23,161	31,985 1,331,310	2.297 0.70	11.552 3.521
H1109B	43.695 1,109	18.163 461	18.163 461	0.827 21	1.596 40.5	1.596 40.5	98.65 636.43	335.7 499.6	1,519 24,887	33,364 1,388,710	2.297 0.70	12.273 3.741



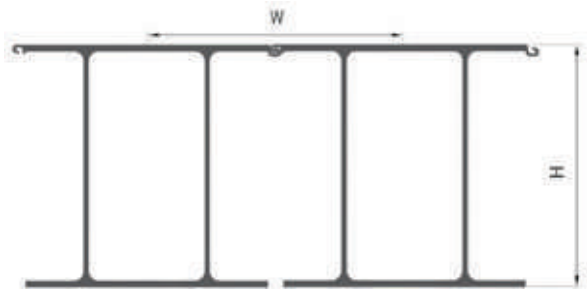
DOUBLE H PILE												
H Pile Section	h	W ₁	W ₂	S	t ₁	t ₂	CROSS SECTIONAL AREA	MASS	SECTION MODULUS	MOMENT OF INERTIA	COATING (FRONT)	COATING (BACK)
	in mm	in mm	in mm	in mm	in mm	in mm	in ² cm ²	lb/ft kg/m	in ³ cm ³	in ⁴ cm ⁴	ft ² /ft m ² /m	ft ² /ft m ² /m
H1109C	43.695 1,109	36.326 922	36.326 922	0.827 21	1.596 40.5	1.596 40.5	187.66 1,210.70	638.7 950.4	2,809 46,026	62,460 2,599,748	7.536 1.162	13.074 3.985



COMBINED WALL PROPERTIES **ESC H-HRZ COMBI WALL**



H Pile Section	ESC-HRZ26-1400 INFILL SHEET PILE					ESC-ESZ26-1400 INFILL SHEET PILE				
	SYSTEM WIDTH	MOMENT INERTIA	SECTION MODULUS	MASS _{60%} *	MASS _{100%} *	SYSTEM WIDTH	MOMENT INERTIA	SECTION MODULUS	MASS _{60%} *	MASS _{100%} *
	in mm	in ⁴ /ft cm ⁴ /m	in ³ /ft cm ³ /m	lb/ft ² kg/m ²	lb/ft ² kg/m ²	in mm	in ⁴ /ft cm ⁴ /m	in ³ /ft cm ³ /m	lb/ft ² kg/m ²	lb/ft ² kg/m ²
H1109C	75.766 1,923	5372 735,874	238 12,802	63.97 312.36	73.54 359.07	75.766 1,923	5372 735,852	238 12,802	62.16 308.42	72.2 352.52
H1109C	75.766 1,923	5590 765,723	255 13,722	65.58 320.21	75.15 366.93	75.766 1,923	5590 765,702	255 13,722	64.77 316.28	73.8 360.37
H1109C	99.93 2,384	8217 1,125,639	371 19,929	91.62 447.38	99.34 485.07	99.93 2,384	8217 1,125,622	371 19,930	90.97 444.21	98.26 479.78



H Pile Section	h	W ₁	W ₂	S	t ₁	t ₂	SYSTEM WIDTH	MOMENT OF INERTIA	SECTION MODULUS	MASS (60%)	MASS (100%)
	in mm	in mm	in mm	in mm	in mm	in mm	in mm	in ⁴ cm ⁴	ft ² /ft m ² /m	lb/ft ² kg/m ²	lb/ft ² kg/m ²
H1109C	43.695 1,109	36.326 922	36.326 922	0.827 21	1.596 40.5	1.596 40.5	38.77 984	19,287 2,642,020	870 46,775	196.26 958.29	197.81 965.85



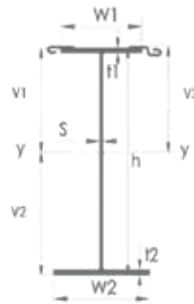
ESC-CRZ INFILL SHEET PILES



SECTION	WIDTH	HEIGHT	THICKNESS	CROSS SECTIONAL AREA	WEIGHT	ELASTIC SECTION MODULUS	MOMENT OF INERTIA	COATING AREA *(both side per pile)
	(w) in mm	(h) in mm	(t) in mm	in ² cm ²	Per Pile lb/ft kg/m	in ³ cm ³	in ⁴ cm ⁴	ft ² /ft m ² /m
ESC-CRZ14-1540	60.63 1,540	13.58 345	0.39 10.0	33.08 213.4	112.56 167.5	129.87 2,129	882.25 36,722	14.01 4.27
ESC-CRZ19-1400	55.12 1,400	16.57 421	0.37 9.5	32.04 206.7	109.03 162.24	158.91 2,605	1,315.95 54,774	14.27 4.35
ESC-CRZ26-1400	55.12 1,400	18.11 460	0.48 12.2	42.38 273.4	144.24 214.64	221.80 3,636	2,009.11 83,626	14.70 4.48

*excludes internal section of interlock

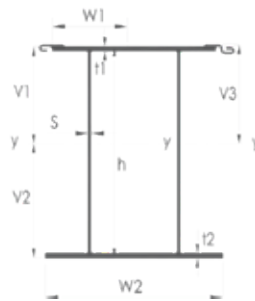
ESC H PILES WITH COLD ROLLED Z INTERLOCK



SINGLE H PILE H...-1 SERIES													
H Pile Section	h	W ₁	W ₂	S	t ₁	t ₂	CROSS SECTIONAL AREA	MASS	SECTION MODULUS*	SECTION MODULUS**	MOMENT OF INERTIA	COATING (FRONT)	COATING (BACK)
	in mm	in mm	in mm	in mm	in mm	in mm	in ² cm ²	lb/ft kg/m	in ³ cm ³	in ³ cm ³	in ⁴ cm ⁴	ft ² /ft m ² /m	ft ² /ft m ² /m
880A-1C	32.20 818	16.30 414	18.03 458	0.63 16	0.79 20	0.79 20	53.82 347.2	183.46 273	565.65 9,273	648.74 10,635	9,871.85 410,899	1.84 0.56	11.02 3.36
880B-1C	32.40 823	16.30 414	18.46 469	0.63 16	0.87 22	0.87 22	56.92 367.2	193.54 288	620.61 10,174	691.62 11,338	10,750.73 447,481	1.84 0.56	11.12 3.39
880C-1C	33.27 845	16.30 414	18.58 472	0.71 18	0.87 22	0.87 22	60.05 387.4	204.29 304	658.19 10,790	725.47 11,893	11,641.51 484,558	1.84 0.56	11.29 3.44
1080A-1C	42.13 1,070	16.30 414	17.72 450	0.87 22	0.79 20	0.79 20	69.39 447.7	235.87 351	853.63 13,994	957.88 15,703	19,226.41 800,267	1.84 0.56	12.60 3.84
1080B-1C	42.32 1,075	16.30 414	18.50 470	0.87 22	0.87 22	0.94 24	74.18 478.6	252.67 376	981.31 16,087	1,029.31 16,874	21,497.47 894,796	1.84 0.56	12.73 3.88
1080C-1C	42.44 1,078	16.30 414	18.27 464	0.87 22	1.02 26	1.02 26	77.86 502.3	264.77 394	1,035.35 16,973	1,114.96 18,278	23,035.63 958,819	1.84 0.56	12.70 3.87
1080D-1C	43.39 1,102	16.30 414	18.74 476	0.87 22	1.10 28	1.10 28	81.79 527.7	278.21 414	1,137.28 18,644	1,199.26 19,660	25,599.31 1,065,528	1.84 0.56	12.93 3.94
1180A-1C	44.02 1,118	16.30 414	18.31 465	0.87 22	1.18 30	1.18 30	84.44 544.8	287.62 428	1,194.81 19,587	1,265.87 20,752	27,343.69 1,138,135	1.84 0.56	12.93 3.94
1180B-1C	43.98 1,117	16.30 414	17.13 435	0.94 24	1.26 32	1.26 32	88.77 572.7	302.40 450	1,216.22 19,938	1,318.58 21,616	28,119.77 1,170,438	1.84 0.56	12.70 3.87
1180C-1C	44.41 1,128	16.30 414	19.17 487	0.94 24	1.34 34	1.34 34	94.41 609.1	321.22 478	1,382.38 22,662	1,404.59 23,026	31,267.24 1,301,446	1.84 0.56	13.12 4.00
1180C-1C	44.37 1,127	16.30 414	18.35 466	1.02 26	1.42 36	1.42 36	99.11 639.4	337.34 502	1,416.48 23,221	1,460.58 23,944	32,244.48 1,342,122	1.84 0.56	12.93 3.94

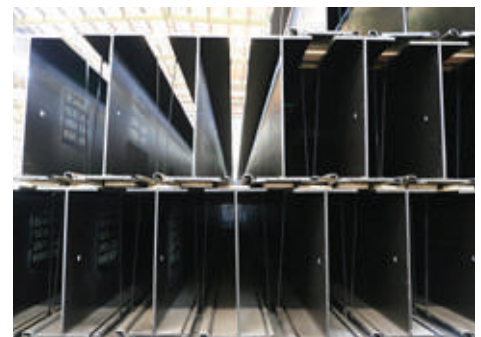
* Referring to outer flange, highest value of v1 & v2 ** Referring to outer clutch, v3

ESC H PILES WITH COLD ROLLED Z INTERLOCK

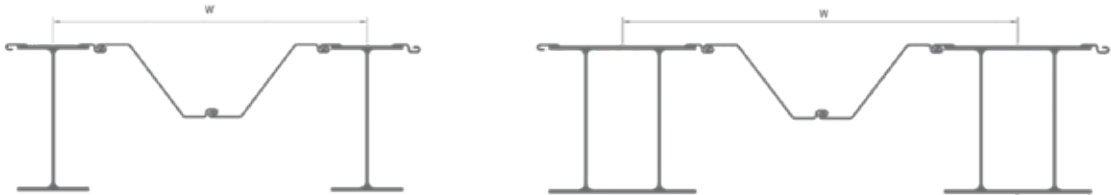


DOUBLE H PILE H...-2 SERIES													
H Pile Section	h	W ₁	W ₂	S	t ₁	t ₂	CROSS SECTIONAL AREA	MASS	SECTION MODULUS*	SECTION MODULUS**	MOMENT OF INERTIA	COATING (FRONT)	COATING (BACK)
	in mm	in mm	in mm	in mm	in mm	in mm	in ² cm ²	lb/ft kg/m	in ³ cm ³	in ³ cm ³	in ⁴ cm ⁴	ft ² /ft m ² /m	ft ² /ft m ² /m
880A-2C	32.32 821	34.84 885	37.28 947	0.63 16	0.79 20	0.87 22	105.87 683	360.19 536	1,216.34 19,940	1,183.22 19,397	19,701.82 820,055	3.38 1.03	13.22 4.03
880B-2C	32.83 834	34.84 885	37.28 947	0.71 18	0.87 22	0.87 22	114.05 735.8	388.42 578	1,278.68 20,962	1,291.13 21,166	21,393.06 890,450	3.38 1.03	13.22 4.03
880C-2C	33.11 841	34.84 885	37.36 949	0.71 18	0.87 22	0.94 24	117.34 757	399.17 594	1,354.44 22,204	1,318.58 21,616	22,559.79 939,013	3.38 1.03	13.22 4.03
1080A-2C	40.43 1,027	34.84 885	35.98 914	0.79 20	1.02 26	1.02 26	140.45 906.1	477.79 711	1,859.34 30,481	1,899.30 31,136	38,429.67 1,599,570	3.38 1.03	13.06 3.98
1080B-2C	42.24 1,073	34.84 885	36.69 932	0.87 22	0.94 24	0.94 24	144.99 935.4	493.25 734	1,927.91 31,605	1,954.38 32,039	41,454.22 1,725,462	3.38 1.03	13.16 4.01
1080C-2C	42.24 1,073	34.84 885	35.43 900	0.87 22	1.10 28	1.10 28	154.32 995.6	525.50 782	2,090.96 34,278	2,139.09 35,067	45,164.07 1,879,878	3.38 1.03	13.02 3.97
1080D-2C	42.80 1,087	34.84 885	38.19 970	0.94 24	1.10 28	1.10 28	164.70 1,062.60	560.45 834	2,276.28 37,316	2,236.99 36,672	48,812.39 2,031,733	3.38 1.03	13.25 4.04
1180A-2C	43.11 1,095	34.84 885	37.56 954	0.94 24	1.18 30	1.18 30	170.00 1,096.80	578.59 861	2,382.23 39,053	2,351.86 38,555	51,575.36 2,146,737	3.38 1.03	13.19 4.02
1180B-2C	43.11 1,095	34.84 885	37.56 954	0.94 24	1.26 32	1.26 32	175.41 1,131.70	596.74 888	2,490.45 40,827	2,449.39 40,154	53,815.57 2,239,982	3.38 1.03	13.16 4.01
1180C-2C	43.50 1,105	34.84 885	38.54 979	0.94 24	1.34 34	1.34 34	182.88 1,179.90	622.27 926	2,639.10 43,264	2,585.67 42,388	57,815.27 2,406,463	3.38 1.03	13.22 4.03
1180C-2C	43.31 1,100	34.84 885	38.39 975	1.02 26	1.42 36	1.42 36	194.14 1,252.50	660.58 983	2,759.46 45,237	2,703.40 44,318	60,249.80 2,507,796	3.38 1.03	13.22 4.03

* Referring to outer flange, highest value of v1 & v2 ** Referring to outer clutch, v3



COMBINED WALL PROPERTIES **ESC H-CRZ COMBI WALL**



H Pile Section	ESC-CRZ14-1540 INFILL SHEET PILE					ESC-CRZ19-1400 INFILL SHEET PILE					ESC-CRZ26-1400 INFILL SHEET PILE				
	SYSTEM WIDTH	SYSTEM INERTIA	SECTION MODULUS	MASS _{60%} *	MASS _{100%} *	SYSTEM WIDTH	SYSTEM INERTIA	SECTION MODULUS	MASS _{60%} *	MASS _{100%} *	SYSTEM WIDTH	SYSTEM INERTIA	SECTION MODULUS	MASS _{60%} *	MASS _{100%} *
	in mm	in ⁴ /ft cm ⁴ /m	in ³ /ft cm ³ /m	lb/ft ² kg/m ²	lb/ft ² kg/m ²	in mm	in ⁴ /ft cm ⁴ /m	in ³ /ft cm ³ /m	lb/ft ² kg/m ²	lb/ft ² kg/m ²	in mm	in ⁴ /ft cm ⁴ /m	in ³ /ft cm ³ /m	lb/ft ² kg/m ²	lb/ft ² kg/m ²
ESC-880A-1C	81.38 2,067	1,580.86 216,556	104.25 5,605	42.09 205.5	43.60 212.9	75.87 1,927	1,764.10 241,657	116.32 6,254	44.58 217.7	46.20 225.6	75.87 1,927	1,874.86 256,830	123.54 6,642	50.18 245	51.77 252.8
ESC-880A-2C	99.92 2,538	2,464.33 337,580	148.52 7,985	55.54 271.2	56.77 277.2	94.41 2,398	2,663.16 364,816	165.61 8,904	58.35 284.9	59.64 291.2	94.41 2,398	2,750.99 376,848	165.80 8,914	62.81 306.7	64.12 313.1
ESC-880B-1C	81.38 2,067	1,710.05 234,254	110.39 5,935	43.64 213.1	45.16 220.5	75.87 1,927	1,902.67 260,640	122.83 6,604	46.26 225.9	47.88 233.8	75.87 1,927	2,011.97 275,613	129.88 6,983	51.86 253.2	53.47 261.1
ESC-880B-2C	99.92 2,538	2,666.81 365,316	161.52 8,684	58.90 287.6	60.13 293.6	94.41 2,398	2,877.46 394,172	174.26 9,369	61.89 302.2	63.18 308.5	94.41 2,398	2,965.29 406,204	179.58 9,655	66.36 324	67.67 330.4
ESC-880C-1C	81.38 2,067	1,841.00 252,192	115.13 6,190	45.22 220.8	46.74 228.2	75.87 1,927	2,043.14 279,882	127.78 6,870	47.94 234.1	49.56 242	75.87 1,927	2,152.44 294,855	134.61 7,237	53.51 261.3	55.13 269.2
ESC-880C-2C	99.92 2,538	2,806.49 384,451	171.03 9,195	60.23 294.1	61.46 300.1	94.41 2,398	3,025.29 414,423	184.36 9,912	63.30 309.1	64.61 315.5	94.41 2,398	3,113.12 426,455	189.72 10,200	67.79 331	69.08 337.3
ESC-1080A-1C	81.38 2,067	2,955.99 404,930	147.80 7,946	49.91 243.7	51.43 251.1	75.87 1,927	3,239.13 443,716	161.95 8,707	52.98 258.7	54.60 266.6	75.87 1,927	3,348.43 458,689	167.42 9,001	58.55 285.9	60.17 293.8
ESC-1080A-2C	99.92 2,538	4,706.43 644,717	233.43 12,550	69.69 340.3	70.90 346.2	94.41 2,398	5,036.16 689,885	249.78 13,429	73.30 357.9	74.61 364.3	94.41 2,398	5,123.99 701,917	254.13 13,663	77.78 379.8	79.07 386.1
ESC-1080B-1C	81.38 2,067	3,289.83 450,662	158.08 8,499	52.31 255.4	53.82 262.8	75.87 1,927	3,597.23 492,771	172.85 9,293	55.56 271.3	57.18 279.2	75.87 1,927	2,976.53 407,744	178.10 9,575	61.13 298.5	62.75 306.4
ESC-1080B-2C	99.92 2,538	5,068.54 694,320	239.79 12,892	71.54 349.3	72.77 355.3	94.41 2,398	5,419.40 742,384	256.40 13,785	75.26 367.5	76.57 373.9	94.41 2,398	5,507.24 754,416	260.55 14,008	79.75 389.4	81.04 395.7
ESC-1080C-1C	81.38 2,067	3,515.94 481,636	170.77 9,181	54.17 264.5	55.66 271.8	75.87 1,927	3,839.76 525,995	186.50 10,027	57.53 280.9	59.15 288.8	75.87 1,927	3,949.07 540,968	191.80 10,312	63.10 308.1	64.72 316
ESC-1080C-2C	99.92 2,538	5,512.68 755,161	262.02 14,087	75.37 368	76.57 373.9	94.41 2,398	5,889.47 806,777	279.93 15,050	79.30 387.2	80.61 393.6	94.41 2,398	5,977.31 818,809	284.10 15,274	83.78 409.1	85.07 415.4
ESC-1080D-1C	81.38 2,067	3,892.81 533,261	183.01 9,839	56.14 274.1	57.63 281.4	75.87 1,927	4,244.01 581,371	199.52 10,727	59.66 291.3	61.26 299.1	75.87 1,927	4,353.31 596,344	204.66 11,003	65.21 318.4	66.83 326.3
ESC-1080D-2C	99.92 2,538	5,949.46 814,994	273.61 14,710	79.61 388.7	80.83 394.7	94.41 2,398	6,351.75 870,103	292.11 15,705	83.80 409.2	85.09 415.5	94.41 2,398	6,439.59 882,135	296.15 15,922	88.27 431	89.58 437.4
ESC-1180A-1C	81.38 2,067	4,149.23 568,388	192.77 10,364	57.49 280.7	58.96 287.9	75.87 1,927	4,519.07 619,050	209.94 11,287	61.11 298.4	62.69 306.1	75.87 1,927	4,628.37 634,023	215.02 11,560	66.68 325.6	68.26 333.3
ESC-1180A-2C	99.92 2,538	6,280.24 860,307	287.39 15,451	81.78 399.3	82.98 405.2	94.41 2,398	6,701.85 918,061	306.68 16,488	86.10 420.4	87.39 426.7	94.41 2,398	6,789.68 930,093	310.69 16,704	90.56 442.2	91.87 448.6
ESC-1180B-1C	81.38 2,067	4,263.32 584,016	200.62 10,786	59.68 291.4	61.13 298.5	75.87 1,927	4,641.43 635,813	218.42 11,743	63.45 309.8	65.02 317.5	75.87 1,927	4,750.74 650,786	223.55 12,019	69.02 337	70.59 344.7
ESC-1180B-2C	94.41 2,398	6,548.44 897,046	299.09 16,080	88.88 434	85.20 416	94.41 2,398	6,985.71 956,946	319.06 17,154	88.43 431.8	89.72 438.1	94.41 2,398	7,073.54 968,978	323.08 17,370	92.90 453.6	94.21 460
ESC-1180C-1C	81.38 2,067	4,725.99 647,396	213.04 11,454	62.44 304.9	63.96 312.3	75.87 1,927	5,137.73 703,799	231.61 12,452	66.44 324.4	68.06 332.3	75.87 1,927	5,247.03 718,771	236.54 12,717	72.01 351.6	73.63 359.5
ESC-1180C-2C	94.41 2,398	7,027.29 962,642	315.38 16,956	92.10 449.7	88.25 430.9	94.41 2,398	7,492.51 1,026,371	336.27 18,079	91.65 447.5	92.96 453.9	94.41 2,398	7,580.33 1,038,402	340.21 18,291	96.13 469.4	97.42 475.7
ESC-1180D-1C	81.38 2,067	4,869.65 667,075	221.36 11,901	64.82 316.5	66.33 323.9	75.87 1,927	5,291.82 724,907	240.55 12,933	68.98 336.8	70.59 344.7	75.87 1,927	5,401.12 739,880	245.52 13,200	74.55 364	76.17 371.9
ESC-1180D-2C	99.92 2,538	7,318.75 1,002,568	329.54 17,717	91.63 447.4	92.86 453.4	94.41 2,398	7,800.98 1,068,628	351.26 18,885	96.52 471.3	97.83 477.7	94.41 2,398	7,888.82 1,080,660	355.20 19,097	101.01 493.2	102.30 499.5

*Mass_{60%} refers to a combined wall with a sheet pile length at 60% of the King Pipe Pile Length. Mass_{100%} refers to equal sheet pile and King Pipe Pile Lengths. Please refer to our 'Useful Equations' section for the formula to calculate other length combinations.

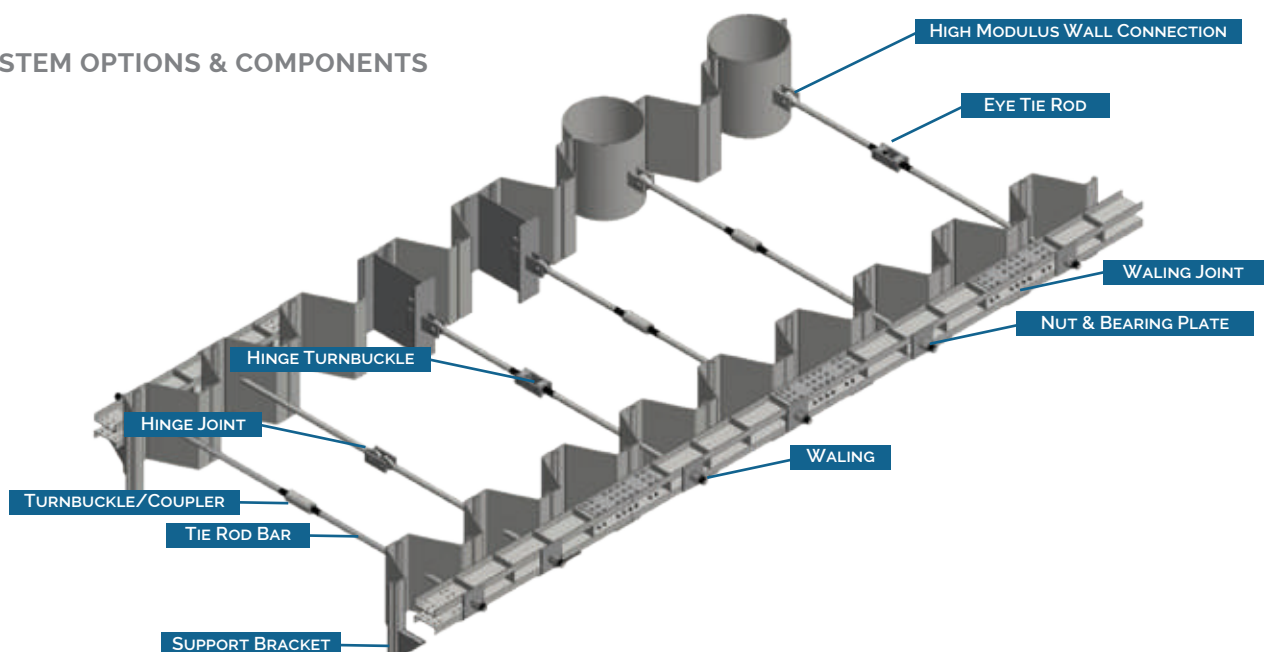
ESC Tie Rod System

Anchorage Systems



ESC is proud to offer a full suite of options for designing, fabricating and supplying full [Tie Rod System Assemblies](#) at competitive delivery schedules. Provided in this catalog are the standard sizes for the typical components. On top of this is the flexibility to provide a wide range of steel grades. Project specific requirements can also be catered to such as corrosion protection combinations, high forces, extreme lengths and large expected settlements.

SYSTEM OPTIONS & COMPONENTS



Tie Rod System Configurations

- ✓ Sheet Pile Main Wall tied to Sheet Pile Anchor Wall
- ✓ Sheet Pile Main Wall tied to Concrete Block Anchor Wall
- ✓ H Pile Combi Wall tied to Sheet Pile Anchor Wall
- ✓ Pipe Pile Combi Wall tied to Sheet Pile Anchor Wall
- ✓ Other Special Configurations—Pipe Combi Wall tied to H Pile Combi Wall

What Our Engineers Say?

"Unlike other companies, ESC can design and deliver an entire retaining wall system giving you a hassle-free, one-stop solution with no worries of interfacing issues between sheet pile and tie rod components."



TIE ROD BAR SIZING - CUT THREAD



CODE	THREAD	BAR Ø	MASS	GRADE 460		GRADE 500		GRADE 550		GRADE 650		GRADE 700	
				YL	UL	YL	UL	YL	UL	YL	UL	YL	UL
	in mm	in mm	lb/ft kg/m	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN
CT01	1-7/8 x 3/16 M48x5	1-7/8 48	9.55 14.2	147 656	195 869	160 713	208 926	176 784	240 1,069	208 926	272 1,212	224 998	282 1,254
CT02	2-3/16 x 3/16 M56x5.5	2-3/16 56	12.99 19.3	203 905	270 1,201	221 984	287 1,279	243 1,083	332 1,476	287 1,279	376 1,673	310 1,378	389 1,732
CT03	2-11/16 x 11/4 M68x6	2-11/16 68	19.16 28.5	307 1,367	407 1,813	334 1,486	434 1,932	367 1,635	501 2,229	434 1,932	568 2,527	468 2,081	588 2,616
CT04	2-13/16 x 13/4 M72x6	2-13/16 72	21.48 32	349 1,551	462 2,057	379 1,686	493 2,192	417 1,854	568 2,529	493 2,192	644 2,866	530 2,360	667 2,967
CT05	3 x 1/4 M76x6	3 76	23.93 35.6	392 1,746	520 2,315	426 1,898	554 2,467	469 2,088	640 2,847	554 2,467	725 3,226	597 2,657	750 3,340
CT06	3-3/8 x 1/4 M85x6	3-3/8 85	29.93 44.5	500 2,227	664 2,954	544 2,421	707 3,147	598 2,663	816 3,632	707 3,147	925 4,116	762 3,390	957 4,261
CT07	3-9/16 x 1/4 M90x6	3-9/16 90	33.56 49.9	566 2,520	751 3,342	615 2,739	800 3,561	677 3,013	923 4,109	800 3,561	1,046 4,657	862 3,835	1,083 4,821
CT08	3-3/4 x 1/4 M95x6	3-3/4 95	37.39 55.6	636 2,831	844 3,754	691 3,077	899 4,000	761 3,385	1,037 4,616	899 4,000	1,175 5,231	968 4,308	1,217 5,416
CT09	3-15/16 x 1/4 M100x6	3-15/16 100	41.43 61.7	710 3,160	941 4,190	772 3,435	1,003 4,465	849 3,778	1,158 5,152	1,003 4,465	1,312 5,839	1,080 4,808	1,358 6,045
CT10	4-1/8 x 1/4 M105x6	4-1/8 105	45.68 68.0	788 3,507	1,045 4,650	857 3,812	1,113 4,955	942 4,193	1,285 5,717	1,113 4,955	1,456 6,480	1,199 5,336	1,507 6,708
CT11	4-5/16 x 1/4 M110x6	4-5/16 110	50.13 74.6	870 3,872	1,154 5,134	946 4,208	1,229 5,471	1,040 4,629	1,418 6,312	1,229 5,471	1,607 7,154	1,324 5,892	1,664 7,407
CT12	4-1/2 x 1/4 M115x6	4-1/2 115	54.79 81.5	956 4,255	1,268 5,642	1,039 4,625	1,351 6,012	1,143 5,087	1,559 6,937	1,351 6,012	1,767 7,862	1,455 6,475	1,829 8,139
CT13	4-15/16 x 3/8 M125x10	4-15/16 125	64.74 96.3	1,059 4,712	1,404 6,248	1,151 5,121	1,496 6,658	1,266 5,634	1,726 7,682	1,496 6,658	1,956 8,706	1,611 7,170	2,025 9,014
CT14	5-1/8 x 3/8 M130x10	5-1/8 130	70.02 104.2	1,153 5,133	1,530 6,807	1,254 5,580	1,630 7,254	1,379 6,138	1,881 8,370	1,630 7,254	2,131 9,486	1,755 7,812	2,207 9,820
CT15	5-5/16 x 3/8 M135x10	5-5/16 135	75.51 112.4	1,252 5,573	1,661 7,390	1,361 6,058	1,769 7,875	1,497 6,663	2,042 9,086	1,769 7,875	2,314 10,298	1,906 8,481	2,395 10,661
CT16	5-1/2 x 3/8 M140x10	5-1/2 140	81.21 120.8	1,355 6,031	1,797 7,997	1,473 6,555	1,915 8,522	1,620 7,211	2,209 9,833	1,915 8,522	2,504 11,144	2,062 9,177	2,592 11,537
CT17	5-7/8 x 1/2 M150x12	5-7/8 150	93.22 138.7	1,525 6,785	2,022 8,997	1,657 7,375	2,154 9,587	1,823 8,112	2,486 11,062	2,154 9,587	2,817 12,537	2,320 10,325	2,917 12,980
CT18	6-1/8 x 1/2 M155x12	6-1/8 155	99.54 148.1	1,638 7,289	2,172 9,666	1,780 7,923	2,314 10,300	1,958 8,715	2,670 11,884	2,314 10,300	3,026 13,469	2,492 11,092	3,133 13,944
CT19	6-5/16 x 1/2 M160x12	6-5/16 160	106.06 157.8	1,755 7,811	2,327 10,358	1,908 8,490	2,480 11,038	2,098 9,339	2,862 12,736	2,480 11,038	3,243 14,434	2,671 11,887	3,358 14,943
CT20	6-1/2 x 1/2 M165x12	6-1/2 165	112.8 167.9	1,876 8,351	2,489 11,075	2,040 9,078	2,652 11,801	2,244 9,985	3,060 13,617	2,652 11,801	3,468 15,432	2,856 12,709	3,590 15,977

TIE ROD BAR SIZING - ROLLED THREAD



CODE	THREAD	BAR Ø	MASS	GRADE 460		GRADE 500		GRADE 550		GRADE 650		GRADE 700	
				YL	UL	YL	UL	YL	UL	YL	UL	YL	UL
	in mm	in mm	lb/ft kg/m	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN
RT01	1-7/8 x 3/16 M48x5	1 3/4 45	8.39 12.48	147 656	195 869	160 713	208 926	176 784	240 1,069	208 926	272 1,212	224 998	282 1,254
RT02	2-3/16 x 3/16 M56x5	2 1/16 53	11.64 17.32	203 905	270 1,201	221 984	287 1,279	243 1,083	332 1,476	287 1,279	376 1,673	310 1,378	389 1,732
RT03	2-11/16 x 1/4 M68x6	2 1/2 63	16.46 24.5	307 1,367	407 1,813	334 1,486	434 1,932	367 1,635	501 2,229	434 1,932	568 2,527	468 2,081	588 2,616
RT04	2-13/16 x 1/4 M72x6	2 11/16 68	19.15 28.5	349 1,551	462 2,057	379 1,686	493 2,192	417 1,854	568 2,529	493 2,192	644 2,866	530 2,360	667 2,967
RT05	3 x 1/4 M76x6	2 3/4 70	20.29 30.2	392 1,746	520 2,315	426 1,898	554 2,467	469 2,088	640 2,847	554 2,467	725 3,226	597 2,657	750 3,340
RT06	3-3/8 x 1/4 M85x6	3 1/8 80	26.54 39.5	500 2,227	664 2,954	544 2,421	707 3,147	598 2,663	816 3,632	707 3,147	925 4,116	762 3,390	957 4,261

CODE	THREAD	BAR Ø	MASS	GRADE 460		GRADE 500		GRADE 550		GRADE 650		GRADE 700	
				YL	UL	YL	UL	YL	UL	YL	UL	YL	UL
				lb/ft	kN	kN	kN	kN	kN	kN	kN	kN	kN
	in mm	in mm	kg/m										
RT07	3-9/16 x 1/4 M90x6	3 3/8 85	29.9 44.5	566 2,520	751 3,342	615 2,739	800 3,561	677 3,013	923 4,109	800 3,561	1,046 4,657	862 3,835	1,083 4,821
RT08	3-3/4 x 1/4 M95x6	3 9/16 90	33.53 49.9	636 2,831	844 3,754	691 3,077	899 4,000	761 3,385	1,037 4,616	899 4,000	1,175 5,231	968 4,308	1,217 5,416
RT09	3-15/16 x 1/4 M100x6	3 1/2 95	37.36 55.6	710 3,160	941 4,190	772 3,435	1,003 4,465	849 3,778	1,158 5,152	1,003 4,465	1,312 5,839	1,080 4,808	1,358 6,045
RT10	4-1/8 x 1/4 M105x6	3 15/16 100	41.46 61.7	788 3,507	1,045 4,650	857 3,812	1,113 4,955	942 4,193	1,285 5,717	1,113 4,955	1,456 6,480	1,199 5,336	1,507 6,708
RT11	4-5/16 x 1/4 M110x6	4 1/8 105	45.7 68	870 3,872	1,154 5,134	946 4,208	1,229 5,471	1,040 4,629	1,418 6,312	1,229 5,471	1,607 7,154	1,324 5,892	1,664 7,407
RT12	4-1/2 x 1/4 M115x6	4 5/16 110	50.13 74.6	956 4,255	1,268 5,642	1,039 4,625	1,351 6,012	1,143 5,087	1,559 6,937	1,351 6,012	1,767 7,862	1,455 6,475	1,829 8,139
RT13	4-15/16 x 3/8 M125x10	4 3/4 120	59.67 88.8	1,059 4,712	1,404 6,248	1,151 5,121	1,496 6,658	1,266 5,634	1,726 7,682	1,496 6,658	1,956 8,706	1,611 7,170	2,025 9,014
RT14	5-15/16 x 3/8 M135x10	5 1/8 130	70.02 104.2	1,252 5,573	1,661 7,390	1,361 6,058	1,769 7,875	1,497 6,663	2,042 9,086	1,769 7,875	2,314 10,298	1,906 8,481	2,395 10,661
RT15	5-1/2 x 3/8 M140x10	5 5/16 135	75.53 112.4	1,355 6,031	1,797 7,997	1,473 6,555	1,915 8,522	1,620 7,211	2,209 9,833	1,915 8,522	2,504 11,144	2,062 9,177	2,592 11,537
RT16	5-7/8 x 3/8 M150x12	5 11/16 145	87.09 129.6	1,525 6,785	2,022 8,997	1,657 7,375	2,154 9,587	1,823 8,112	2,486 11,062	2,154 9,587	2,817 12,537	2,320 10,325	2,917 12,980

TIE ROD BAR SIZING - UPSET THREAD



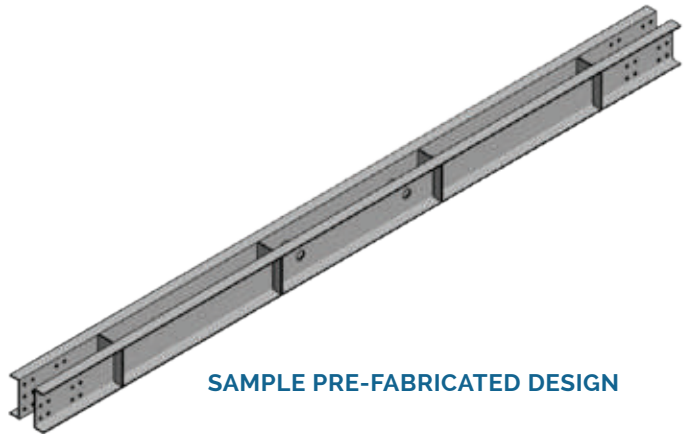
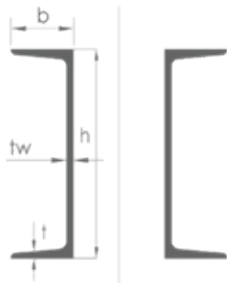
CODE	THREAD	BAR Ø	MASS	GRADE 460		GRADE 500		GRADE 550		GRADE 650		GRADE 700	
				YL	UL	YL	UL	YL	UL	YL	UL	YL	UL
				lb/ft	kN	kN	kN	kN	kN	kN	kN	kN	kN
	in mm	in mm	kg/m										
UT01	1-7/8 x 3/16 M48X5	1 9/16 40	6.65 9.9	130 578	172 767	141 628	184 817	155 691	212 942	184 817	240 1,068	198 880	249 1,106
UT02	2-3/16 x 3/16 M56X5.5	1 3/4 45	8.4 12.5	164 732	218 970	179 795	232 1,034	197 875	268 1,193	232 1,034	304 1,352	250 1,113	315 1,400
UT03	2-3/8 x 3/16 M60X5.5	1 15/16 50	10.35 15.4	203 903	269 1,198	221 982	287 1,276	243 1,080	331 1,473	287 1,276	375 1,669	309 1,374	388 1,728
UT04	2-11/16 x 1/4 M68X6	2 3/16 55	12.57 18.7	246 1,093	326 1,449	267 1,188	347 1,544	294 1,307	400 1,782	347 1,544	454 2,019	374 1,663	470 2,091
UT05	2-13/16 x 1/4 M72X6	2 3/8 60	14.92 22.2	292 1,301	388 1,725	318 1,414	413 1,838	349 1,555	477 2,121	413 1,838	540 2,403	445 1,979	559 2,488
UT06	3 x 1/4 M76X6	2 9/16 65	17.54 26.1	343 1,526	455 2,024	373 1,659	485 2,157	410 1,825	559 2,489	485 2,157	634 2,821	522 2,323	656 2,920
UT07	3-3/8 x 1/4 M85X6	2 3/4 70	20.29 30.2	398 1,770	528 2,348	432 1,924	562 2,501	476 2,117	648 2,886	562 2,501	735 3,271	605 2,694	761 3,387
UT08	3-9/16 x 1/4 M90X6	2 15/16 75	23.32 34.7	457 2,032	606 2,695	496 2,209	645 2,872	546 2,430	744 3,313	645 2,872	844 3,755	695 3,093	874 3,888
UT09	3-3/4 x 1/4 M95X6	3 1/8 80	26.54 39.5	519 2,312	689 3,066	565 2,513	734 3,267	621 2,765	847 3,770	734 3,267	960 4,273	791 3,519	994 4,423
UT10	3-15/16 x 1/4 M100X6	3 3/8 85	29.9 44.5	586 2,610	778 3,461	637 2,837	829 3,688	701 3,121	956 4,256	829 3,688	1,084 4,823	892 3,972	1,122 4,994
UT11	4-1/8 x 1/4 M105X6	3 9/16 90	33.53 49.9	657 2,926	872 3,881	715 3,181	929 4,135	786 3,499	1,072 4,771	929 4,135	1,215 5,407	1,001 4,453	1,258 5,598
UT12	4-5/16 x 1/4 M110X6	3 3/4 95	37.36 55.6	733 3,261	972 4,324	796 3,544	1,035 4,607	876 3,899	1,194 5,316	1,035 4,607	1,354 6,025	1,115 4,962	1,402 6,238
UT13	4-1/2 x 1/4 M115X6	3 15/16 100	41.46 61.7	812 3,613	1,077 4,791	882 3,927	1,147 5,105	971 4,320	1,323 5,890	1,147 5,105	1,500 6,676	1,235 5,498	1,553 6,912
UT14	4-15/16 x 3/8 M125X10	4 1/8 105	45.7 68	895 3,983	1,187 5,282	973 4,330	1,265 5,628	1,070 4,762	1,459 6,494	1,265 5,628	1,654 7,360	1,362 6,061	1,712 7,620
UT15	5-1/8 x 3/8 M130X10	4 5/16 110	50.13 74.6	982 4,372	1,303 5,797	1,068 4,752	1,388 6,177	1,174 5,227	1,601 7,127	1,388 6,177	1,815 8,078	1,495 6,652	1,879 8,363
UT16	5-5/16 x 3/8 M135X10	4 1/2 115	54.77 81.5	1,074 4,778	1,424 6,336	1,167 5,193	1,517 6,751	1,284 5,713	1,750 7,790	1,517 6,751	1,984 8,829	1,634 7,271	2,054 9,140

CODE	THREAD	BAR Ø	MASS	GRADE 460		GRADE 500		GRADE 550		GRADE 650		GRADE 700	
				YL	UL	YL	UL	YL	UL	YL	UL	YL	UL
	in mm	in mm	lb/ft kg/m	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN
UT17	5-1/2 x 3/8 M140X10	4 3/4 120	59.67 88.8	1,169 5,202	1,550 6,899	1,271 5,655	1,652 7,351	1,398 6,220	1,906 8,482	1,652 7,351	2,160 9,613	1,779 7,917	2,236 9,953
UT18	5-7/8 x 1/2 M150X12	4 15/16 125	64.71 96.3	1,268 5,645	1,682 7,486	1,379 6,136	1,792 7,977	1,517 6,750	2,068 9,204	1,792 7,977	2,344 10,431	1,930 8,590	2,426 10,799
UT19	6-1/8 x 1/2 M155X12	5 1/8 130	70.02 104.2	1,372 6,106	1,819 8,097	1,491 6,637	1,939 8,628	1,640 7,300	2,237 9,955	1,939 8,628	2,535 11,282	2,088 9,291	2,624 11,680
UT20	6-5/16 x 1/2 M160X12	5 5/16 135	75.53 112.4	1,479 6,584	1,962 8,731	1,608 7,157	2,091 9,304	1,769 7,873	2,412 10,735	2,091 9,304	2,734 12,167	2,251 10,020	2,830 12,596
UT21	6-1/2 x 1/2 M165X12	5 1/2 140	81.18 120.8	1,591 7,081	2,110 9,390	1,729 7,697	2,248 10,006	1,903 8,467	2,594 11,545	2,248 10,006	2,940 13,085	2,421 10,776	3,044 13,547

* Fully threaded bars are available for most sizes as an option for the customer.

WALING CHANNEL

The Waling Assembly transmits forces from the sheet piling to the anchorage whilst simultaneously aligning and stiffening the wall. ESC offers standard hot rolled channel sections presented, but can also provide full options such as splicing plates and bolt holes. Alternatives that ESC can accommodate to are cold formed channels, or double wide flange beams or as the client requires.



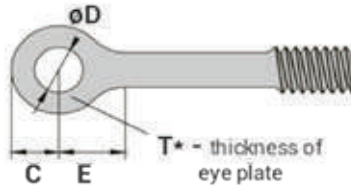
SAMPLE PRE-FABRICATED DESIGN

Section	h	b	t _w	t ₂	SECTIONAL AREA	MASS PER UNIT LENGTH	MOMENT OF INERTIA	SECTION MODULUS	COATING AREA
	in mm	in mm	in mm	in mm	in ² cm ²	lb/ft kg/m	in ⁴ cm ⁴	in ³ cm ³	ft ² /ft m ² /m
WC01	7.09 180	2.76 70	0.35 9.0	0.41 10.5	0.05 29.29	15.45 22.99	32.91 1,370	9.27 152	1.97 0.6
WC02	7.87 200	2.87 73	0.28 7.0	0.43 11.0	0.04 28.83	15.21 22.63	42.76 1,780	10.86 178	2.13 0.65
WC03	7.87 200	2.95 75	0.35 9.0	0.43 11.0	0.05 32.83	17.32 25.77	45.98 1,914	11.65 191	2.17 0.66
WC04	8.66 220	3.03 77	0.28 7.0	0.45 11.5	0.05 31.84	16.79 24.99	57.52 2,394	13.30 218	2.33 0.71
WC05	8.66 220	3.11 79	0.35 9.0	0.45 11.5	0.06 36.24	19.12 28.45	61.77 2,571	14.27 234	2.33 0.71
WC06	9.84 250	3.07 78	0.28 7.0	0.47 12.0	0.05 34.91	18.41 27.4	80.70 3,359	16.41 269	2.53 0.77
WC07	9.84 250	3.15 80	0.35 9.0	0.47 12.0	0.06 39.91	21.05 31.33	86.97 3,620	17.69 290	2.56 0.78
WC08	11.02 280	3.23 82	0.30 7.5	0.49 12.5	0.06 40.02	21.11 31.42	114.19 4,753	20.74 340	2.79 0.85
WC09	11.02 280	3.31 84	0.37 9.5	0.49 12.5	0.07 45.62	24.06 35.81	122.96 5,118	22.33 366	2.79 0.85
WC10	12.60 320	3.46 88	0.31 8.0	0.55 14.0	0.08 48.5	25.58 38.07	180.45 7,511	28.61 469	3.12 0.95
WC11	12.60 320	3.54 90	0.39 10.0	0.55 14.0	0.09 54.9	28.96 43.1	193.57 8,057	30.74 504	3.12 0.95
WC12	14.17 360	3.78 96	0.35 9.0	0.63 16.0	0.09 60.89	32.12 47.8	285.27 11,874	40.26 660	3.44 1.05
WC13	14.17 360	3.86 98	0.43 11.0	0.63 16.0	0.11 68.09	35.92 53.45	303.96 12,652	42.88 703	3.48 1.06
WC14	15.75 400	3.94 100	0.41 10.5	0.71 18.0	0.12 75.04	39.59 58.91	422.29 17,577	53.62 879	3.74 1.14
WC15	15.75 400	4.02 102	0.49 12.5	0.71 18.0	0.13 83.04	43.81 65.19	447.92 18,644	56.85 932	3.77 1.15

CONNECTION OPTIONS

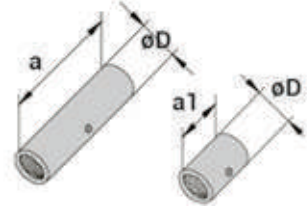
EYE TIE ROD

1. Eye Tie Rods are special bars with upset threads on one end, with the other end of the bar pressed and drilled into a flat eye shape which can be used to connect to a hinge joint or connection plate for high modulus walls.



TURNBUCKLE/COUPLER

2. Turnbuckles and couplers are the most common connections to extend the full assembly length of the tie rod system. Typical adjustment length is 3.54in (90mm), but greater lengths are available on request. The minimum engagement length for full joint strength is one outer diameter.



STEEL GRADES

The standard steel grade for Tie Rod System Connection options is S355 and Grade A572/50. The sizing of components is designed for Grade 550, cut thread. ESC can provide full design options for other grades (Grade 460, 500, 650 & 700) and thread forms.

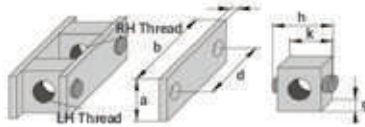


EYE TIE RODS						TURNBUCKLE			COUPLER		
THREAD	CODE	C	T*	E	ØD	CODE	a1	D	CODE	a	D
		in mm	in mm	in mm	in mm		in mm	in mm		in mm	in mm
1 7/8 M48X5	ETR01	2 3/16 55	1 7/16 36	3 76	1 9/16 39	TB01	4 5/16 110	3 9/16 90	CP01	11 7/16 290	3 9/16 90
2 3/16 M56X5.5	ETR02	2 3/8 61	1 5/8 41	3 1/4 83	1 3/4 44	TB02	5 1/8 130	3 15/16 100	CP02	12 3/16 310	3 15/16 100
2 3/8 M60X5.5	ETR03	2 11/16 68	1 11/16 43	3 13/16 97	1 15/16 50	TB03	5 1/2 140	4 5/16 110	CP03	12 5/8 320	4 5/16 110
2 11/16 M68X6	ETR04	2 15/16 75	1 13/16 46	4 1/8 105	2 3/16 55	TB04	6 5/16 160	4 3/4 120	CP04	13 3/8 340	4 3/4 120
2 13/16 M72X6	ETR05	3 3/16 81	2 51	4 7/16 113	2 3/8 60	TB05	6 11/16 170	5 1/8 130	CP05	13 3/4 350	5 1/8 130
3 M76X6	ETR06	3 7/16 88	2 3/16 56	4 3/4 120	2 9/16 65	TB06	6 11/16 170	5 5/16 135	CP06	13 3/4 350	5 5/16 135
3 3/8 M85X6	ETR07	3 3/4 95	2 3/8 61	5 1/4 133	2 3/4 70	TB07	7 7/8 200	5 7/8 150	CP07	14 15/16 380	5 7/8 150
3 9/16 M90X6	ETR08	4 101	2 1/16 66	5 9/16 141	2 15/16 75	TB08	7 7/8 200	6 5/16 160	CP08	14 15/16 380	6 5/16 160
3 3/4 M95X6	ETR09	4 1/4 108	2 13/16 71	5 13/16 148	3 1/8 80	TB09	8 11/16 220	6 1/2 165	CP09	15 3/4 400	6 1/2 165
3 15/16 M100X6	ETR10	4 1/2 115	2 13/16 71	6 5/16 161	3 3/8 85	TB10	9 1/16 230	6 7/8 175	CP10	16 1/8 410	6 7/8 175
4 1/8 M105X6	ETR11	4 3/4 121	3 76	6 11/16 170	3 1/2 89	TB11	9 13/16 250	7 5/16 185	CP11	16 15/16 430	7 5/16 185
4 5/16 M110X6	ETR12	5 1/16 128	3 3/16 81	7 178	3 11/16 94	TB12	9 13/16 250	7 1/2 190	CP12	16 15/16 430	7 1/2 190
4 1/2 M115X6	ETR13	5 5/16 135	3 3/8 86	7 5/16 186	3 15/16 100	TB13	10 5/8 270	7 7/8 200	CP13	17 11/16 450	7 7/8 200
4 15/16 M125X10	ETR14	5 5/8 143	3 5/8 92	7 5/8 193	4 1/8 105	TB14	11 7/16 290	8 1/4 210	CP14	18 1/2 470	8 1/4 210
5 1/8 M130X10	ETR15	5 7/8 149	3 13/16 97	7 7/8 200	4 5/16 110	TB15	11 7/16 290	8 11/16 220	CP15	18 1/2 470	8 11/16 220
5 5/16 M135X10	ETR16	6 1/8 156	3 13/16 97	8 1/4 209	4 1/2 115	TB16	11 13/16 300	8 7/8 225	CP16	18 7/8 480	8 7/8 225
5 1/2 M140X10	ETR17	6 3/8 162	4 102	8 7/8 225	4 3/4 120	TB17	12 5/8 320	9 1/4 235	CP17	19 11/16 500	9 1/4 235
5 7/8 M150X12	ETR18	6 11/16 170	4 3/16 107	9 1/8 232	4 15/16 125	TB18	14 3/16 360	9 13/16 250	CP18	21 1/4 540	9 13/16 250
6 1/8 M155X12	ETR19	6 15/16 176	4 7/16 112	9 11/16 246	5 1/8 130	TB19	14 15/16 380	10 1/16 255	CP19	22 1/16 560	10 1/16 255
6 5/16 M160X12	ETR20	7 3/16 182	4 5/8 117	9 15/16 253	5 5/16 135	TB20	14 15/16 380	10 7/16 265	CP20	22 1/16 560	10 7/16 265
6 1/2 M165X12	ETR21	7 7/16 189	4 13/16 122	10 1/4 260	5 1/2 140	TB21	15 3/4 400	10 13/16 275	CP21	22 13/16 580	10 13/16 275

CONNECTION OPTIONS

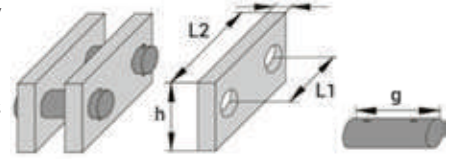
HINGE TURNBUCKLE

3. Hinge Turnbuckles are utilised to account for possible settlement, as the two connection points are hinged.



HINGE JOINT

4. Hinge Joints are generally provided for tie rods with extreme overall lengths or possible settlements. The standard design includes two eye tie rods connected by hinge plates and pins.



HINGE TURNBUCKLE									HINGE JOINT					
THREAD	CODE	a	b	c	d	g	k	h	CODE	a	D	a	D	D
		in mm	in mm	in mm	in mm	in mm	in mm	in mm		in mm	in mm	in mm	in mm	in mm
1 7/8 M48X5	HT01	3 9/16 90	15 9/16 395	1 3/8 35	9 7/16 240	2 3/16 55	3 15/16 100	8 11/16 220	HJ01	1 3/8 35	3 9/16 90	5 1/8 130	9 1/16 230	6 1/2 165
2 3/16 M56X5.5	HT02	3 15/16 100	16 15/16 430	1 3/4 45	10 1/16 255	2 3/8 60	3 15/16 100	9 7/16 240	HJ02	1 3/4 45	3 15/16 100	5 11/16 145	10 1/4 260	7 1/2 190
2 3/8 M60X5.5	HT03	4 5/16 110	17 12 445	1 3/4 50	10 1/4 260	2 15/16 75	4 5/16 110	9 13/16 250	HJ03	1 3/4 45	4 5/16 110	6 5/16 160	11 280	7 1/2 190
2 11/16 M68X6	HT04	4 15/16 125	19 1/8 485	1 15/16 50	10 5/8 270	3 1/8 80	4 3/4 120	10 5/8 270	HJ04	1 15/16 50	4 15/16 125	6 11/16 170	12 3/16 310	8 1/16 205
2 13/16 M72X6	HT05	5 5/16 135	19 11/16 500	1 15/16 50	11 280	3 1/8 80	4 3/4 120	10 5/8 270	HJ05	1 15/16 50	5 5/16 135	7 5/16 185	13 330	8 1/4 210
3 M76X6	HT06	5 11/16 145	20 1/16 510	1 15/16 50	11 280	3 1/8 80	4 3/4 120	10 5/8 270	HJ06	1 15/16 50	5 11/16 145	7 7/8 200	13 3/16 335	8 7/16 215
3 3/8 M85X6	HT07	6 11/16 170	21 7/8 555	1 15/16 50	11 5/8 295	3 3/4 95	6 11/16 170	12 5/8 320	HJ07	1 15/16 50	6 11/16 170	8 1/4 210	14 15/16 380	8 11/16 220
3 9/16 M90X6	HT08	7 5/16 185	22 1/4 565	1 15/16 50	11 5/8 295	3 3/4 95	6 11/16 170	12 5/8 320	HJ08	1 15/16 50	7 5/16 185	8 7/8 225	16 1/8 410	8 7/8 225
3 3/4 M95X6	HT09	7 7/8 200	23 7/16 595	1 15/16 50	12 305	3 3/4 95	7 1/16 180	13 330	HJ09	1 15/16 50	7 7/8 200	9 7/16 240	16 15/16 430	9 1/16 230
3 15/16 M100X6	HT10	8 7/16 215	24 3/16 615	1 15/16 50	12 3/16 310	4 1/8 105	7 1/2 190	13 3/8 340	HJ10	1 15/16 50	8 7/16 215	10 1/4 260	18 1/8 460	9 1/16 230
4 1/8 M105X6	HT11	9 1/4 235	25 3/8 645	1 15/16 50	12 3/16 325	4 1/8 115	8 1/16 205	14 355	HJ11	1 15/16 50	9 1/4 235	10 13/16 275	19 11/16 500	9 1/4 235
4 5/16 M110X6	HT12	9 13/16 250	25 13/16 655	1 15/16 50	12 5/8 320	4 1/2 115	8 1/16 205	14 355	HJ12	1 15/16 50	9 13/16 250	11 7/16 290	21 1/4 540	9 7/16 240
4 1/2 M115X6	HT13	10 5/8 270	26 15/16 685	1 15/16 50	13 3/16 335	4 15/16 125	8 11/16 220	14 9/16 370	HJ13	1 15/16 50	10 5/8 270	11 13/16 300	22 1/16 560	9 5/8 245
4 15/16 M125X10	HT14	11 5/8 295	28 9/16 725	1 15/16 50	13 9/16 345	5 5/16 135	9 1/16 230	14 15/16 380	HJ14	1 15/16 50	11 5/8 295	12 5/8 320	22 7/16 570	9 13/16 250
5 1/8 M130X10	HT15	12 3/8 315	28 15/16 735	1 15/16 50	13 3/8 340	5 7/8 150	10 1/4 260	16 1/8 410	HJ15	1 15/16 50	12 3/8 315	13 330	24 13/16 630	10 1/16 255
5 5/16 M135X10	HT16	13 3/16 335	29 3/4 755	1 15/16 50	13 9/16 345	6 5/16 160	11 280	16 15/16 430	HJ16	1 15/16 50	13 3/16 335	13 9/16 345	25 9/16 650	10 1/16 255
5 1/2 M140X10	HT17	14 355	30 7/8 785	1 15/16 50	14 3/16 360	6 5/16 160	11 280	16 15/16 430	HJ17	1 15/16 50	14 355	14 355	26 3/4 680	10 1/4 260
5 7/8 M150X12	HT18	15 9/16 395	33 1/4 845	1 15/16 50	15 3/8 390	6 11/16 170	11 7/16 290	17 5/16 440	HJ18	1 15/16 50	15 9/16 395	14 9/16 370	29 1/8 740	10 7/16 265

CORROSION PROTECTION OPTIONS

Corrosion Protection of Tie Rod Systems can be achieved with the following methods or a combination of these methods. Other less common options include encapsulation and Teflon coating.



GALVANIZATION



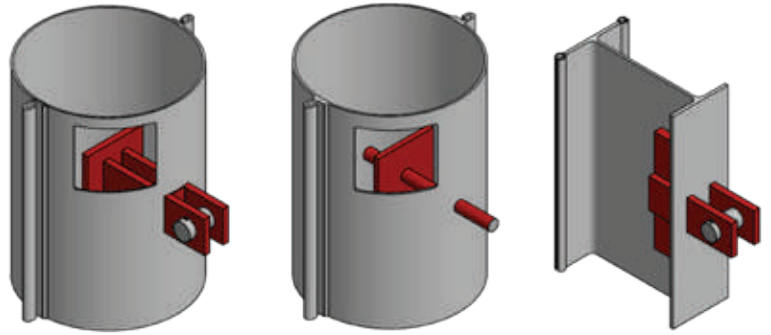
EPOXY COATING



TAPING

HIGH MODULUS WALL CONNECTIONS

ESC can design and fabricate a wide variety of Tie Rod connections for both King Pipe & H Piles that are easy to handle and install. Parameters required in the design of the connection are: preferred connection type, King Pile sizing and Tie Rod Bar sizing and strength. Presented are some typical designs but ESC can offer a full suite of options depending on the application and project requirements.



OTHER ACCESSORIES

ESC is able to supply the following accessories in addition to those specified in the previous sections:

The ESC Advantage

- ✓ Captive Nuts
- ✓ Swivel Nuts
- ✓ Angle Seating
- ✓ Bearing Plates
- ✓ Support Brackets
- ✓ Tie Rod Spreader Beam
- ✓ Washers
- ✓ Spacers (for Z Piles)



TIE ROD SPREADER BEAM

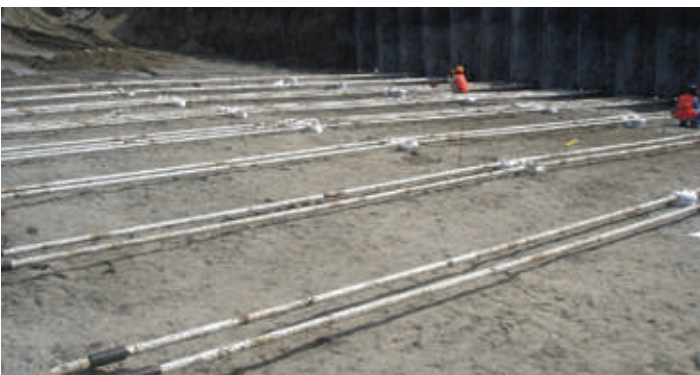
PROJECT REFERENCES



SBB TUGS JETTY, UAE



OT2 OIL TERMINAL, UAE



WATCO BREAKWATER BERTH, USA



JUBAIL SUPPLY BASE, SAUDI ARABIA

COATINGS

CORROSION PROTECTION SYSTEMS

ESC is committed to providing high quality Corrosion Protection Systems that prevent corrosion and extend the life of steel structures: whether it be sheet piles, combined walls, tie rod systems or steel structure fabrications.

The ESC Advantage

- ✓ Certified ESC Protective Coating Inspectors
- ✓ State-of-the-Art Coating Application & Inspection
- ✓ Protective Packing included in pricing



WATCH THE ESC PIPE
PILE COATING SPRAY
APPLICATION PROCESS

COAL TAR EPOXY

Coal Tar Epoxy (CTE) Coatings are the most commonly utilised corrosion protection for steel sheet piles and common in steel structures, due to their low-cost, high resistance to exposures in sea water, oil and chemicals. ESC can provide competitive solutions to the project requirements. CTE offers excellent water and crude oil resistance, corrosion resistance and good resistance against chemically polluted water. It can be applied and can also cure at low temperatures (below freezing point is possible). CTE also offers good resistance to abrasion. ESC uses internationally recognized coatings qualified to numerous standards. ESC can recommend the most suitable and economical coating system and also ensure that the coating is adequately protected during handling and transportation.

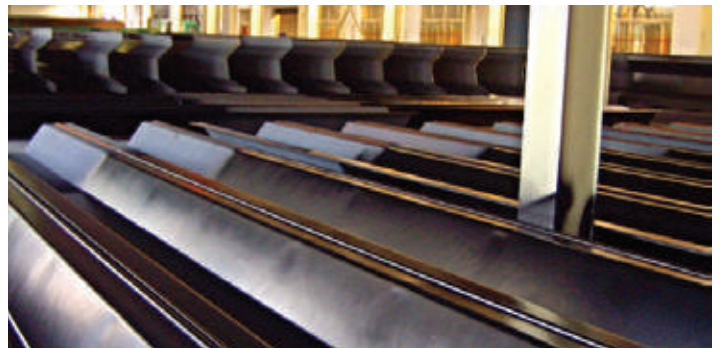
GLASS FLAKE EPOXY COATING

Glass Flake Epoxy Coatings are ideal for applications where there is expected to be impact and high abrasion environments. The product is typically shot blasted to the required surface roughness and then paint is applied via spray. Several layers may be required to obtain the Dry Film Thickness (DFT) specification. ESC applies strict quality controls and careful packing to ensure the coating is in pristine condition when the product arrives on your site.

HOT DIP GALVANIZING & DUPLEX SYSTEMS

Hot Dip Galvanization may be appropriate or required for certain applications. The process of Hot Dip Galvanization involves coating the steel product with a layer of zinc. This is achieved by immersing the steel products in a hot bath of molten zinc producing an

aesthetic metallic silver surface. ESC has experience and the strategic partnerships to effectively apply such systems to its sheet piles, tie rod systems and steel structures. ESC can also offer duplex coating systems, where the steel structure is galvanized then coated.



ESC CONNECTORS

SPECIFICATION



WATCH COMBINED WALL
MANUFACTURING

HOT ROLLED

ESC Hot Rolled Interlocks can be used in a variety of configurations. Note that they can also be used to interlock with non-ESC sheet piles. Please contact info@acerlum-esc.com for more information.



ESC-9J



ESC-10HJ

Compatibility engaging with

Engage with	ESC-6E	ESC-9E	ESC-6J	ESC-9J	ESC-9HJ	ESC-10HJ
ESC-HRZ14-770 to ESC_HRZ38-700	✓	✓	✗	✗	✗	✗
Type IIIw & Type IVw	✗	✗	✓	✓	✗	✗
NS-SP-10H & NS-SP-25H	✗	✗	✗	✗	✓	✓

COLD FORMED



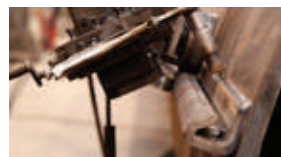
ESC-CR9 TYPE 1



ESC-CR9 TYPE 2 & 3

Compatibility engaging with

Engage with	ESC-CR6	ESC-CR9	ESC-CR12	ESC-CR16
ESC-CRZ11 to ESC-CRZ13	✓	✗	✗	✗
ESC-CRZ14 to ESC-CRZ35	✗	✓	✗	✗
ESC-CRZ26 to ESC-CRZ36	✗	✗	✓	✗
ESC-CRZ36 to ESC-CRZ50	✗	✗	✗	✓
ESC-CRU8 to ESC-CRZ12	✓	✗	✗	✗
ESC-CRU13 to ESC-CRU32	✗	✓	✗	✗
ESC-CRU25 to ESC-CRU29	✗	✓	✓	✗
ESC-CRU35 to ESC-CRU46	✗	✗	✗	✓



ESC-9J WELDING TO
SSAW PIPE



H PILE COLD FORMED
INTERLOCK



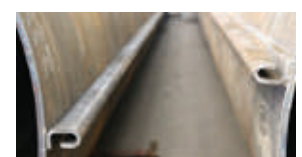
ESC-9E INTERLOCK ON PIPE



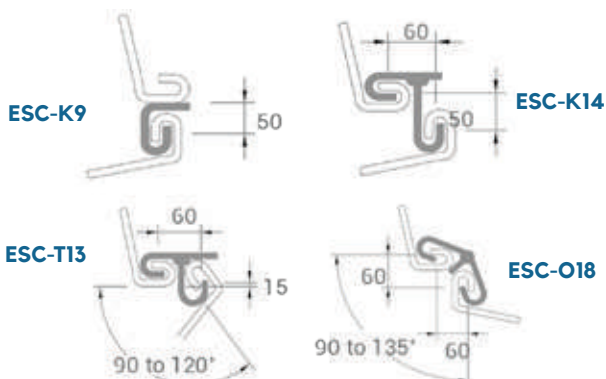
INTERLOCK CHECK



WELD PENETRATION
INSPECTION



ESC-CR9 INTERLOCK ON
PIPE



Strutting System

Introduction



ESC has been involved in difficult project sites from its inception over 30 years ago. Part of the ESC Sheet Piling Solution has often included full design of the strutting system. Using the in-house expertise of ESC's global network of engineers, ESC is well equipped to design and also fabricate **full strutting system assemblies**.

ESC's capabilities include:

- ✓ Drafting Services—shop drawing, layout
- ✓ Structural Calculations—completed by certified Professional Engineers
- ✓ Finite Element Analysis
- ✓ Raw Material Procurement
- ✓ Fabrication to international standards and project specific requirements.
- ✓ Inspection & Testing (3rd Party Independent or ESC)
- ✓ Logistics

- ✓ Full Quality Documentation and MDR with full traceability
- ✓ Project Management and Coordination with client & contractors

Strutting System Capabilities

- ✓ Standard Struts
- ✓ Reusable Modular Struts
- ✓ Hydraulically Activated Struts
- ✓ Pipe or Beam Strutting Sections
- ✓ Project Specific Novel Designs

What Our Engineers Say?

"ESC first designed, fabricated supplied and successfully installed its first pre-fabricated strutting system in 1993 adjacent to a Singapore landmark with a 10m excavation depth."



PROJECT REFERENCES



JBCC, MALAYSIA



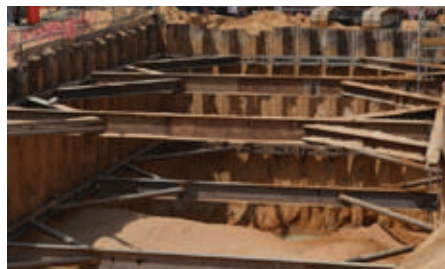
CIRCULAR COFFERDAM, UAE



M.WORLDWIDE BASEMENT, MALAYSIA



STORM WATER PUMP STATION, UAE



SHAH GAS FIELD, UAE



AETNA BUILDING, MALAYSIA

WATERTIGHTNESS

METHODS & DESIGN



DOWNLOAD DATASHEET

Achieving water tightness of a sheet pile wall can be challenging, given the site conditions, difficulty in sealant applications, high interlock temperatures during driving and other factors. ESC has addressed these issues through its design and extensive experience and is willing to deliver both standard and tailored solutions to project requirements.

SHEET PILE DESIGN

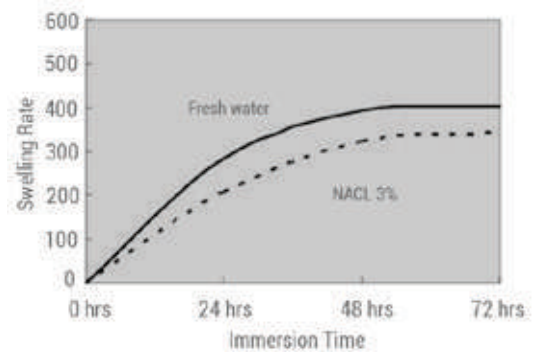
Through either Hot Rolling, which results in a tight fit interlock with a greater number of contact points, or Cold Forming, where the clutch turnover is optimised geometrically, ESC ensures that the sheet pile design allows minimal seepage whilst still providing enough room for easy driving.

ESC offers the widest sheet piles in the world, with up to 70% fewer clutches and thus leak paths compared to a standard U type wall. Tie Backs also typically provide another leak path, which can be mitigated by designing the tieback to act at the retained side of the main wall.

ESC-DPS-500 INTERLOCK SEALANT

ESC's DPS-500 sealant is a hydrophilic polyurethane which has effective application for sheet pile interlocks. It has a high expansion coefficient with over 400% volume increase.

It is a one component system making it easy to handle and apply. It is both lightweight with good surface adhesion which allows easy application even in confined spaces. It can be applied in virtually all weather conditions. It has been extensively used in both freshwater and seawater environments and swells to about 200% volume in 24 hours or less and over 300% volume within 48-72 hours of immersion.



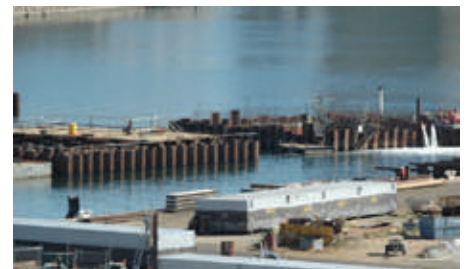
PROJECT REFERENCES



SG MUDA CUTOFF WALL, MALAYSIA



SABAK BERNAM COFFERDAM, MALAYSIA

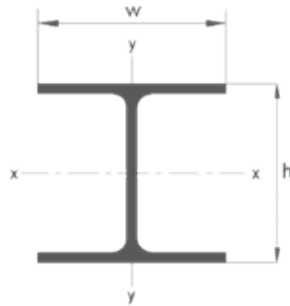


HIGHWAY COFFERDAM, AUSTRALIA

ESC HP PILES

SPECIFICATION

ESC HP Piles are standard H shaped bearing piles with an equal web and flange thickness. They can be used in a wide range of applications: from soldier pile with timber lagging walls, foundation structures and battered steel H-Piles.



The ESC Advantage

- ✓ Global supply capability
- ✓ Competitive Pricing for small and large quantities
- ✓ Supply of Splicing Assemblies and Toe Points which can allow extreme lengths to be driven.
- ✓ Experienced in component design and installation
- ✓ Wide Range of Steel Grades available: S235, S275, S355, S420, S460, A572 Gr 42, 50, 60 and other equivalent grades.
- ✓ Range of Lengths available: standard 20ft (6m) & 40ft (12m), others available for larger orders

SECTION	WEIGHT	DEPTH	WEB	FLANGE		SECTIONAL AREA	ELASTIC PROPERTIES						COATING AREA
			THICKNESS	WIDTH	THICKNESS		X - X AXIS			Y - Y AXIS			
							rx	ly	Sy	ry			
	lb/ft kg/m	d mm	tw mm	bf mm	tf mm	A cm²	Ix cm⁴	Sx cm³	in cm	Iy cm⁴	in³ cm³	in cm	ft²/ft m²/m
HP8 HP200	36 54	8.02 204	0.445 11.3	8.16 207	0.445 11.3	10.6 68.4	119 4,953	29.8 488	3.36 8.53	40.3 1,677	9.88 162	1.95 4.95	3.92 1.19
	42 63	9.7 246	0.415 10.5	10.10 257	0.420 10.7	12.4 80.0	210 8,741	43.4 711	4.13 10.5	71.7 2,984	14.2 233	2.41 6.12	4.83 1.47
HP10 HP250	57 85	9.99 254	0.565 14.4	10.20 259	0.565 14.4	16.7 108	294 12,237	58.8 964	4.18 10.6	101 4,204	19.7 323	2.45 6.22	4.91 1.50
	53 79	11.80 300	0.435 11.0	12.0 305	0.435 11.0	15.5 100	393 16,358	66.7 1,093	5.03 12.8	127 5,286	21.1 346	2.86 7.26	5.82 1.77
HP12 HP310	63 94	11.9 302	0.515 13.1	12.1 307	0.515 13.1	18.4 119	472 19,646	79.1 1,296	5.06 12.9	153 6,368	25.3 415	2.88 7.32	5.86 1.79
	74 110	12.10 307	0.605 15.4	12.20 310	0.610 15.5	21.8 141	569 23,683	93.8 1,537	5.11 13.0	186 7,742	30.4 498	2.92 7.42	5.91 1.80
	84 125	12.3 312	0.685 17.4	12.3 312	0.685 17.4	24.6 159	650 27,055	106 1,737	5.14 13.1	213 8,866	34.6 567	2.94 7.47	5.97 1.82
	73 109	13.6 345	0.505 12.8	14.6 371	0.505 12.8	21.4 138	729 30,343	107 1,753	5.84 14.8	261 10,864	35.8 587	3.49 8.86	6.96 2.12
HP14 HP360	89 132	13.8 351	0.615 15.6	14.7 373	0.615 15.6	26.1 168	904 37,627	131 2,147	5.88 14.9	326 13,569	44.3 726	3.53 8.97	7.02 2.14
	102 152	14.00 356	0.705 17.9	14.8 376	0.705 17.9	30.10 194	1,050 43,704	150 2,458	5.92 15.0	380 15,817	51.4 842	3.56 9.04	7.06 2.15
	117 174	14.2 361	0.805 20.4	14.9 378	0.805 20.4	34.4 222	1,220 50,780	172 2,819	5.96 15.1	443 18,439	59.5 975	3.59 9.12	7.12 2.34
HP16 HP410	88 131	15.3 389	0.540 13.7	15.70 399	0.540 13.7	25.8 167.0	1,110 46,201	145.0 2,376	6.56 16.7	349.0 14,526	44.5 729	3.68 9.35	7.52 2.29
	101 151	15.50 394	0.625 15.9	15.80 401	0.625 15.9	29.9 193	1,300 54,110	168.0 2,753	6.59 16.7	412 17,149	52.2 855	3.71 9.37	7.56 2.30
	121 181	15.80 401	0.750 19.1	15.9 404	0.750 19.1	35.8 231	1,590 66,180	201.0 3,294	6.66 16.9	504 20,978	63.4 1,039	3.75 9.53	7.62 2.32
	141 211	16.0 406	0.875 22.2	16.0 406	0.875 22.2	41.7 269	1,870 77,835	234.0 3,835	6.70 17.0	599 24,932	74.9 1,227	3.79 9.63	7.69 2.34
	162 242	16.30 414	1.000 25.4	16.10 409	1.000 25.4	47.7 308	2,190 91,154	269.0 4,408	6.78 17.2	697 29,011	86.6 1,419	3.82 9.70	7.75 2.36
	183 272	16.5 419	1.130 28.7	16.3 414	1.130 28.7	54.1 349	2,510 104,473	304 4,982	6.81 17.3	818 34,047	100.0 1,639	3.89 9.88	7.81 2.38

Presented in this catalog are standards sizes of ESC H Piles. A comprehensive list of sizes and also the full wide flange beam list can be found at <https://www.escsteel.com/wide-flange-beams>

DESIGN & PRODUCTION STANDARDS

SUBJECT	STANDARD	TITLE
Design	BS 5950	Structural use of steelwork in building.
Design	BS EN 1003-5	Design of steel structures - Part 5:Piling.
Manufacturing	API 5L PSL1	Specification for Line Pipe
Manufacturing	API 5L PSL 2	Specification for Line Pipe
Manufacturing	API 2B	Specification for the Fabrication of Structural Steel Pipe
Manufacturing	ASTM A252	Standard Specification for Welded and Seamless Steel Pipe Piles
Manufacturing	ASTM A671	Standard Specification for Electric-Fusion-Welded Steel Pipe for Atmospheric and Low Temperatures.
Manufacturing	ASTM A691	Standard Specification for Carbon and Alloy Steel Pipe, Electric-Fusion-Welded for High-Pressure Service at High Temp.
Manufacturing	EN 10219	Cold Formed Welded Structural Hollow Sections of Non-Alloy and Fine Grain Steels.
Manufacturing	EN 10210	Hot Finished Structural Hollow Section of Non-Alloy and Fine Grain Steels.
Manufacturing	EN 10208	Steel Pipes for Pipelines for Combustible Fluid.
Manufacturing	BS EN 10248	Hot Rolled Sheet Piling of Non Alloy Steels.
Manufacturing	BS EN 10249	Cold Formed Sheet Piling of Non-Alloy Steels
Manufacturing	AS 1163	Structural Steel Hollow Sections.
Manufacturing	AS 1579	Arc-Welded Steel Pipes and Fittings for Water and Wastewater.
Manufacturing	ASTM A139	Standard Specification for Electric-Fusion (Arc)-Welded Steel Pipe.
Manufacturing	ASTM A53	Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
Manufacturing	AWWA-C200	Steel Water Pipe-6in. (150mm) and Larger.
Manufacturing	CSA Z245	Canadian Standard - Steel Pipe
Manufacturing	GB/T 3091	Low Pressure Fluid Conveying Welded Steel Pipe
Manufacturing	SY/T 5040	Welded Piling Pipe
Manufacturing	GB/T 9711	Oil and Gas Industry: Steel Pipe for Pipeline.
Welding	AWS D1.1	Structural Welding Code - Steel
Welding	AS 1554.1	Structural Steel Welding - Welding of Steel Structures.
Welding	AS 1554.2	Structural Steel Welding - Stud Welding.
Welding	BS EN 1011	Welding - Recommendations for welding of metallic materials
Welding	CSA W59	Welded Steel Construction (Metal Arc Welding)
Welding	GB50661-2011	Welding of Structural Steel
Welding	JGJ 81	Technical Specification for Welding of Steel Structure.
Coatings	ISO 8501	Preparation of steel substrates before application of paints and related products.
Coatings	ISO 8503	Preparation of steel substrates before application of paints and related products.
Coatings	ISO 12944	Paints and varnishes - Corrosion protection of steel structures by protective paint systems.

USEFUL EQUATIONS

MOMENT CAPACITY

$$M = Z \times \sigma_{yield} \times d$$

PIPE PROPERTIES

$$Mass_{pipe} = 0.024661 \times t \times (D - t)$$

$$I_{pipe\ pile} = \frac{\pi \times [D^4 - (D - 2t)^4]}{640000}$$

COMBINED WALL

$$Mass_{L\%} = 2.5(L\% - 0.6)Mass_{100\%} + 2.5(1 - L\%)Mass_{60\%}$$

$$Z_{combi} = \frac{Z_{pipe\ pile}}{W_{combi}} \times \left(\frac{I_{pipe\ pile} + I_{sheet\ pile}}{I_{pipe\ pile}} \right)$$

$$I_{combi} = \frac{I_{pipe\ pile} + I_{sheet\ pile}}{W_{combi}}$$

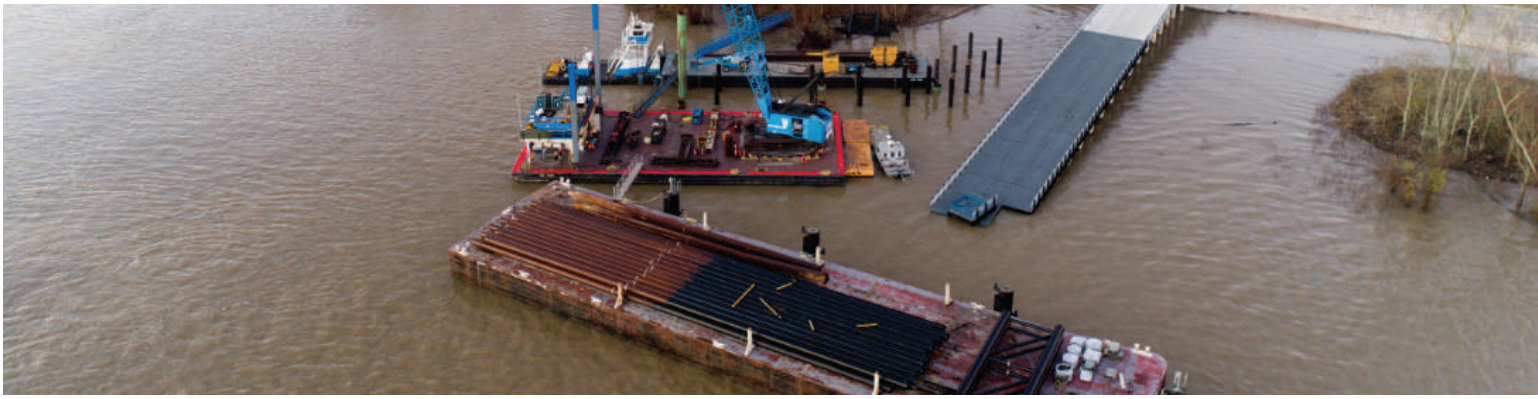
$$Z_{combi} = \frac{Z_{H\ pile}}{W_{combi}} \times \left(\frac{I_{H\ pile} + I_{sheet\ pile}}{I_{H\ pile}} \right)$$

$$I_{combi} = \frac{I_{H\ pile} + I_{sheet\ pile}}{W_{combi}}$$

LEGEND

I	in ³ /ft	cm ⁴ /m	Moment of Inertia per unit wall width
Icombi	in ³ /ft	cm ⁴ /m	Moment of Inertia of Combined Wall per unit wall width
Isheetpile	in ³ /ft	cm ⁴ /m	Moment of Inertia of Sheet Pile per unit wall width
Ipipepile	in ³ /ft	cm ⁴ /m	Moment of Inertia of Pipe Pile per unit wall width
Ipipepile	in ⁴ /ft	cm ⁴ /m	Moment of Inertia of H Pile per unit wall width
Z	in ³ /ft	cm ³ /m	Elastic Section Modulus per unit wall width
Zcombi	in ³ /ft	cm ³ /m	Elastic Section Modulus of Combined Wall Section per unit wall width
Zsheet pile	in ³ /ft	cm ³ /m	Elastic Section Modulus of Sheet Pile Section per unit wall width
Zpipe pile	in ³ /ft	cm ³ /m	Elastic Section Modulus of Pipe Pile Section per unit wall width
ZH pile	in ³ /ft	cm ³ /m	Elastic Section Modulus of H Pile Section per unit wall width
D	in	mm	Diameter of Pipe Pile
t	in	mm	Thickness of Pipe Pile
wcombi	in	mm	Unit Width of Combined Wall
L%	%	%	Percentage of Infill Sheet Pile Length to King Pile Length
MLpipe	lb/ft	kg/m	Mass per Unit Length of Pipe
Mass100%	lb/ft ²	kg/m ²	Mass per Unit Area of Combined Section with Infill Sheet Pile as 100% of King Pile Length
Mass60%	lb/ft ²	kg/m ²	Mass per Unit Area of Combined Section with Infill Sheet Pile as 60% of King Pile Length
MassL%	lb/ft ²	kg/m ²	Mass per Unit Area of Combined Section with Infill Sheet Pile as L% of King Pile Length
oyield	psi	MPa	Yield Strength of Material
M	kip-ft/ft	kNm/m	Moment Capacity per unit length wall

CONVERSION TABLE



METRIC TO IMPERIAL			IMPERIAL TO METRIC			ENGLISH MEASUREMENT	ACTUAL METRIC CONVERSION	SUGGESTED METRIC SIZE
1 cm	=	0.3937 in	1 in	=	2.5400 cm	1/8"	3.18mm	3.0mm
1 m	=	3.2808 ft	1 ft	=	0.3048 m	5/32"	3.97mm	4.0mm
1 cm ²	=	0.1550 in ²	1 in ²	=	6.4516 cm ²	1/5"	5.08mm	5.0mm
1 m ²	=	10.7639 ft ²	1 ft ²	=	0.0929 m ²	1/4"	6.35mm	6.0mm
1 cm ³	=	0.0610 in ³	1 in ³	=	16.3870 cm ³	9/32"	7.14mm	7.0mm
1 m ³	=	35.3149 ft ³	1 ft ³	=	0.0283 m ³	5/16"	7.94mm	8.0mm
1 cm ² / m	=	0.0472 in ² / ft	1 in ² / ft	=	21.166 cm ² / m	23/64"	9.13mm	9.0mm
1 N	=	0.2247 lb	1 lb	=	4.4497 N	3/8"	9.53mm	10.0mm
1 N/mm	=	5.7082 lb/in	1 lb/in	=	0.1752 N/mm	7/16"	11.11mm	11.2mm
1 N/m	=	0.0685 lb/ft	1 lb/ft	=	14.5989 N/m	15/32"	11.91mm	12.0mm
1 N/cm ²	=	1.4499 lb/in ²	1 lb/in ²	=	0.6897 N/cm ²	1/2"	12.70mm	13.0mm
1 N/m ²	=	0.0209 lb/ft ²	1 lb/ft ²	=	47.8968 N/m ²	9/16"	14.29mm	14.0mm
1 N/cm ³	=	3.6827 lb/in ³	1 lb/in ³	=	0.27154 N/cm ³	19/32"	15.08mm	15.0mm
1 N/m ³	=	0.0064 lb/ft ³	1 lb/ft ³	=	157.1420 N/m ³	5/8"	15.88mm	16.0mm
1 kg	=	2.2046 lb	1 lb	=	0.4536 kg	21/32"	16.67mm	17.0mm
1 kg/m	=	0.6720 lb/ft	1 lb/ft	=	1.4882 kg/m	11/16"	17.46mm	17.0mm
1 kg/m ²	=	0.2048 lb/ft ²	1 lb/ft ²	=	4.8824 kg/m ²	23/32"	18.26mm	18.0mm
1 Metric Tons	=	1.1023 US ton	1 US ton	=	0.9072 Metric Tons	3/4"	19.05mm	19.0mm
1 cm ⁴	=	0.0240 in ⁴	1 in ⁴	=	41.6228 cm ⁴	25/32"	19.84mm	20.0mm
1 cm ⁴ / m	=	0.007323 in ⁴ / ft	1 in ⁴ / ft	=	136.5582 cm ⁴ / m	13/16"	20.64mm	21.0mm
1 cm ³	=	0.0610 in ³	1 in ³	=	16.3870 cm ³	7/8"	22.23mm	22.0mm
1 cm ³ / m	=	0.0186 in ³ / ft	1 in ³ / ft	=	53.7631 cm ³ / m	1"	25.40mm	25.0mm
1 Nm	=	0.7373 lb.ft	1 lb.ft	=	1.3563 Nm	1-5/32"	29.39mm	29.0mm
1 Nm/m	=	2.6968 lb.in/ft	1 lb.in/ft	=	0.3708 Nm/m	1-1/4"	31.75mm	32.0mm
						1-5/16"	33.34mm	33.0mm
						1-13/32"	35.72mm	36.0mm
						1-1/2"	38.10mm	38.0mm

Disclaimer

The information provided within this General Catalog is for general information purposes only, without any warranty. ESC Steel LLC shall not be held responsible for any errors, omissions or misuse of any of the information provided. ESC Steel LLC disclaims any and all liability resulting from the ability or inability to use the information within this document. Anyone using the information contained does so at their own risk. ESC Steel LLC shall not be held liable for any damages which includes any financial losses or incidental or consequential damages arising from the use of this information. The product range contained is liable to change without notice.

ESC Product Catalogs

You may download all our product catalogs on this <https://www.acerlum-esc.com/otros-catalogos-de-productos> or request via email: info@acerlum-esc.com. If you are viewing online, you may click on the image below to download.



ESC Capability Statement



Sheet Pile Installation Procedures



Vinyl Sheet Pile Catalog



Vinyl Sheet Pile Installation Guide



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

**ESC CAPABILITY
STATEMENT**

**SHEET PILE
INSTALLATION
PROCEDURES**

**VINYL SHEET PILE
CATALOG**

**VINYL SHEET PILE
INSTALLATION GUIDE**

**TRENCH SHORING
CATALOG**

**STEEL STRUCTURES
CAPABILITIES**

**MOORING BOLLARDS
CATALOG**

**MARINE FENDERS
CATALOG**

**PORTS & OFFSHORE
STRUCTURES**

**ESC PROJECT CASE
STUDIES**

**COMBINATION WALL
PROJECTS**

**STEEL PIPE PILING
PROJECTS**



ACERLUM-ESC

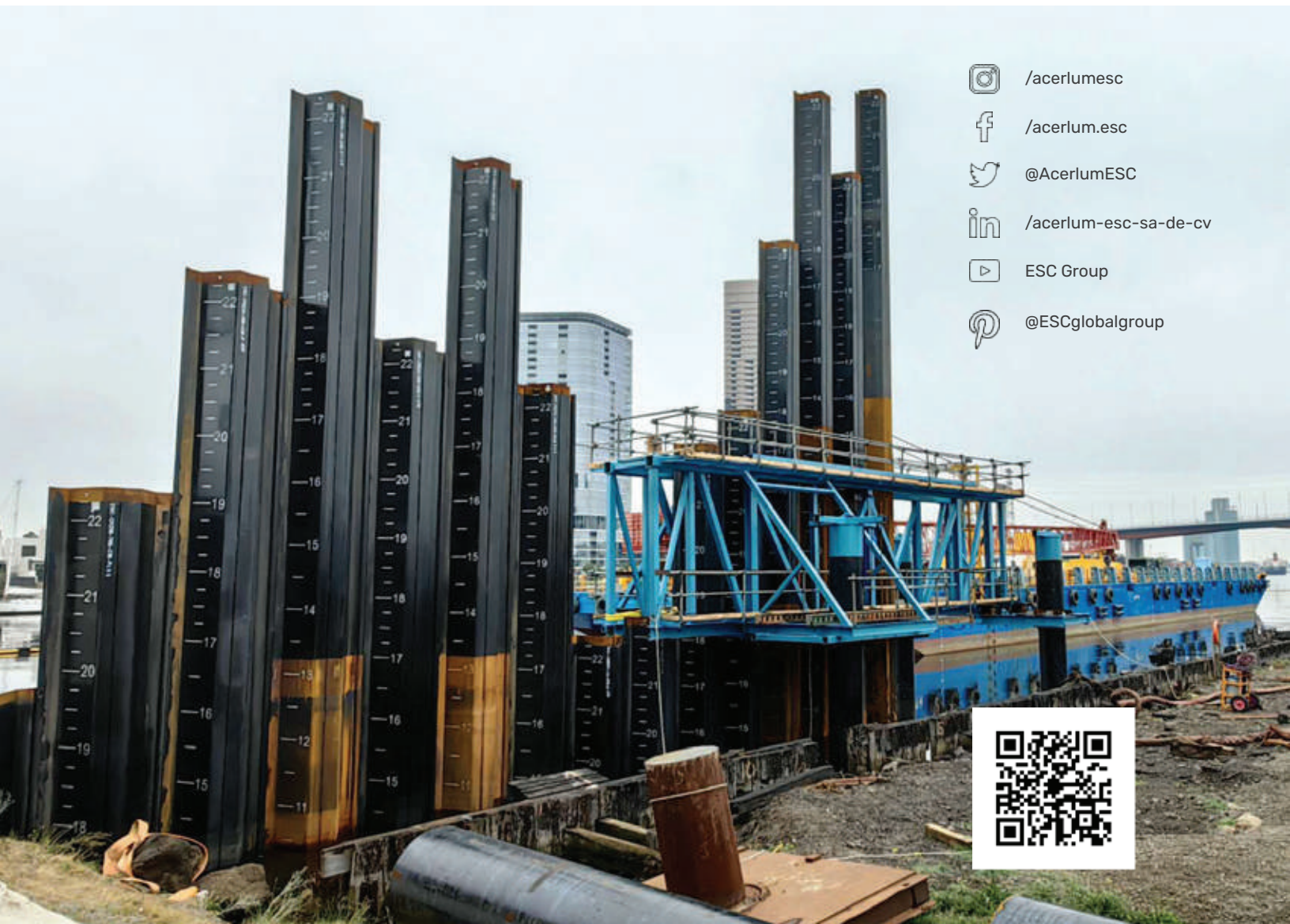
North Carolina Office (Headquarters)

A Loma de la Cañada No. 4, Loma
Dorada, Querétaro, México
CP 76060

E info@acerlum-esc.com

T +52 442 4711 500

WWW.ACERLUM-ESC.COM



/acerlumesesc



/acerlum.esc



@AcerlumESC



/acerlum-esc-sa-de-cv



ESC Group



@ESCglobalgroup

