ESC®
PILE

Sheet Piling Solutions





www.escpile.com

Cold Rolled/Formed Sheet Piles

Product Catalogue 2008

Cert No. KLR 050E421

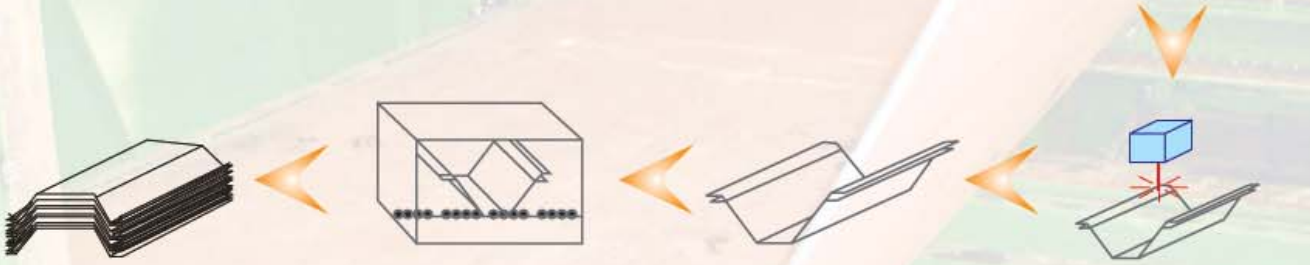
Manufactured and Designed to ISO Certification

Cert No. KLR 404026

MANUFACTURING PROCESS

For Cold Formed

RAW MATERIAL (METAL SHEET) → SHEARING PROCESS → COLD FORMING PROCESS → FORMED SECTION



FITTING & WELDING PROCESS → FINISHED PRODUCTS → BLASTING / PAINTING → STACKING

STACKING → PACKING PROCESS → SHIPMENT TO CLIENT → LOGISTIC & SITE INSTALLATION

For Cold Rolled

ROLL MATERIAL (METAL) → COLD ROLLING PROCESS → FINISHED PRODUCTS

STACKING → PACKING PROCESS → BLASTING / PAINTING

LOGISTIC & SITE INSTALLATION → SHIPMENT TO CLIENT

CONTENTS

FOREWORD

It is with great pleasure that I introduce the ESC Group's 2008 catalogue of products and services.

The past few years have seen a universal boom in the construction sector and a corresponding rise in the demand for steel. This activity has led inevitably to worldwide steel shortages, increasing delivery times and volatile steel rates, placing constructors under pressure to maintain deadlines and budgets. Even in this difficult environment, the ESC Group has prospered, thanks mainly to our Sheet Pile Solutions approach.

Market driven necessities have challenged traditional preconceptions. We are seeing a cross-over in piling applications, from hot rolled to cold formed piles in many heavy engineering projects, such as quay walls and marine structures.

Being able to establish a dialogue with Clients, and interactively assess each situation, has enabled ESC to respond more quickly and competitively to a Client's requirements. This responsiveness has become one of our key advantages and has helped to ensure close and on-going relationships with our major Clients.

Our existing and very successful range of sheet piles includes the Wide Profile Series, U Pile Series, H Piles, BP Series, Trench Series, JDU and Box Series. This year, to service expanding Client requirements, ESC introduced three new product series to the catalogue. The new series are:-

- The EU series, a wide profile series designed in accordance with the latest Eurocodes. The EU Series utilizes the efficiency of ESC wide profile designs with the ball joint clutch mechanism. This produces an effective equivalent to the Z shape sheet piles, with only half the number of clutch joints.

- The CR series, a cold rolled sheet pile based on the same appearance and characteristics as the traditional U profiles. This series is compact and robust, ideal for multiple re-use applications. The cold rolling process also makes it ideal for orders where very fast deliveries are required.

- The Tubular Combi Wall series, combines high strength tubular sections with sheet pile infills to create very strong, stiff walls with high axial load capacities.

These additional series complement and significantly enhance the range of ESC Sheet Piles.

Finally, I am also pleased to announce that we have opened new production facilities in China and the UAE to meet the increasing demand from the construction sector. Further, we expect to see our plant in St. Petersburg, Russia coming on-line by the end of 2008, increasing our capacity well beyond 100,000 metric tonnes per year.

In summary, the next few years will be exciting for ESC as we look to maintain our high standards and ever increasing production output. As always, myself and the staff at all levels will be striving to continually increase the standard of service that we offer to you, our Client.

Best regards,

Bruce Colson
Group Director

INTRODUCTION TO ESC

The ESC Group have been designing and producing sheet piles since the late 1980's and is now a leading manufacturer of cold formed sheet piles supplying a global network. Group production facilities are located in Malaysia, China and The United Arab Emirates, with Russia coming on-line by the end of 2008. Current annual production capacity is more than 100,000 metric tonnes. Production times are fast and product quality guaranteed.

Our objective at ESC is to use our wide range of expertise to provide our Clients with efficient and quality products together with services that meet both stated and implied Client requirements.

At ESC, our approach to sheet piling is orientated to the Client. ESC believe that simply supplying a product is insufficient. ESC is determined to be different and the level of support an ESC Client receives is unprecedented in the industry. Client support extends from general advise on suitable options through to full engineering design and field back-up, including necessary accessories such as painting, tie rods and other items associated with sheet piling works. ESC refer to this support as our Sheet Piling Solution.

THE ESC SHEET PILING SOLUTION

The cornerstone of the ESC approach has always been Sheet Pile Solutions and it remains as important today as it was when the company started. ESC recognize that each project is unique and has it's own set of challenges. Often the Client may not be fully aware of possible options. ESC establish a dialogue with Clients to gain full understanding of the project requirements. From this interaction with the Client, an optimum solution is formulated.

A sheet pile solution is a performance based package. It includes all the elements essential in providing the client with a complete solution to their sheet pile requirements, rather than just supplying a product.

Simply put, rather than just selling sheet piles, ESC consider the needs of the Client from all aspects and then provide a solution to meet those needs. This may include engineering design, corrosion control, construction issues, planning or simply general advise.

PRODUCTS AND APPLICATIONS

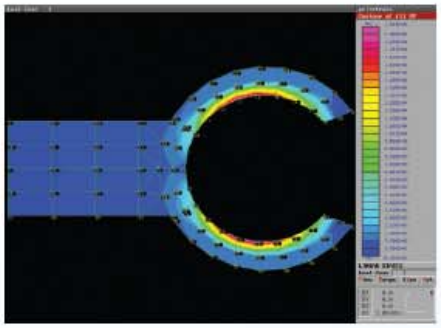
ESC produce a wide range of sheet piles and retaining wall solutions in order to cater for virtually every sheet pile application, such as:

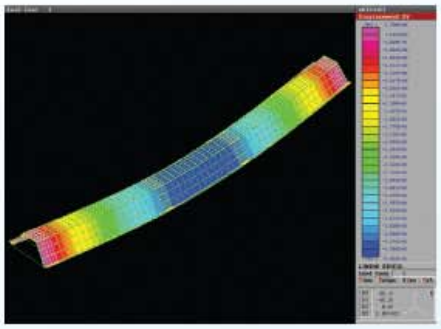
- High strength combi wall systems for deep water quays.
- Cofferdams for underwater bridge piers.
- EU piles for permanent bridge abutments.
- Wide profile piles for deep basement works.
- U piles for temporary hard ground sewerage shafts.
- Custom piles for oil tank farm containment walls.
- Trench piles for pipeline works.
- CR piles for temporary construction works.
- Grouted cutoff piles for polluted ground water containment.
- EU piles for river and canal training works.

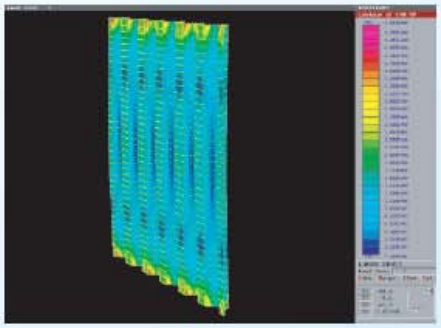
The latest trends in hot rolled sheet pile technology are producing thinner and wider sheet piles. Meanwhile, improvements in steel quality are resulting in thicker plates being used for cold formed sheet piles. As a result, the divide between hot rolled and cold form sheet piles is becoming increasingly blurred and there is increasing cross-over in applications.

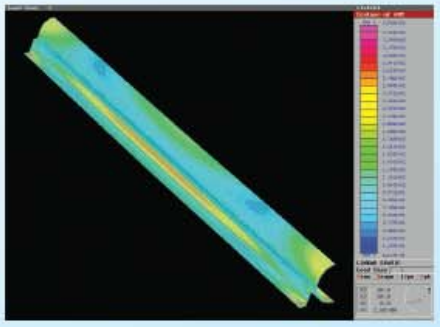
This is good news for the Client, as it provides a wider range of sheet pile alternatives for almost all project types. ESC are constantly working to modify existing designs to better meet Client requirements and to introduce new pile ranges to suit different applications.

In the past year, over half the sheet pile orders were customized in some way from the basic design in order to better satisfy the needs of individual Clients. Such customizing was as a direct result of dialogue with the Client. Dialogue allows ESC to understand the specific project application and then, using the flexibility of cold forming production, manufacture the most effective pile.









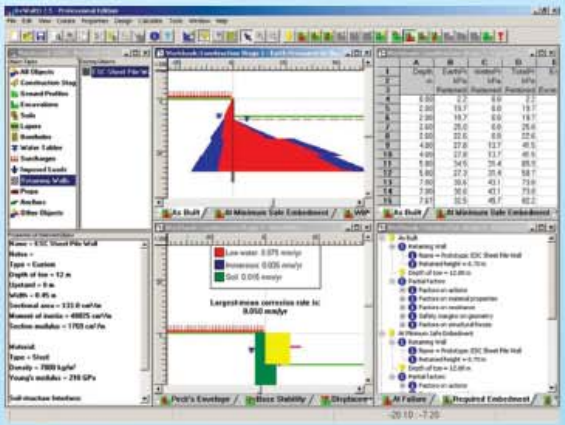
ENGINEERING SERVICES

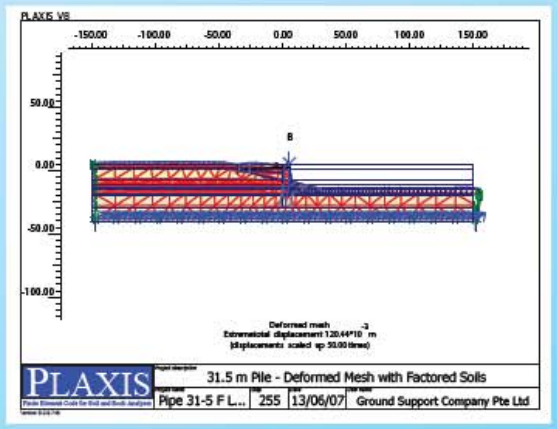
ESC maintain a significant centralized Engineering Department. Virtually all enquiries and orders are passed through the Department for review, regardless of where in the world the project is located.

The level of engineering support for a project may range from technical advise on installation equipment, right through to full design reports. The engineering team have diverse qualifications and experience, but generally focused on civil, structural and geotechnical applications.

The Engineering Department is equipped with state of the art analysis software, plus a considerable library of technical publications and international standards. Using these, designs can be provided for virtually every application, in accordance with the relevant standards from the region.

ESC engineers are available also to attend design meetings, provide on-site technical assistance, and liaise with Consulting Engineers on behalf of the Client. To-date, ESC engineers have provided on-site technical support in many regions including the Netherlands, Bangladesh, Cambodia, India, USA, Australia, New Zealand, Indonesia, China, The United Arab Emirates, Jamaica, Singapore and Malaysia.





MANUFACTURING

ESC sheet piles are produced using both cold forming and cold rolling methods.

The cold forming process uses a brake press to bend a flat plate into the required profile. Press braking is a discrete process that produces individual piles per process operation. Clutch mechanisms and strengthening plates are then welded to the body of the sheet pile in order to achieve the desired finished product. This simple but effective process allows ESC to use the same machinery to produce an almost infinite scope of products suitable for a wide range of end uses.

The cold rolling method uses multiple pairs of contoured rollers to progressively form strip into the required sheet pile profile. The rolling process is continuous and the piles are cut to the required length as they come off the production line.

There is no significant difference from a design, performance or tolerance aspect between piles produced by continuous rolling and those produced on a brake press.

DOCUMENTATION

As part of an extensive quality control program, all sheet piles supplied by ESC are marked with a unique number and accompanied by a Manufacturing Certificate. This document provides certificates for the raw material used in the piles, traceability for the raw material through the manufacturing process, quality inspection documents and independent test certificates.

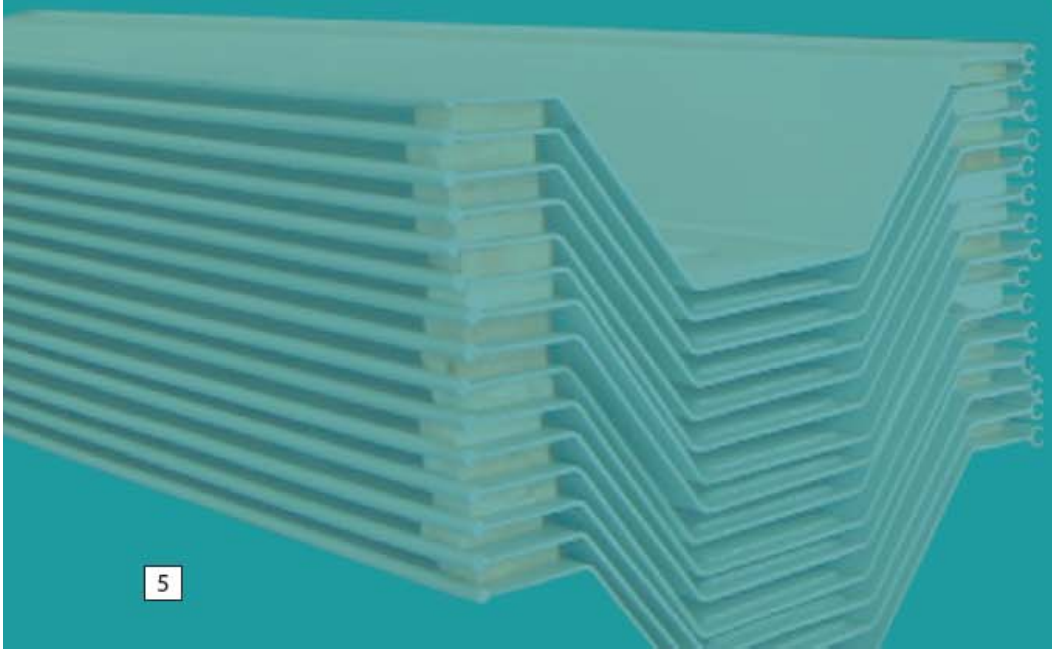
ESC also have extensive quality control procedures, manufacturing procedures and inspection and testing procedures, which are fully documented and available for submittal to Clients on request.

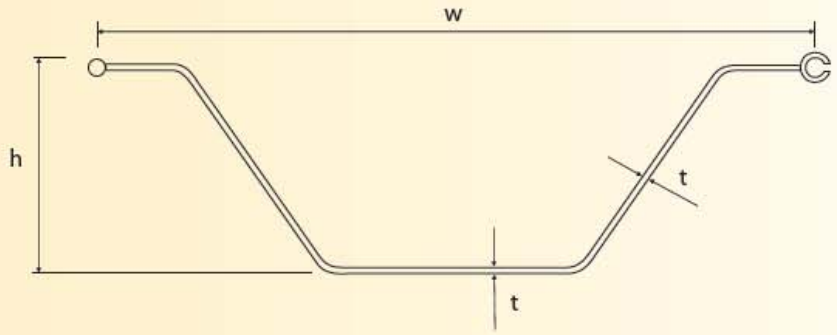
FAST FACTS

- ESC piles are produced in accordance with the latest international standards (EN 10249 parts 1 and 2) as well as ISO 9000 quality management systems. Other standards can be applied on request.
- ESC have designed and supplied sheet piles to projects in New Zealand, Australia, Chile, Haiti, Singapore, Malaysia, Indonesia, Cambodia, India, Bangladesh, Saudi Arabia, United Arab Emirates, Qatar, The Netherlands, Nigeria and Jamaica.
- ESC have production facilities established in Malaysia, China and United Arab Emirates producing over 100,000 metric tonnes per year. Agents are established in most regions around the world.
- ESC have established working relationships with manufacturers of steel, paints, tie rods system, tape wrapping systems, cathodic protection systems and all other items usually associated with sheet piling works, in order to provide complete packages to customers.
- ESC sheet piles have been used on sites controlled by some of the most well known names in engineering design, including Mott MacDonald, Beca, Halcrow, MUC, Gibb, Maunsells, Jacobs and many others.

ESC EU SHEET PILES

A wide profile pile utilizing a robust ball joint clutch, the EU series is efficient in terms of weight and installation costs. Suitable for all applications both temporary and permanent. Especially effective in marine conditions where strength and installation efficiency are premium considerations.





Section	Class[1]	Dimensions[2]			Coating Area[3]	Section Area	Mass		Elastic Section Modulus	Moment of Inertia	Radius Of Gyration
		w	h	t							
		mm	mm	mm	$m^2/m/m$	cm^2/m	kg/m	kg/m^2	cm^3/m	cm^4/m	cm
ESC-EU3	3	830	139	5.75	2.39	70.4	45.9	55.3	320	2050	5.40
ESC-EU4	3	800	159	5.75	2.48	73.0	45.9	57.3	390	2800	6.20
ESC-EU5	3	750	199	5.75	2.64	77.9	45.9	61.1	500	4610	7.70
ESC-EU6	3	720	212	6.50	2.75	90.5	51.2	71.1	600	6040	8.20
ESC-EU8	3	700	236	7.50	2.88	112.2	61.6	88.1	810	8850	8.90
ESC-EU9	3	800	236	8.00	2.82	119.3	74.9	93.6	900	9710	9.00
ESC-EU12	3	1200	359	8.00	2.68	109.2	102.8	85.7	1200	20670	13.80
ESC-EU13	3	1200	354	8.00	2.71	112.8	106.3	88.6	1260	21130	13.70
ESC-EU14	3	1150	393	8.00	2.83	117.7	106.3	92.4	1410	26280	14.90
ESC-EU15	3	1100	399	8.00	2.96	123.1	106.3	96.6	1520	28850	15.30
ESC-EU16	3	1150	394	9.50	2.83	137.3	123.9	107.8	1620	30370	14.90
ESC-EU17	2	1100	422	9.50	2.96	143.5	123.9	112.7	1740	35800	15.80
ESC-EU18	2	1100	422	9.75	2.96	146.9	126.9	115.3	1800	36620	15.80
ESC-EU19	3	1050	417	9.50	3.10	150.4	123.9	118.1	1910	37930	15.90
ESC-EU20	3	1300	508	9.50	2.96	142.5	145.3	111.8	2060	51440	19.00
ESC-EU22	3	1350	505	10.00	2.88	150.6	159.6	118.2	2220	53230	18.80
ESC-EU24	3	1300	520	10.00	2.99	156.3	159.6	122.7	2380	58940	19.40
ESC-EU25	2	1250	563	10.00	3.11	162.5	159.6	127.6	2520	68970	20.60
ESC-EU26	2	1200	564	10.00	3.24	169.4	159.6	133.0	2620	73470	20.80
ESC-EU28	2	1300	521	12.00	2.99	184.0	187.8	144.5	2760	68620	19.30
ESC-EU32	2	1400	608	12.00	3.06	188.0	206.7	147.6	3190	93150	22.30
ESC-EU34	2	1350	615	12.00	3.17	195.0	206.7	153.1	3390	100160	22.70
ESC-EU36	2	1300	633	12.00	3.30	202.5	206.7	159.0	3600	109560	23.30
ESC-EU40	2	1400	602	15.00	3.10	240.1	263.9	188.5	4090	118080	22.20
ESC-EU46	2	1300	626	15.00	3.34	258.6	263.9	203.0	4600	138150	23.10
ESC-EU50	2	1250	642	16.00	3.47	285.0	279.6	223.7	5070	158510	23.60

NOTES:

1. Cross section class defined as per Euro Code EN 1993-5:2007; Class 2 sections may be used with plastic design.
2. Dimension may be varied at client's request to suit specific requirements.
3. Coating area for both sides of piles measured per linear metre of wall; For single side painting, divide value by 2.
4. Sheet piles are commonly provided in steel grades complying with S275 and S355. Other grades such as Q345B, Q390B, X56, X65 and A690 are available and can be specified.

Sheet pile specification sheets are to be used by experienced designers. It is recommended that users refer to ESC for free assistance in correct sheet pile selection.

ESC EU SERIES SHEET PILES

DESCRIPTION: The EU pile profile is a fully interlocking wide profile sheet pile, fitted with a ball joint clutch mechanism. Normal width 700mm to 1400mm. Full sheet pile profile developed in individual units.

This pile is best suited for — Temporary Works ☑ — Permanent Works ☑

FIELDS OF APPLICATION	Not Suited	Suitable	Recommended
Cofferdams (land)	☐	☐	☑
Cofferdams (water)[4]	☐	☑	☐
Low Embankments	☐	☑	☐
Deep Excavation	☐	☐	☑
Shallow Excavation	☐	☐	☑
Light Marine	☐	☐	☑
Heavy Marine	☐	☐	☑
Ground Water Control[4]	☐	☑	☐
Axial Loading	☐	☑	☐
High Cantilever Walls	☑	☐	☐

DESIGN CODE EN 1993-5 : 2007

INSTALLATION PARAMETERS

Optimal Soil Conditions

Soft / Loose	Medium / Firm	Hard / Dense
☑	☑	☑

Recommended Installation Lengths

< 12.0m	12.0m - 24.0m	> 24.0m
☑	☑	☐

Recommended Re-use[1]

Low (< 5)	Medium (5-10)	High (>10)
☐	☑	☐

Installation Equipment[2]

Vibrohammer	Impact Hammer	Drop Hammer
☑	☑	☐

Maximum internal corner angle[3]: 10 °

Maximum external corner angle[3]: 10 °

COMMENTS AND NOTES

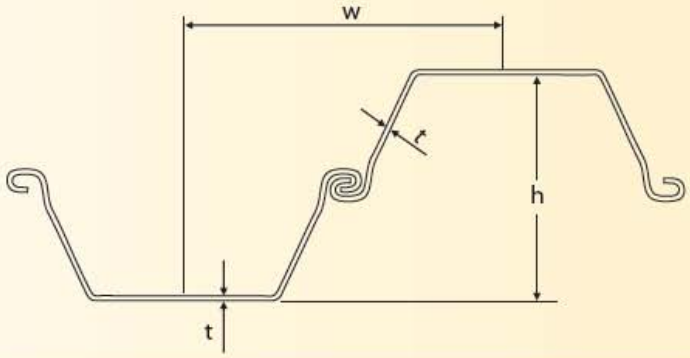
1. Actual re-use will be determined by pile length and driving conditions.
2. For selection of correct equipment it is recommended to contact ESC or the piling equipment supplier.
3. Angle refers to deviation off straight driving line. Use corner pile if required angle exceeds allowance.
4. Interlocks suitable for sealing with bitumen or epoxy sealant prior to pile installation.

INTERLOCK TYPE

BALL JOINT

ESC CR SHEET PILES

Robust and compact piles suitable for hard driving and high re-use situations. Ubiquitous design makes the CR piles suitable for most applications. Cold rolling manufacturing process allows swift response and quick deliveries.



Section	Dimension			Mass		Section Area		Elastic Section Modulus	Moment Of Inertia
	w	h	t	Single	Per m of Wall	Single	Per m of Wall	Per m of Wall	Per m of Wall
	mm	mm	mm	kg/m	kg/m^2	cm^2	cm^2/m	cm^3/m	cm^4/m
ESC-CR11-575	575	360	8.0	59.8	104.0	76.2	132.5	1094	19684
ESC-CR11-600	600	360	8.0	61.7	102.8	78.6	131.0	1106	19910
ESC-CR12-575	575	360	9.0	67.1	116.7	85.5	148.7	1221	21978
ESC-CR12-600	600	360	9.0	69.0	115.0	87.9	146.5	1234	22220
ESC-CR13-575	575	360	10.0	74.5	129.5	94.8	164.9	1346	24220
ESC-CR13-600	600	360	10.0	76.7	127.9	97.7	162.9	1361	24490
ESC-CR20-650	650	540	8.0	77.0	118.5	98.1	151.0	2060	55640
ESC-CR23-650	650	540	9.0	86.2	132.6	109.8	168.9	2310	62390
ESC-CR25-650	650	540	10.0	95.5	146.9	121.7	187.2	2560	69090

NOTES:

CR piles available in steel grade MDB350, a specific cold rolling steel with a yield strength of 350 N/mm^2.

For assistance in selecting the correct sheet pile for your application, please contact one of our representatives. Sheet pile specification sheets are to be used by experienced designers.

ESC CR SERIES SHEET PILES

DESCRIPTION: The CR pile profile is a fully interlocking medium gauge sheet pile with conventional rolled clutches. Short panels and heavy walls suit multiple re-uses. Nominal width 575mm to 650mm.

This pile is best suited for — Temporary Works ☑ — Permanent Works ☐

FIELDS OF APPLICATION	Not Suited	Suitable	Recommended
Cofferdams (land)	☐	☐	☑
Cofferdams (water)[4]	☐	☑	☐
Low Embankments	☐	☑	☐
Deep Excavation	☐	☑	☐
Shallow Excavation	☐	☐	☑
Light Marine	☐	☐	☑
Heavy Marine	☐	☑	☐
Ground Water Control[4]	☑	☐	☐
Axial Loading	☐	☑	☐
High Cantilever Walls	☑	☐	☐

DESIGN CODE: EN 1993-5 : 2007

INSTALLATION PARAMETERS

Optimal Soil Conditions: Soft / Loose ☑ Medium / Firm ☑ Hard / Dense ☑

Recommended Installation Lengths: < 12.0m ☑ 12.0m - 24.0m ☑ > 24.0m ☑

Recommended Re-use[1]: Low (< 5) ☐ Medium (5-10) ☐ High (>10) ☑

Installation Equipment[2]: Vibrohammer ☑ Impact Hammer ☑ Drop Hammer ☑

Maximum internal corner angle[3]: 15 °

Maximum external corner angle[3]: 15 °

COMMENTS AND NOTES

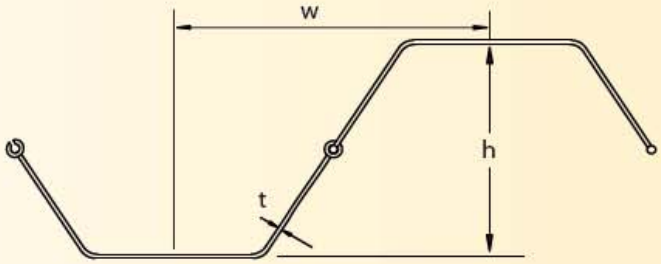
1. Actual re-use will be determined by pile length and driving conditions.
2. For selection of correct equipment it is recommended to contact ESC or the piling equipment supplier.
3. Angle refers to deviation off straight driving line. Use corner pile if required angle exceeds allowance.
4. Interlocks suitable for sealing with bitumen or epoxy sealant prior to pile installation.

INTERLOCK TYPE

ROLLED

ESC U SHEET PILES

Tough and efficient, the cold formed U series is designed to cater for contractors and clients who require a smaller section for projects. Suitable for hard driving conditions, these piles are designed to mirror the conventional hot rolled sheet piles and provide the end user with a familiar profile to permanent and temporary works.

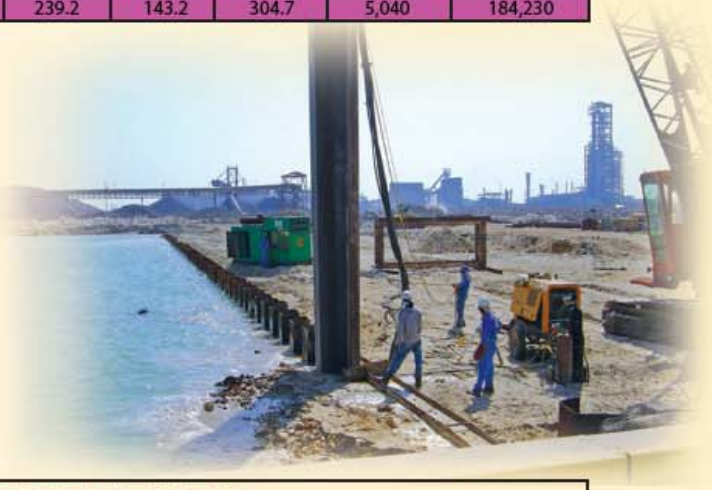


Section	Class	Dimension			Coating Area	Mass		Section Area		Elastic Section Modulus	Moment Of Inertia
		w	h	t		Single	Per m	Single	Per m	Per m	Per m
		mm	mm	mm	$m^2/m/m$	kg/m	kg/m^2	cm^2	cm^2/m	cm^3/m	cm^4/m
ESC 6U	2	535	258	6.5	2.61	38.7	72.3	49.3	92.1	600	7,690
ESC 9U	2	450	341	6.5	3.10	38.7	86.1	49.4	109.7	900	15,280
ESC 12U	2	595	426	8.0	2.91	58.2	97.8	74.1	124.6	900	25,480
ESC 15U	2	525	495	8.0	3.30	58.2	110.9	74.2	141.3	1,500	36,980
ESC 16U	2	750	453	10.0	2.77	88.9	118.5	113.2	151.0	1,610	36,550
ESC 18U	2	470	498	8.0	3.68	58.2	123.8	74.1	157.7	1,800	44,750
ESC 18U-2	2	710	511	10.0	2.93	88.9	125.2	113.2	159.5	1,800	46,540
ESC 20U	2	675	542	10.0	3.08	88.9	131.7	113.2	167.8	2,000	54,090
ESC 25U	2	590	579	10.0	3.52	88.9	150.6	113.2	191.8	2,510	73,800
ESC 25U-2	2	765	587	12.0	2.98	112.5	146.9	143.2	187.1	2,510	73,790
ESC 32U	2	670	636	12.0	3.40	112.5	168.0	143.4	214.0	3,200	101,670
ESC 38U	2	590	684	12.0	3.86	112.5	190.6	143.3	242.8	3,820	130,760
ESC 45U	2	515	724	12.0	4.42	112.5	218.3	143.2	278.1	4,530	163,980
ESC 50U	2	470	731	12.0	4.85	112.5	239.2	143.2	304.7	5,040	184,230

NOTES:

Sheet piles are commonly provided in steel grades complying with S275 and S355. Other grades such as Q345B, Q390B, X56, X65 and A690 are available and can be specified.

Sheet pile specification sheets are to be used by experienced designers. It is recommended that users refer to ESC for free assistance in correct sheet pile selection.



ESC U SERIES SHEET PILES

DESCRIPTION: The U pile profile is a fully interlocking light to heavy gauge sheet pile, fitted with a ball joint clutch mechanism. Nominal width 450mm to 765mm.

This pile is best suited for — Temporary Works ✓ — Permanent Works ✓

FIELDS OF APPLICATION	Not Suited	Suitable	Recommended
Cofferdams (land)	☐	☐	✓
Cofferdams (water)[4]	☐	✓	☐
Low Embankments	☐	✓	☐
Deep Excavation	☐	☐	✓
Shallow Excavation	☐	☐	✓
Light Marine	☐	☐	✓
Heavy Marine	☐	✓	☐
Ground Water Control[4]	☐	✓	☐
Axial Loading	☐	✓	☐
High Cantilever Walls	✓	☐	☐

DESIGN CODE: EN 1993-5 : 2007

INSTALLATION PARAMETERS

Optimal Soil Conditions: Soft / Loose ✓ — Medium / Firm ✓ — Hard / Dense ✓

Recommended Installation Lengths: < 12.0m ✓ — 12.0m - 24.0m ✓ — > 24.0m ✓

Recommended Re-use[1]: Low (< 5) ☐ — Medium (5-10) ☐ — High (>10) ✓

Installation Equipment[2]: Vibrohammer ✓ — Impact Hammer ✓ — Drop Hammer ✓

Maximum internal corner angle[3]: 6°

Maximum external corner angle[3]: 6°

COMMENTS AND NOTES

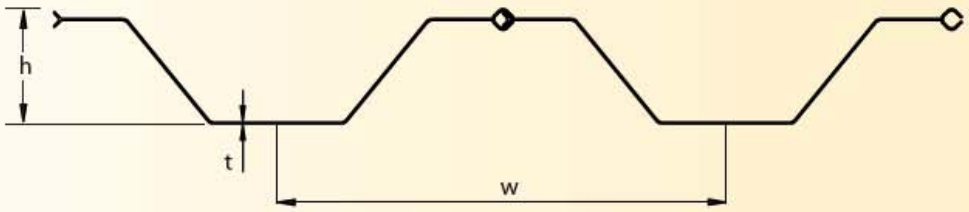
1. Actual re-use will be determined by pile length and driving conditions.
2. For selection of correct equipment it is recommended to contact ESC or the piling equipment supplier.
3. Angle refers to deviation off straight driving line. Use corner pile if required angle exceeds allowance.
4. Interlocks suitable for sealing with bitumen or epoxy sealant prior to pile installation.

INTERLOCK TYPE

BALL JOINT

ESC BP SHEET PILES

Designed with an open clutch suitable for post installation grout sealing, the BP pile is ideal for de-watering works, groundwater cutoff walls and pollution control situations. This pile with its light weight, wide profile and minimal clutches also provides an attractive commercial proposition for retaining walls and other applications.



Section	Class	Dimensions			Coating Area	Section Area	Mass		Elastic Section Modulus	Moment of Inertia	Radius Of Gyration
		w	h	t							
		mm	mm	mm	$m^2/m/m$	cm^2/m	kg/m	kg/m^2	cm^3/m	cm^4/m	cm
ESC-8BP	3	1300	362	6.00	2.63	81.9	83.6	64.3	800	14920	13.50
ESC-12BP	3	1530	406	8.00	2.63	104.9	125.9	82.3	1230	25200	15.50
ESC-15BP	3	1560	404	10.00	2.64	131.6	161.2	103.3	1520	30580	15.20
ESC-18BP	3	1570	411	12.00	2.66	160.1	197.3	125.7	1840	37710	15.30

NOTES:

Sheet piles are commonly provided in steel grades complying with S275 and S355. Other grades such as Q345B, Q390B, X56, X65 and A690 are available and can be specified.

Sheet pile specification sheets are to be used by experienced designers. It is recommended that users refer to ESC for free assistance in correct sheet pile selection.

ESC BP SERIES SHEET PILES

DESCRIPTION: The BP pile profile is a fully interlocking light to medium gauge sheet pile, fitted with a box joint clutch mechanism. Designed for post installation grout sealing. Nominal width 1350mm to 1570mm.

This pile is best suited for — Temporary Works ☑ — Permanent Works ☑

FIELDS OF APPLICATION	Not Suited	Suitable	Recommended
Cofferdams (land)	☐	☑	☐
Cofferdams (water)[4]	☐	☐	☑
Low Embankments	☐	☑	☐
Deep Excavation	☑	☐	☐
Shallow Excavation	☐	☑	☐
Light Marine	☐	☐	☑
Heavy Marine	☑	☐	☐
Ground Water Control[4,5]	☐	☐	☑
Axial Loading	☑	☐	☐
High Cantilever Walls	☑	☐	☐

DESIGN CODE: EN 1993-5 : 2007

INSTALLATION PARAMETERS

Optimal Soil Conditions
- Soft / Loose ☑ — Medium / Firm ☑ — Hard / Dense ☐

Recommended Installation Lengths
- < 12.0m ☑ — 12.0m - 24.0m ☑ — > 24.0m ☑

Recommended Re-use[1]
- Low (< 5) ☑ — Medium (5-10) ☐ — High (>10) ☐

Installation Equipment[2]
- Vibrohammer ☑ — Impact Hammer ☐ — Drop Hammer ☐

Maximum internal corner angle[3]: 12°

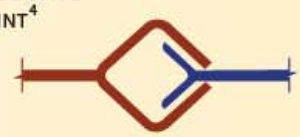
Maximum external corner angle[3]: 12°

COMMENTS AND NOTES

1. Actual re-use will be determined by pile length and driving conditions.
2. For selection of correct equipment it is recommended to contact ESC or the piling equipment supplier.
3. Angle refers to deviation off straight driving line. Use corner pile if required angle exceeds allowance.
4. Box clutch designed to provide open void suitable for application of sealing grout.
5. Clutch system specifically designed for containment of polluted ground water.

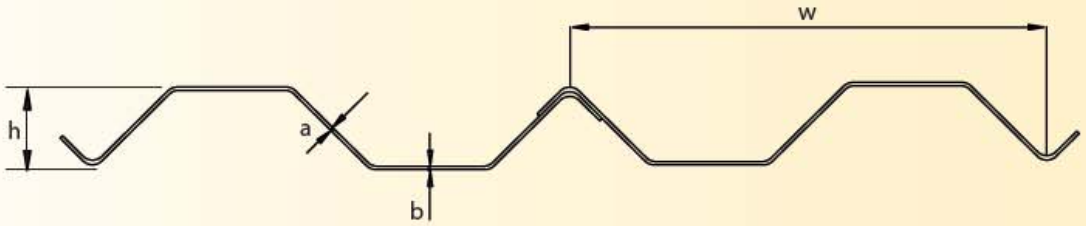
INTERLOCK TYPE

BOX JOINT[4]



ESC TRENCH PILES

Extremely popular for shallow trenches or similar excavations. These piles are cost effective and simple to use. The design of the profile allows the thin sections to be re-used several times and provide the end user with safe and tidy excavations time and again.



Section	Unit Width w	Dimensions			Sectional Area Per wall Length	Unit Weight Per wall Width	Coating Area Both Sides Per wall Width	Moment of Inertia Per wall Width	Modulus of Section Per wall Width
		a	b	h					
	m	mm	mm	mm	cm^2/m	kg/m^2	m^2/m	cm^4/m	cm^3/m
ESCT2	0.88	4.0	4.0	152.0	54.5	42.82	2.727	1,630	215
ESCT3	0.88	6.0	6.0	154.0	81.8	64.23	2.727	2,440	315
ESCT4	0.88	8.0	8.0	156.0	85.6	82.64	2.727	3,240	415

NOTES:

Sheet piles are commonly provided in steel grades complying with S275 and S355. Other grades such as Q345B, Q390B, X56, X65 and A690 are available and can be specified.

Sheet pile specification sheets are to be used by experienced designers. It is recommended that users refer to ESC for free assistance in correct sheet pile selection.

ESC TRENCH SERIES SHEET PILES

DESCRIPTION: The TRENCH pile profile is a light weight trench sheet with a simple overlap connection. Designed for fast re-uses with low strength requirements such as pipeline installation. Nominal width 880mm.

This pile is best suited for — Temporary Works ☑ — Permanent Works ☐

FIELDS OF APPLICATION	Not Suited	Suitable	Recom-mended
Cofferdams (land)	☐	☑	☐
Cofferdams (water)	☑	☐	☐
Low Embankments	☐	☑	☐
Deep Excavation	☑	☐	☐
Shallow Excavation	☐	☐	☑
Light Marine	☐	☑	☐
Heavy Marine	☑	☐	☐
Ground Water Control	☑	☐	☐
Axial Loading	☑	☐	☐
High Cantilever Walls	☑	☐	☐

DESIGN CODE: EN 1993-5 : 2007

INSTALLATION PARAMETERS

Optimal Soil Conditions: Soft / Loose ☑ — Medium / Firm ☐ — Hard / Dense ☐

Recommended Installation Lengths: < 12.0m ☑ — 12.0m - 24.0m ☐ — > 24.0m ☐

Recommended Re-use[1]: Low (< 5) ☐ — Medium (5-10) ☑ — High (>10) ☐

Installation Equipment[2]: Vibrohammer ☑ — Impact Hammer ☐ — Drop Hammer ☐

Maximum internal corner angle[3]: 15°

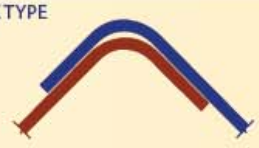
Maximum external corner angle[3]: 15 °

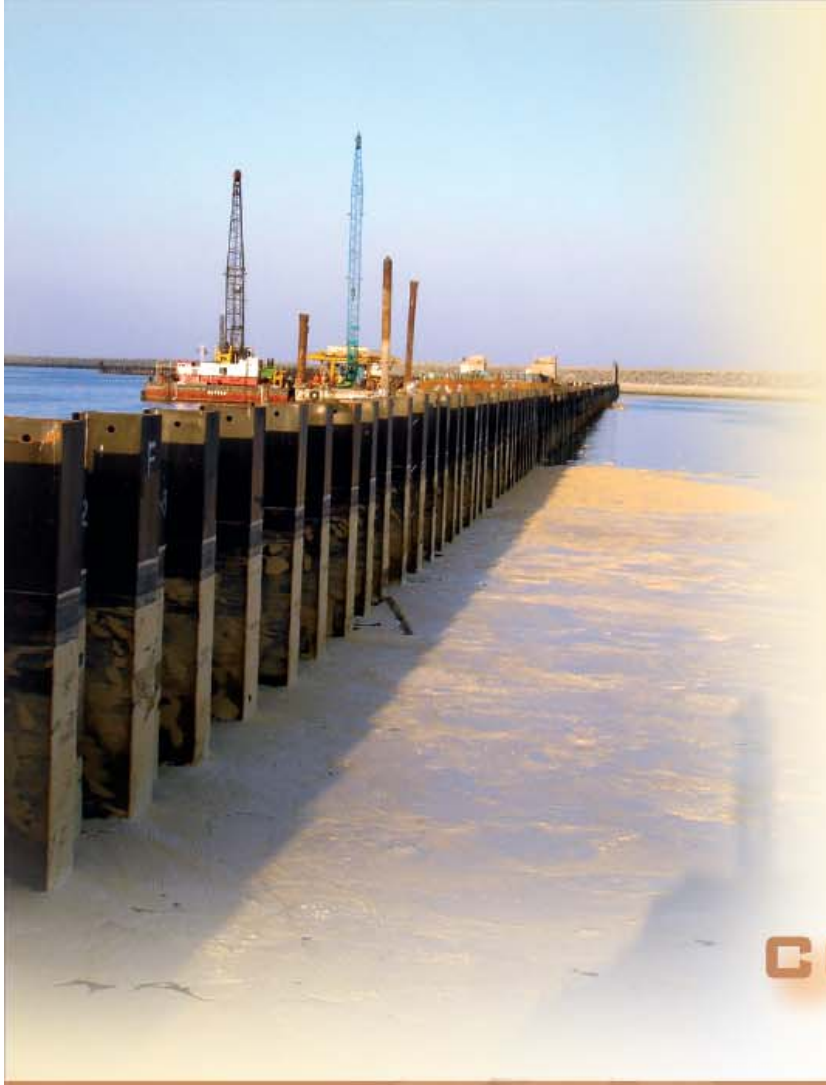
COMMENTS AND NOTES

1. Actual re-use will be determined by pile length and driving conditions.
2. For selection of correct equipment it is recommended to contact ESC or the piling equipment supplier.
3. Angle refers to deviation off straight driving line. Use corner pile if required angle exceeds allowance.

INTERLOCK TYPE

OVERLAP

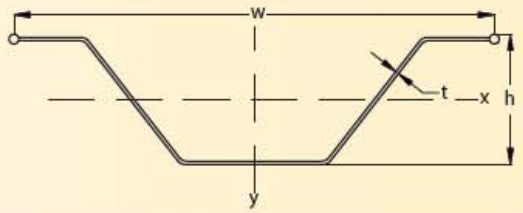




ESC H PILE COMBI WALLS

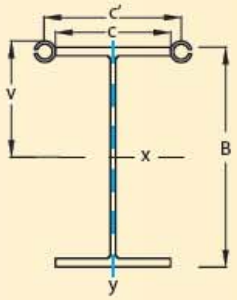
The ESC H Pile system combines cold formed sheet piles with H Piles to produce very high strength walls at economical weights. Most commonly used in marine applications where large spans are common between the sea bed and the anchor support, the high inertia of the system results in low deflection values. Other advantages include increased vertical load bearing capacity, ability to penetrate very hard ground with the H Pile units during installation, high lateral impact resistance, and the option to specify H piles of a different length to the infill sheet piles, providing a more economic design while maintaining stability.

SHEET PILE
UNIT PROPERTIES



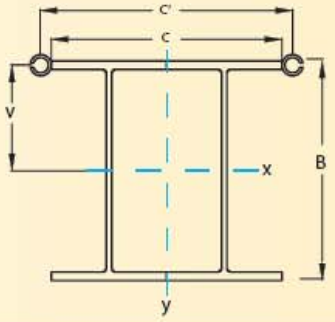
Section	Dimensions			Sectional Area	Unit Weight	Moment of Inertia	Modulus of Section
	t	w	h				
	mm	mm	mm	cm^2	kg/m	cm^4	cm^3
ESC-S8	8	1440	415	156.3	122.7	41,330	1,960
ESC-S10	10	1440	416	192.4	151.0	50,530	2,420
ESC-S12	12	1440	417	228.3	179.2	59,730	2,865

SINGLE H - PILE
UNIT PROPERTIES

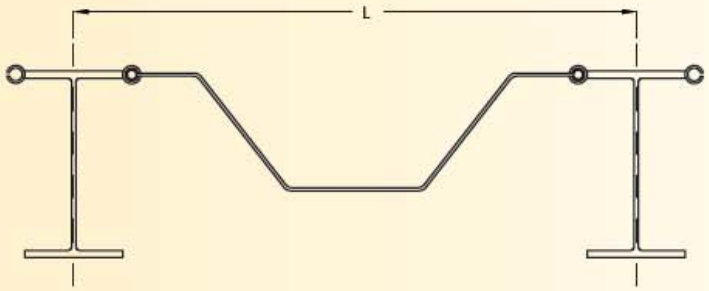


Section	Dimensions				Section Area	Mass	Elastic Section Modulus, Z_x	Moment of Inertia , I_x	Radius of Gyration, r_x
	B	C	C'	v					
	mm	mm	mm	mm	cm^2	kg/m	cm^3	cm^4	cm
H50/20A-1	496	199	259	271	135.5	106.4	1,840	56,840	20.48
H50/20B-1	500	200	260	272	148.4	116.5	2,070	63,380	20.66
H50/20C-1	506	201	261	274	165.6	130.0	2,400	72,725	20.96
H60/30A-1	582	300	360	313	208.8	163.9	3,725	125,660	24.53
H60/30B-1	588	300	360	314	226.8	178.0	4,205	141,660	24.99
H60/30C-1	594	302	362	316	256.7	201.5	4,825	161,610	25.09
H70/30A-1	692	300	360	366	245.7	192.9	5,240	205,800	28.94
H70/30B-1	700	300	360	368	269.8	211.8	6,000	235,750	29.56
H70/30C-1	708	302	362	370	307.9	241.7	6,955	272,430	29.75
H90/40A-1	915	400	460	478	343.6	269.7	10,600	507,400	38.43
H90/40B-1	915	400	460	475	411.2	322.8	12,775	602,430	38.28
H90/40C-1	915	400	460	473	455.2	357.3	15,175	683,685	38.76

DOUBLE H - PILE
UNIT PROPERTIES



Section	Dimensions				Section Area	Mass	Elastic Section Modulus, Z_x	Moment of Inertia , I_x	Radius of Gyration, r_x
	B	C	C'	v					
	mm	mm	mm	mm	cm^2	kg/m	cm^3	cm^4	cm
H50/20A-2	496	398	458	271	236.8	185.9	3,265	100,855	20.64
H50/20B-2	500	400	460	272	262.7	206.2	3,700	113,240	20.76
H50/20C-2	506	402	462	274	296.8	233.0	4,320	131,100	21.02
H60/30A-2	582	600	660	313	383.2	300.8	6,830	230,410	24.52
H60/30B-2	588	600	660	314	419.2	329.1	7,770	261,685	24.98
H60/30C-2	594	604	664	316	479.1	376.1	8,970	300,660	25.05
H70/30A-2	692	600	660	366	457.3	359.0	9,700	380,710	28.85
H70/30B-2	700	600	660	368	505.2	396.6	11,190	439,550	29.50
H70/30C-2	708	604	664	370	581.7	456.3	13,060	511,640	29.66
H90/40A-2	915	800	860	478	634.8	498.3	19,500	910,640	37.88
H90/40B-2	915	800	860	475	767.0	602.1	23,375	1,094,000	37.77
H90/40C-2	915	800	860	473	849.2	666.6	26,510	1,246,000	38.31



COMBINATION ESC H.../... - 1/8

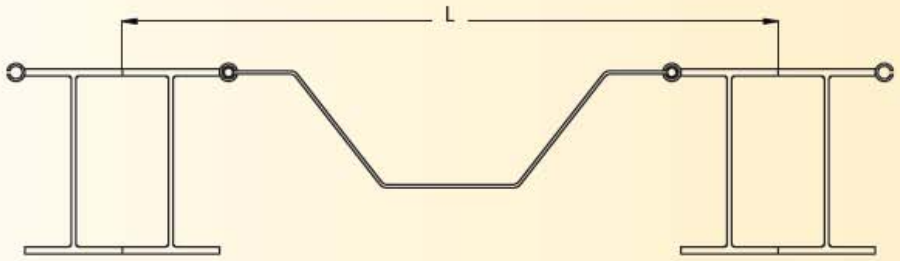
Section	Unit Length L	Properties per metre of wall			Weight Combination		
		Sectional Area	Moment of Inertia, I_x	Section Modulus, Z_x	SP=60%H	SP=75%H	SP=100%H
	m	cm^2/m	cm^4/m	cm^3/m	kg/m^2	kg/m^2	kg/m^2
ESC H50/20A-1/8	1.70	171.7	57,745	1,870	99.6	112.8	134.80
ESC H50/20B-1/8	1.70	179.4	61,595	2,015	105.6	118.8	140.80
ESC H50/20C-1/8	1.70	189.4	67,090	2,210	113.5	126.7	148.70
ESC H60/30A-1/8	1.80	202.8	92,770	2,750	126.0	138.5	159.20
ESC H60/30B-1/8	1.80	212.9	101,665	3,020	133.9	146.3	167.10
ESC H60/30C-1/8	1.80	229.4	112,745	3,365	146.9	159.4	180.10
ESC H70/30A-1/8	1.80	223.4	137,295	3,495	142.1	154.6	175.40
ESC H70/30B-1/8	1.80	236.7	153,930	3,920	152.6	165.1	185.80
ESC H70/30C-1/8	1.80	258.0	174,310	4,450	169.2	181.7	202.50
ESC H90/40A-1/8	1.90	263.1	288,850	6,035	175.1	186.9	206.50
ESC H90/40B-1/8	1.90	302.5	338,820	7,185	203.0	214.8	237.50
ESC H90/40C-1/8	1.90	321.9	381,590	8,215	221.2	233.0	252.70

COMBINATION ESC H.../... - 1/10

Section	Unit Length L	Properties per metre of wall			Weight Combination		
		Sectional Area	Moment of Inertia, I_x	Section Modulus, Z_x	SP=60%H	SP=75%H	SP=100%H
	m	cm^2/m	cm^4/m	cm^3/m	kg/m^2	kg/m^2	kg/m^2
ESC H50/20A-1/10	1.70	192.9	63,050	2,040	109.6	125.3	151.4
ESC H50/20B-1/10	1.70	200.5	67,005	2,190	115.6	131.3	157.4
ESC H50/20C-1/10	1.70	210.6	72,505	2,390	123.4	139.1	165.3
ESC H60/30A-1/10	1.80	222.8	97,880	2,900	135.4	150.2	174.9
ESC H60/30B-1/10	1.80	232.9	106,775	3,170	143.3	158.1	182.8
ESC H60/30C-1/10	1.80	249.4	117,860	3,515	156.3	171.1	195.8
ESC H70/30A-1/10	1.80	243.4	142,405	3,625	151.6	166.4	191.1
ESC H70/30B-1/10	1.80	256.7	159,045	4,050	162.0	177.1	201.5
ESC H70/30C-1/10	1.80	278.3	179,420	4,580	178.7	193.5	218.5
ESC H90/40A-1/10	1.90	282.0	293,645	6,135	184.0	198.0	221.4
ESC H90/40B-1/10	1.90	317.7	343,665	7,290	211.9	226.0	249.4
ESC H90/40C-1/10	1.90	340.8	386,430	8,320	230.1	244.1	267.5

COMBINATION ESC H.../... - 1/12

Section	Unit Length L	Properties per metre of wall			Weight Combination		
		Sectional Area	Moment of Inertia, I_x	Section Modulus, Z_x	SP=60%H	SP=75%H	SP=100%H
	m	cm^2/m	cm^4/m	cm^3/m	kg/m^2	kg/m^2	kg/m^2
ESC H50/20A-1/12	1.70	214.0	68,570	2,220	119.6	137.7	168.0
ESC H50/20B-1/12	1.70	221.7	72,420	2,370	125.5	143.7	174.0
ESC H50/20C-1/12	1.70	231.7	77,935	2,570	133.4	151.7	181.9
ESC H60/30A-1/12	1.80	242.8	102,995	3,050	144.8	162.0	190.6
ESC H60/30B-1/12	1.80	252.9	111,885	3,320	152.7	169.9	198.5
ESC H60/30C-1/12	1.80	269.4	122,970	3,670	165.7	182.9	211.5
ESC H70/30A-1/12	1.80	263.4	147,515	3,755	161.0	178.2	206.8
ESC H70/30B-1/12	1.80	276.7	164,155	4,180	171.4	188.6	217.2
ESC H70/30C-1/12	1.80	298.0	184,530	4,710	188.1	205.3	233.9
ESC H90/40A-1/12	1.90	301.0	298,490	6,235	192.9	209.2	236.3
ESC H90/40B-1/12	1.90	336.7	348,505	7,390	220.9	237.1	264.3
ESC H90/40C-1/12	1.90	359.7	391,270	8,420	239.0	255.3	282.4



COMBINATION ESC H.../... - 2/8

Section	Unit Length L	Properties per metre of wall			Weight Combination		
		Sectional Area	Moment of Inertia, I_x	Section Modulus, Z_x	SP=60%H	SP=75%H	SP=100%H
	m	cm^2/m	cm^4/m	cm^3/m	kg/m^2	kg/m^2	kg/m^2
ESC H50/20A-2/8	1.90	207.0	74,835	2,645	131.0	142.8	162.5
ESC H50/20B-2/8	1.90	220.6	81,350	2,890	141.7	153.5	173.2
ESC H50/20C-2/8	1.90	238.6	90,750	3,230	155.8	167.6	187.3
ESC H60/30A-2/8	2.10	256.9	129,400	4,090	173.2	184.0	201.7
ESC H60/30B-2/8	2.10	274.1	144,295	4,550	186.7	197.4	215.2
ESC H60/30C-2/8	2.10	302.5	162,850	5,130	209.0	219.7	237.5
ESC H70/30A-2/8	2.10	292.2	200,970	5,415	200.9	211.6	229.4
ESC H70/30B-2/8	2.10	315.0	228,990	6,140	218.8	229.5	247.3
ESC H70/30C-2/8	2.10	351.5	263,320	7,040	247.4	258.1	275.9
ESC H90/40A-2/8	2.30	343.9	413,580	8,855	244.1	258.3	270.0
ESC H90/40B-2/8	2.30	401.5	493,300	10,540	289.2	299.0	315.2
ESC H90/40C-2/8	2.30	437.2	559,710	11,910	317.0	327.0	343.2

COMBINATION ESC H.../... - 2/10

Section	Unit Length L	Properties per metre of wall			Weight Combination		
		Sectional Area	Moment of Inertia, I_x	Section Modulus, Z_x	SP=60%H	SP=75%H	SP=100%H
	m	cm^2/m	cm^4/m	cm^3/m	kg/m^2	kg/m^2	kg/m^2
ESC H50/20A-2/10	1.90	225.9	79,580	2,815	139.9	153.9	177.3
ESC H50/20B-2/10	1.90	239.5	86,195	3,060	150.6	164.6	188.0
ESC H50/20C-2/10	1.90	257.5	95,595	3,400	164.7	178.7	202.1
ESC H60/30A-2/10	2.10	274.1	133,780	4,230	181.3	194.0	215.2
ESC H60/30B-2/10	2.10	291.2	148,675	4,685	194.8	207.5	228.6
ESC H60/30C-2/10	2.10	319.7	167,220	5,270	217.1	229.8	251.0
ESC H70/30A-2/10	2.10	309.3	205,350	5,530	209.0	221.7	242.8
ESC H70/30B-2/10	2.10	332.2	233,370	6,260	226.9	239.6	260.8
ESC H70/30C-2/10	2.10	368.5	267,700	7,155	255.4	268.1	289.3
ESC H90/40A-2/10	2.30	359.6	417,900	8,950	251.4	263.0	282.3
ESC H90/40B-2/10	2.30	417.2	497,620	10,630	296.6	308.2	327.5
ESC H90/40C-2/10	2.30	452.9	563,340	11,985	324.6	336.2	355.5

COMBINATION ESC H.../... - 2/12

Section	Unit Length L	Properties per metre of wall			Weight Combination		
		Sectional Area	Moment of Inertia, I_x	Section Modulus, Z_x	SP=60%H	SP=75%H	SP=100%H
	m	cm^2/m	cm^4/m	cm^3/m	kg/m^2	kg/m^2	kg/m^2
ESC H50/20A-2/12	1.90	244.8	84,520	2,990	148.8	165.1	192.2
ESC H50/20B-2/12	1.90	258.5	91,035	3,230	159.5	175.8	202.9
ESC H50/20C-2/12	1.90	276.4	100,450	3,575	173.6	189.9	217.0
ESC H60/30A-2/12	2.10	291.2	138,160	4,370	189.4	204.1	228.6
ESC H60/30B-2/12	2.10	308.4	153,055	4,825	202.8	217.6	242.1
ESC H60/30C-2/12	2.10	336.8	171,615	5,405	225.2	239.9	264.4
ESC H70/30A-2/12	2.10	326.5	209,735	5,650	217.0	231.8	256.3
ESC H70/30B-2/12	2.10	349.3	237,750	6,375	235.0	249.7	274.2
ESC H70/30C-2/12	2.10	385.7	272,080	7,275	263.5	278.2	302.8
ESC H90/40A-2/12	2.30	375.3	421,900	9,035	258.8	272.2	294.6
ESC H90/40B-2/12	2.30	432.7	504,620	10,715	304.0	317.4	339.7
ESC H90/40C-2/12	2.30	468.5	567,710	12,080	332.0	345.5	367.8

ESC H PILE COMBI SHEET PILES

DESCRIPTION: The H PILE COMBI WALL is a heavy duty H kingpile interlocked with a light sheet pile infill. High strength wall with suitable for use as a foundation for axial loads. Nominal width 1700mm to 2300mm.

This pile is best suited for — Temporary Works ☐ — Permanent Works ☑

FIELDS OF APPLICATION	Not Suited	Suitable	Recommended
Cofferdams (land)	☐	☑	☐
Cofferdams (water)	☐	☑	☐
Low Embankments	☑	☐	☐
Deep Excavation	☐	☐	☑
Shallow Excavation	☑	☐	☐
Light Marine	☐	☑	☐
Heavy Marine	☐	☐	☑
Ground Water Control	☐	☑	☐
Axial Loading	☐	☐	☑
High Cantilever Walls	☐	☐	☑

DESIGN CODE: EN 1993-5 : 2007

INSTALLATION PARAMETERS

Optimal Soil Conditions

Soft / Loose	Medium / Firm	Hard / Dense
☑	☑	☑

Recommended Installation Lengths[4]

< 12.0m	12.0m - 24.0m	> 24.0m
☑	☑	☑

Recommended Re-use[1]

Low (< 5)	Medium (5-10)	High (>10)
☑	☐	☐

Installation Equipment[2]

Vibrohammer	Impact Hammer	Drop Hammer
☑	☑	☑

Maximum internal corner angle[3]:	10 °
Maximum external corner angle[3]:	10 °

COMMENTS AND NOTES

1. Actual re-use will be determined by pile length and driving conditions.
2. For selection of correct equipment it is recommended to contact ESC or the piling equipment supplier.
3. Angle refers to deviation off straight driving line. Use corner pile if required angle exceeds allowance.
4. H pile and sheet pile infill may be different lengths.

INTERLOCK TYPE

BALL JOINT

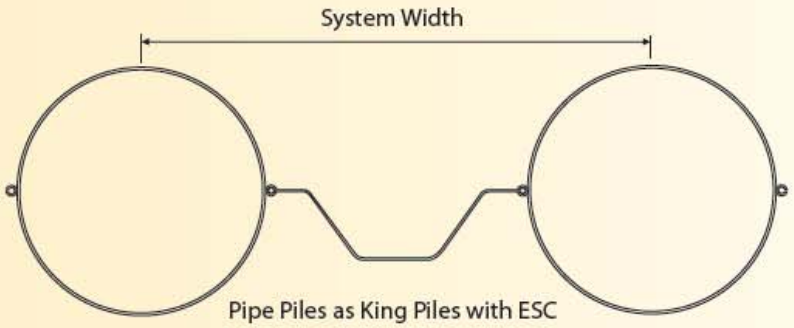
NOTES:

Sheet piles are commonly provided in steel grades complying with S275 and S355. Other grades such as Q345B, Q390B, X56, X65 and A690 are available and can be specified.

Sheet pile specification sheets are to be used by experienced designers. It is recommended that users refer to ESC for free assistance in correct sheet pile selection.

ESC TUBULAR COMBI WALLS

The tubular combi wall system combines welded tubular sections with cold formed sheet pile infills. A very high strength, high inertia system. It is suited particurlarly to marine works, especially those incorporating large vertical loads on the sheet pile wall.



Pipe Piles as King Piles with ESC S10 Sheet Piles threading into C60 Clutch Connections

Pipe Pile System	Properties of Pipe Pile				Properties of Combined Wall					
	Outside Diameter mm	Wall Thickness mm	Pile Weight kg/m	Radius of Gyration cm	System Width m	System Inertia I_x cm^4/m	Section Modulus Z_x cm^3/m	Weight (S Pile Length / Pile Length) 100% kg/m^2	Weight (S Pile Length / Pile Length) 80% kg/m^2	Cross Sectional Area cm^2/m
PS 813-10.0/10	813.0	10.0	225.0	26.7	2.31	109,960	2,705	162.7	147.4	207.3
PS 813-12.5/10	813.0	12.5	274.0	26.9	2.31	130,950	3,220	184.0	168.6	234.4
PS 813-14.2/10	813.0	14.2	317.0	27.0	2.31	145,000	3,570	198.2	182.8	252.5
PS 914-10.0/10	914.0	10.0	250.0	30.2	2.41	141,405	3,095	166.4	151.6	212.0
PS 914-12.5/10	914.0	12.5	305.0	30.5	2.41	170,270	3,725	189.2	174.4	241.0
PS 914-14.2/10	914.0	14.2	342.0	30.6	2.41	189,620	4,150	204.5	189.8	260.5
PS 1016-10.0/10	1016.0	10.0	275.0	33.8	2.52	178,765	3,520	169.0	154.9	215.3
PS 1016-12.5/10	1016.0	12.5	336.0	34.1	2.52	216,970	4,270	193.2	179.1	246.1
PS 1016-14.2/10	1016.0	14.2	378.0	34.2	2.52	242,620	4,775	209.9	195.8	267.4
PS 1220-10.0/10	1220.0	10.0	325.0	41.0	2.72	274,405	4,500	175.0	161.9	222.9
PS 1220-12.5/10	1220.0	12.5	399.0	41.3	2.72	336,385	5,515	202.2	189.1	257.6
PS 1220-14.2/10	1220.0	14.2	449.0	41.4	2.72	378,090	6,200	220.6	207.5	281.0
PS 1220-16.0/10	1220.0	16.0	502.0	41.5	2.72	421,860	6,915	240.1	227.0	305.9
PS 1420-10.0/10	1420.0	10.0	375.0	48.0	2.92	394,355	5,555	180.1	167.9	229.4
PS 1420-12.5/10	1420.0	12.5	461.0	48.3	2.92	486,120	6,845	209.6	197.4	267.0
PS 1420-14.2/10	1420.0	14.2	519.0	48.5	2.92	547,960	7,720	229.4	217.3	292.2
PS 1420-16.0/10	1420.0	16.0	581.0	48.5	2.92	612,940	8,630	250.7	238.5	319.4
PS 1420-17.5/10	1420.0	17.5	632.0	48.6	2.92	666,710	9,390	268.1	256.0	341.5
PS 1620-12.5/10	1620.0	12.5	523.0	55.4	3.12	669,805	8,265	216.0	204.6	275.2
PS 1620-14.2/10	1620.0	14.2	589.0	55.5	3.12	756,350	9,340	237.2	225.8	302.2
PS 1620-16.0/10	1620.0	16.0	660.0	55.6	3.12	847,385	10,460	260.0	248.5	331.2
PS 1620-17.2/10	1620.0	17.5	719.0	55.6	3.12	922,775	11,390	278.9	267.4	355.3
PS 1620-20.0/10	1620.0	20.0	816.0	56.7	3.12	1,047,480	12,930	310.0	298.5	394.9
PS 1820-14.2/10	1820.0	14.2	659.0	62.6	3.32	1,004,370	11,035	244.0	233.3	310.8
PS 1820-16.0/10	1820.0	16.0	739.0	62.7	3.32	1,126,440	12,375	268.1	257.4	341.5
PS 1820-17.5/10	1820.0	17.5	805.0	62.7	3.32	1,227,600	13,490	288.0	277.2	366.9
PS 1820-20.0/10	1820.0	20.0	915.0	62.7	3.32	1,395,070	15,330	321.0	310.4	409.0
PS 2020-16.0/10	2020.0	16.0	818.0	69.7	3.52	1,451,060	14,365	275.3	265.2	350.7
PS 2020-17.5/10	2020.0	17.5	891.0	69.8	3.52	1,582,240	15,665	296.0	285.9	377.1
PS 2020-20.0/10	2020.0	20.0	1013.0	69.8	3.52	1,799,560	17,815	330.7	320.6	421.3

NOTES:

Sheet piles are commonly provided in steel grades complying with S275 and S355. Other grades such as Q345B, Q390B, X56, X65 and A690 are available and can be specified.

Specification sheets are to be used by experienced designers. It is recommended that users refer to ESC for free assistance in correct sheet pile selection.

ESC TUBULAR COMBI SHEET PILES

DESCRIPTION: The TUBULAR COMBI WALL is a heavy duty tubular king pile interlocked with a light sheet pile infill, to create a high inertia wall. Very good for walls with high axial loads. Nominal width 2300mm to 3500mm.

This pile is best suited for — Temporary Works ☑ — Permanent Works ☑

FIELDS OF APPLICATION	Not Suited	Suitable	Recommended
Cofferdams (land)	☐	☑	☐
Cofferdams (water)	☐	☑	☐
Low Embankments	☑	☐	☐
Deep Excavation	☐	☐	☑
Shallow Excavation	☑	☐	☐
Light Marine	☐	☑	☐
Heavy Marine	☐	☐	☑
Ground Water Control	☐	☑	☐
Axial Loading	☐	☐	☑
High Cantilever Walls	☐	☐	☑

DESIGN CODE: EN 1993-5 : 2007

INSTALLATION PARAMETERS

Optimal Soil Conditions
- Soft / Loose ☑ — Medium / Firm ☑ — Hard / Dense ☑

Recommended Installation Lengths[4]
- < 12.0m ☑ — 12.0m - 24.0m ☑ — > 24.0m ☑

Recommended Re-use[1]
- Low (< 5) ☑ — Medium (5-10) ☐ — High (>10) ☐

Installation Equipment[2]
- Vibrohammer ☑ — Impact Hammer ☑ — Drop Hammer ☑

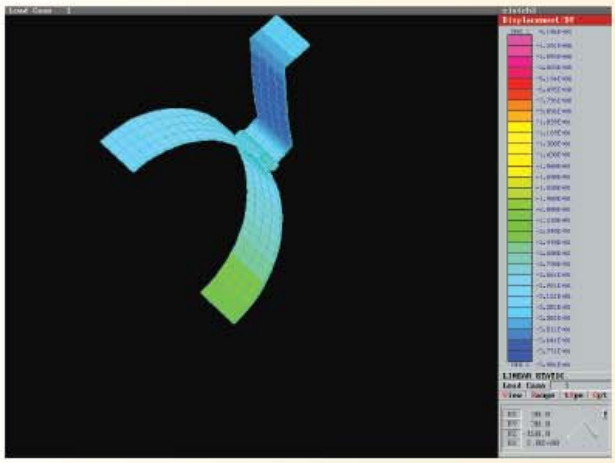
Maximum internal corner angle[3]:	10 °
Maximum external corner angle[3]:	10 °

COMMENTS AND NOTES

1. Actual re-use will be determined by pile length and driving conditions.
2. For selection of correct equipment it is recommended to contact ESC or the piling equipment supplier.
3. Angle refers to deviation off straight driving line. Use corner pile if required angle exceeds allowance.
4. Tubular pile and sheet pile infill may be different lengths.

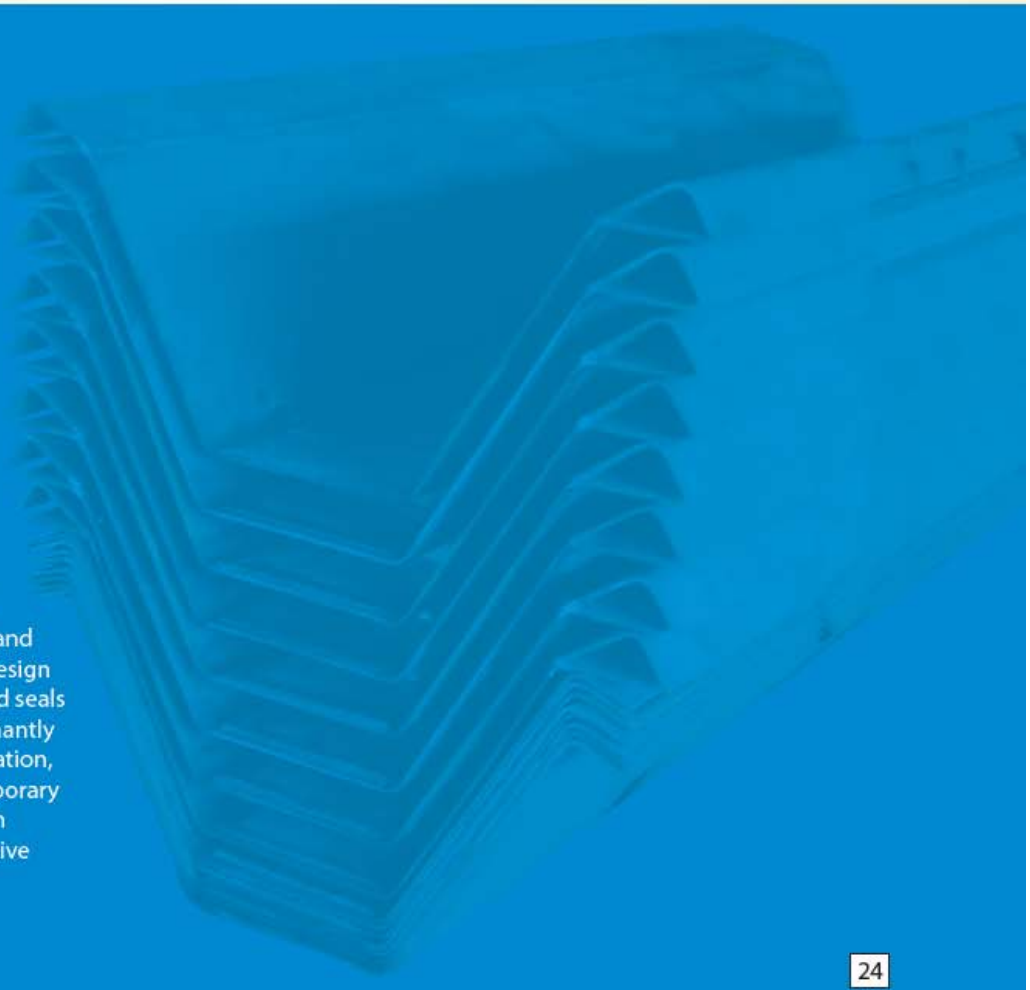
INTERLOCK TYPE

BALL JOINT



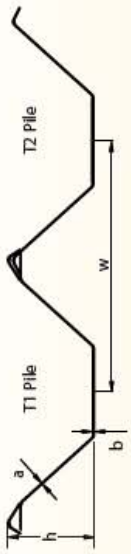
ESC WIDE PROFILE SHEET PILES

A - SERIES
B - SERIES
C - SERIES



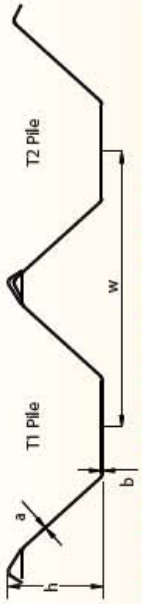
ESC's patented wide profile shape optimizes strength and weight. The unique clutch design allows for easy installation and seals during excavation. Predominantly suited for permanent application, but sometimes used for temporary works. The clutch design provides a smooth, attractive appearance on the finished wall.

A-Series



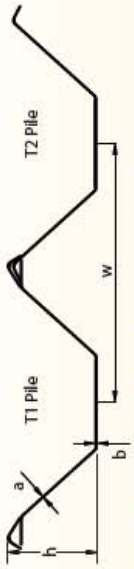
Section	Unit Width w	Dimensions			Sectional Area	Unit Weight	Coating Area Both Sides	Moment of Inertia	Modulus of Section
		a	b	h					
	m	mm	mm	mm	cm^2/m	kg/m^2	m^2/m	cm^4/m	cm^3/m
ESC6A	1.00	4.0	4.0	446.0	68.1	53.0	3.126	17,570	580
ESC8A	0.90	4.0	8.0	366.0	82.2	65.0	3.070	20,680	840
ESC12A	1.10	5.0	9.0	453.0	95.8	75.0	3.029	35,560	1210
ESC14A	1.00	5.0	9.0	483.0	104.8	82.0	3.313	43,110	1430
ESC16A	1.20	6.0	10.0	530.0	114.0	89.0	3.096	55,460	1640
ESC18A	1.00	6.0	12.0	498.0	129.2	101.0	3.326	55,560	1760
ESC20A	1.25	8.0	12.0	520.0	144.6	114.0	2.998	67,650	2000
ESC22A	1.20	8.0	13.0	542.0	153.2	120.0	3.124	76,750	2250
ESC25A	1.50	8.0	14.0	606.0	155.4	122.0	2.988	101,310	2510
ESC30A	1.40	9.0	14.0	637.0	176.4	139.0	3.190	125,020	3060
ESC32A	1.40	10.0	14.0	639.0	189.8	149.0	3.190	133,600	3260
ESC36A	1.60	10.0	16.0	712.0	192.8	152.0	3.116	167,430	3620
ESC40A	1.50	10.0	15.0	763.0	197.8	155.0	3.325	186,920	3990
ESC46A	1.50	12.0	20.0	765.0	246.2	189.0	3.325	227,390	4610
ESC50A	1.50	12.0	24.0	766.0	259.2	203.0	3.327	252,280	5020

B-Series



Section	Unit Width w	Dimensions			Sectional Area	Unit Weight	Coating Area Both Sides	Moment of Inertia	Modulus of Section
		a	b	h					
	m	mm	mm	mm	cm^2/m	kg/m^2	m^2/m	cm^4/m	cm^3/m
ESC6B	0,90	5,0	5,0	367,0	84,1	66,0	3,044	17,160	630
ESC8B	1.15	6.0	6.0	433.0	95.1	75.0	2.896	25,980	840
ESC12B	1,20	6,0	10,0	417,0	104,2	82,0	2.785	33,630	1210
ESC14B	1.10	8.0	8.0	469.0	132.7	104.0	3.036	45,060	1390
ESC16B	1,20	8,0	8,0	544,0	134,4	106,0	3,113	59,010	1600
ESC18B	1,30	8,0	12,0	487,0	139,4	109,0	2,878	59,910	1830
ESC20B	1.15	9.0	9.0	565.0	159.1	125.0	3.254	76,230	2010
ESC22B	1.25	9.0	14.0	523.0	161.9	127.0	2.999	75,360	2250
ESC25B	1.20	9.0	15.0	539.0	173.2	136.0	3.118	86,900	2510
ESC30B	1,15	10,0	16,0	564,0	199,9	157,0	3,269	106,150	3020
ESC32B	1.15	10.0	18.0	560.0	211.2	166.0	3.264	114,800	3280
ESC36B	1.05	10.0	19.0	617.0	225.2	175.0	3.583	133,530	3600
ESC40B	1.40	12.0	18.0	639.0	233.3	183.0	3.191	166,920	4090
ESC46B	1.45	15.0	23.0	642.0	279.4	217.0	3.048	187,470	4600
ESC50B	1.40	15.0	23.0	640.0	293.7	231.0	3.174	207,630	5020
ESC60B	1.50	15.0	23.0	779.0	300.7	236.0	3.339	289,730	6100
ESC70B	1.50	18.0	27.0	777.0	356.9	280.0	3.323	343,070	7170

C-Series



Section	Unit Width w	Dimensions			Sectional Area	Unit Weight	Coating Area Both Sides	Moment of Inertia	Modulus of Section
		a	b	h					
	m	mm	mm	mm	cm^2/m	kg/m^2	m^2/m	cm^4/m	cm^3/m
ESC6C	1.00	6.0	6.0	318.0	91.2	72.0	2.754	14,110	590
ESC8C	1.00	8.0	8.0	302.0	122.1	96.0	2.719	20,530	840
ESC12C	1.15	8.0	8.0	441.0	126.4	100.0	2.897	39,140	1240
ESC14C	1.15	9.0	9.0	434.0	142.2	112.0	2.897	44,360	1410
ESC16C	1.10	9.0	9.0	470.0	149.3	117.0	3.036	52,070	1580
ESC18C	1.20	9.0	9.0	545.0	152.9	120.0	3.126	69,000	1840
ESC20C	1.20	10.0	10.0	551.0	168.4	132.0	3.123	77,150	2070
ESC22C	1.15	10.0	10.0	572.0	175.8	138.0	3.271	85,290	2250
ESC25C	1.25	10.0	16.0	524.0	181.3	142.0	2.994	85,130	2520
ESC30C	1.25	12.0	18.0	539.0	216.3	170.0	3.002	104,010	3010
ESC32C	1.20	12.0	18.0	547.0	224.0	176.0	3.141	110,620	3200
ESC36C	1.20	12.0	24.0	565.0	245.3	191.0	3.143	128,610	3590
ESC40C	1.25	15.0	25.0	531.0	285.9	224.0	3.034	138,730	4070
ESC46C	1.15	15.0	27.0	586.0	309.5	240.0	3.277	167,380	4650
ESC50C	1.10	15.0	27.0	608.0	320.9	252.0	3.420	184,750	5040
ESC60C	1.40	18.0	28.0	638.0	352.3	277.0	3.166	244,810	6990

NOTES:

Sheet piles are commonly provided in steel grades complying with S275 and S355. Other grades such as Q345B, Q390B, X56, X65 and A690 are available and can be specified.

Sheet pile specification sheets are to be used by experienced designers. It is recommended that users refer to ESC for free assistance in correct sheet pile selection.

ESC WIDE PROFILE SERIES SHEET PILES

DESCRIPTION: The WIDE PROFILE series optimizes strength and weight and utilises a unique angle clutch which allows for easy installation yet seals during excavation. The clutch design provides a smooth and pleasing finished wall appearance.

This pile is best suited for — Temporary Works ☐ — Permanent Works ☑

FIELDS OF APPLICATION	Not Suited	Suitable	Recom-mended
Cofferdams (land)	☐	☑	☐
Cofferdams (water)	☑	☐	☐
Low Embankments	☐	☐	☑
Deep Excavation	☐	☑	☐
Shallow Excavation	☐	☐	☑
Light Marine	☐	☑	☐
Heavy Marine	☐	☑	☐
Ground Water Control	☑	☐	☐
Axial Loading	☐	☑	☐
High Cantilever Walls	☐	☑	☐

DESIGN CODE: EN 1993-5 : 2007

INSTALLATION PARAMETERS

Optimal Soil Conditions

Soft / Loose	Medium / Firm	Hard / Dense
☑	☑	☐

Recommended Installation Lengths[4]

< 12.0m	12.0m - 24.0m	> 24.0m
☑	☑	☑

Recommended Re-use[1]

Low (< 5)	Medium (5-10)	High (>10)
☑	☐	☐

Installation Equipment[2]

Vibrohammer	Impact Hammer	Drop Hammer
☑	☑	☐

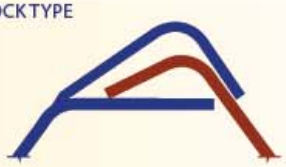
Maximum internal corner angle[3]:	77 °
Maximum external corner angle[3]:	8 °

COMMENTS AND NOTES

1. Actual re-use will be determined by pile length and driving conditions.
2. For selection of correct equipment it is recommended to contact ESC or the piling equipment supplier.
3. Angle refers to deviation off straight driving line. Use corner pile if required angle exceeds allowance.
4. Due to the wide range of pile strengths, driving length should be carefully considered on a project basis.

INTERLOCK TYPE

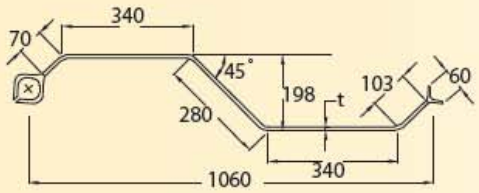
ANGLE



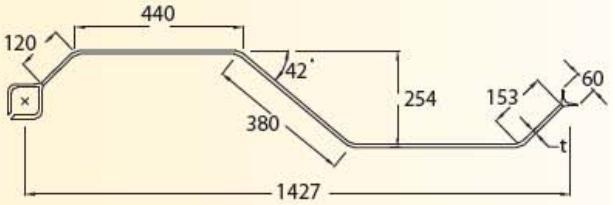
ESC JAGGED WALL AND BOX PILES

The jagged wall and box series are combination piles which can be used to produce very specific pile properties. The jagged wall is a high inertia wall, very suitable for cantilever walls where anchorages are not feasible. The Box pile is a strong axial load bearing pile, suitable for foundation systems.

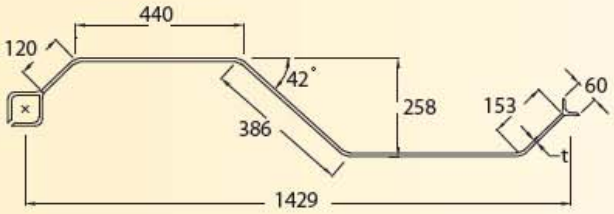
ESC SPECIAL PILES - JAGGED WALL



6 DU-SHEET PILE PROFILE

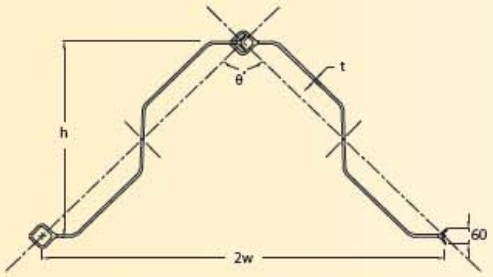


9 DU-SHEET PILE PROFILE

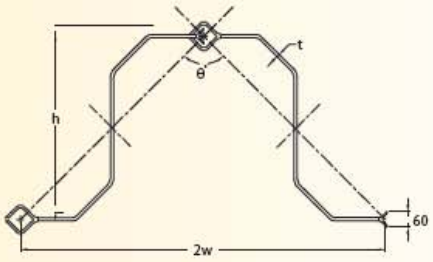


11 DU-SHEET PILE PROFILE

Section	Details of Sizing & Structural Parameters for Normal Configuration					
	Thickness t mm	Coverage w mm	Height h mm	Weight kg/m^2	Moment of Inertia Ixx cm^4/m	Section Modulus Zxx cm^3/m
6 DU	7	1,060	198	74.6	5,800	570
9 DU	9	1,427	254	92.7	12,000	920
11 DU	12	1,429	258	113.7	14,900	1,130

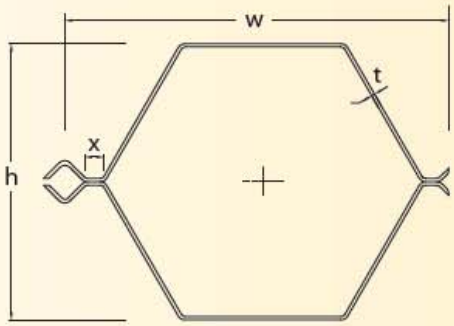


25 JDU-JAGGED WALL PROFILE



40 & 55 JDU-JAGGED WALL PROFILE

Section	Typical Parameters for Jagged Wall Profiles						
	Thickness t mm	Angle (0) –	Coverage w mm	Height h mm	Weight kg/m^2	Moment of Inertia Ixx cm^4/m	Section Modulus Zxx cm^3/m
25 JDU	7	84	1,336	832	118.5	124,700	2,840
		87	1,422	796	111.5	109,600	2,580
		90	1,502	758	105.5	96,100	2,350
		93	1,578	718	100.4	84,100	2,150
40 JDU	9	86	1,910	1,069	138.5	241,100	4,330
		89	2,015	1,017	131.0	211,300	3,940
		92	2,120	963	124.7	184,600	3,590
		95	2,220	906	119.2	160,600	3,280
55 JDU	12	84	1,776	1,110	203.4	376,300	6,510
		87	1,890	1,061	191.3	330,900	5,920
		90	1,996	1,010	181.1	290,600	5,390
		93	2,100	956	172.3	254,400	4,920



Section	Details of Sizing & Structural Parameters						
	Wall Configuration						
	Thickness t mm	X mm	Coverage 2w mm	Height h mm	Weight kg/m²	Moment of Inertia Ixx cm⁴/m	Section Modulus Zxx cm³/m
ESC 40 BOX	9	75	1,345	680	192.3	155,300	4,560
		100	1,370	637	188.8	131,100	4,110
		150	1,420	551	182.1	90,800	3,290
		200	1,470	464	175.9	60,000	2,580
ESC 60 BOX	12	75	1,297	699	265.8	216,800	6,190
		100	1,323	655	260.5	182,900	5,580
		150	1,376	567	250.5	126,800	4,470
		200	1,429	479	241.2	84,600	3,500
ESC 100 BOX	12	75	1,645	1,163	278.3	604,200	10,390
		100	1,670	1,119	274.1	542,500	9,690
		150	1,720	1,033	266.1	433,300	8,390
		200	1,770	946	258.6	341,300	7,210

ESC JAGGED WALL AND BOX SERIES SHEET PILES

DESCRIPTION: The JAGGED WALL and BOX series are combination piles which are used to create customized walls with high inertia and low weight. Specifically designed for high cantilever walls.

This pile is best suited for — Temporary Works ☐ — Permanent Works ☑

FIELDS OF APPLICATION	Not Suited	Suitable	Recommended
Cofferdams (land)	☑	☐	☐
Cofferdams (water)[4]	☐	☑	☐
Low Embankments	☑	☐	☐
Deep Excavation	☐	☑	☐
Shallow Excavation	☐	☑	☐
Light Marine	☐	☑	☐
Heavy Marine	☐	☐	☑
Ground Water Control[4,5]	☐	☑	☐
Axial Loading	☐	☑	☐
High Cantilever Walls	☐	☐	☑

DESIGN CODE: EN 1993-5 : 2007

INSTALLATION PARAMETERS

Optimal Soil Conditions
Soft / Loose ☑ — Medium / Firm ☑ — Hard / Dense ☐

Recommended Installation Lengths
< 12.0m ☑ — 12.0m - 24.0m ☑ — > 24.0m ☑

Recommended Re-use[1]
Low (< 5) ☑ — Medium (5-10) ☐ — High (>10) ☐

Installation Equipment[2]
Vibrohammer ☑ — Impact Hammer ☑ — Drop Hammer ☐

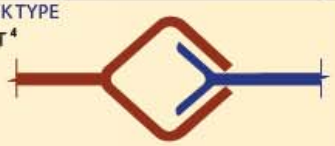
Maximum internal corner angle[3]: 12 °
Maximum external corner angle[3]: 12 °

COMMENTS AND NOTES

1. Actual re-use will be determined by pile length and driving conditions.
2. For selection of correct equipment it is recommended to contact ESC or the piling equipment supplier.
3. Angle refers to deviation off straight driving line. Use corner pile if required angle exceeds allowance.
4. Box clutch designed to provide open void suitable for application of sealing grout.
5. Clutch system specifically designed for containment of polluted ground water.

INTERLOCK TYPE

BOX JOINT[4]



PAINTING, ACCESSORIES AND CORNER PILES

PAINTING

ESC have professional in-house painting facilities that can provide a wide range of coating solutions from light shop primers to heavy duty marine protection systems.

These facilities allow ESC to tailor coatings to suit the Client's requirements. A paint system can be recommended to suit the end use, or ESC can apply coatings to the Client's specification. ESC maintain working relationships with all major paint suppliers, so virtually any paint system and product can be requested and provided.

Pile surfaces are prepared for coating application in accordance with ISO 8503. Thus, depending on requirements, surface preparation could range from a power brush clean-up through to shot blasting to near white standard. After surface preparation, coatings are applied to the piles in accordance ISO 12944. Generally, Clients will specify the required coating performance in accordance with target marine and atmospheric conditions, as well as required durability. With this information, ESC then is able to recommend a conforming coating system.

Blasting and painting are conducted in accordance with the strict conditions specified by the Standards and the Paint Manufacturers. Additional requirements by Clients can also be accommodated. On conclusion of the painting, the Client receives a complete painting report, including QA/QC results of weather recordings, steel temperatures, surface roughness and wet and dry film thickness. Third party verification is also provided by the Paint Manufacturer.

After painting, ESC take extreme care in the packaging and delivery of the piles to protect coated surfaces during transit.

For assistance on paint system specification, please contact ESC and a technician will be able to recommend the correct paint application to suit the project requirements.

HOT DIP GALVANISING

Sheet piles can be Hot Dip Galvanized as either an alternative to painting, or as a base coat to enhance paint systems. The galvanizing process is done in accordance with ISO 1461, and $_2$ coatings are applied to an average thickness of 610 gm unless otherwise specified.

For more information on galvanizing piles, contact ESC and a technician will be available to discuss the options.

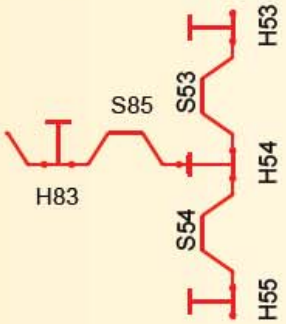
CORNER / JUNCTION PILES

Corner piles can be fabricated for every type of ESC pile. The piles may be ordered based on a general angle specification, or they may be produced to accommodate the exact pile layout of a project.

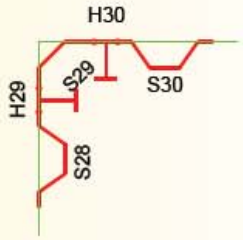
Junction piles are also available, both for connecting ESC sheet piles and for joining an ESC wall to an existing sheet pile wall.

When ESC is provided with details of the driving line, corner piles can be supplied to coincide with the exact dimensions. The Client can be provided then with a schedule and a drawing showing the location of every pile, with the corner piles specifically marked and numbered.

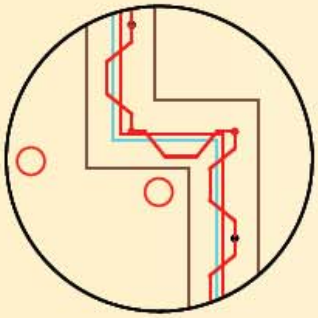
Fabricated CR Corner Pile



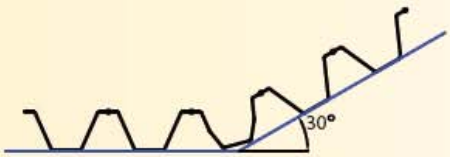
COMBI Wall Junction Pile



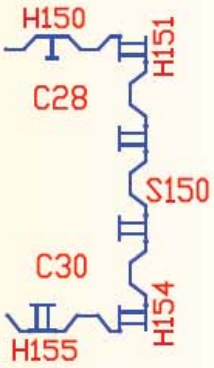
COMBI Wall Corner Pile



BP Corner Piles



EU 30 degree Corner Pile



Double H Combi Corner Piles

Junction Pile Between EU Series and Larssen Type Piles

PILE SHOES

Pile shoes are available to reinforce the tip of the pile during driving into hard ground, or soft soil with obstacles and debris.

Damage to the leading edge of a pile will increase driving resistance, prevent penetration and may result in the pile skewing off the intended driving line. This is particularly true when an impact type driving hammer is being used.

Pile shoes will protect the tip of the pile and reduce the potential for damage to the leading edge.

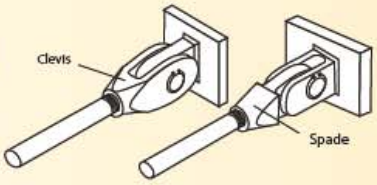
TIE ROD SYSTEMS

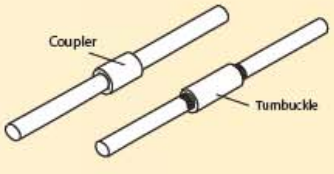
Design: Dextra tie rods and connecting accessories conform to major standards used worldwide, i.e., ANSI/AISC 360-05, BS 5950-2000, AS 4100-1998 and EN 1993 (Euro code).

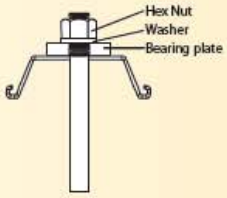
Product range: Smooth bars with threads at both ends are available in 3 different grades (500, 600 and 700MPa) with diameter ranging from 30mm to 90mm. While the fully threaded bars are available in grade 500, 555 and 670MPa with diameter ranging from 32mm to 75mm.

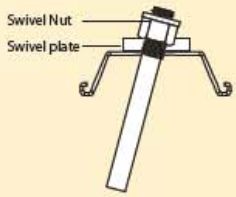
Connecting accessories: Various types of connecting elements are available for different applications.

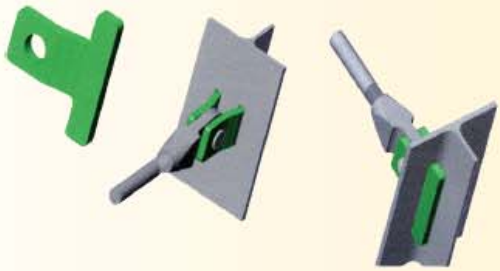
- **Fork and spade clevises:** Pin connections are possible with fork or spade clevises. The use of fork and spade clevis in combination can form articulated joints when needed.
- **Coupler and turnbuckle:** Two bars can be connected using couplers or turnbuckles to achieve longer total length. Turnbuckle can also provide length adjustment of about 100mm.
- **Hexagonal nut and bearing plate:** Bars can be connected to sheet pile or wailing beam by using steel bearing plate, hexagonal nut and washer.
- **Swivel hexagonal nut and swivel bearing plate:** When the rotation is required at bearing plate, swivel hexagonal nut and plate will allow bar rotation of 7 degree of the normal axis.
- **T-plate:** T-plate is specially designed to connect clevis to flange of steel H-beam without welding operation.
- **Special connection:** Other types of connecting element can be manufactured as per customer request.











QUALITY CONTROL AND DOCUMENTATION

CERTIFICATE OF APPROVAL

This is to certify that the Quality Management System of:

Earth Support Company (M) Sdn. Bhd. (353146-T)
Pontian, Johor
Malaysia

has been approved by Lloyd's Register Quality Assurance to the following Quality Management System Standards:

ISO 9001:2000
EN ISO 9001:2000
BS EN ISO 9001:2000
MS ISO 9001:2000

The Quality Management System is applicable to:

Manufacture of cold formed steel sheet piles.

Approval Certificate No: KLR 0404026

Original Approval: 28 November 2003
Current Certificate: 28 November 2006
Certificate Expiry: 27 November 2009

Issued by: Lloyd's Register of Shipping (M) Bhd
for and on behalf of Lloyd's Register Quality Assurance Ltd.

This document is subject to the provision on the reverse

CERTIFICATE OF APPROVAL

This is to certify that the Quality Management System of:

ESC Projects Sdn. Bhd. (368816-K)
Petaling Jaya, Selangor
Malaysia

has been approved by Lloyd's Register Quality Assurance to the following Quality Management System Standards:

ISO 9001:2000
EN ISO 9001:2000
BS EN ISO 9001:2000
MS ISO 9001:2000

The Quality Management System is applicable to:

Design and installation of earth retaining systems and sheet pile systems for construction industry.

Approval Certificate No: KLR 0500424

Original Approval: 28 November 2007
Current Certificate: 28 November 2007
Certificate Expiry: 27 November 2010

Issued by: Lloyd's Register of Shipping (M) Bhd
for and on behalf of Lloyd's Register Quality Assurance Ltd.

This document is subject to the provision on the reverse

MANUFACTURING TOLERANCES

Tolerance	Limits			
Mass	±7%			
Length	±50mm			
Height	h≤200 ±4mm	200<h≤300 ±6mm	300<h≤400 ±8mm	400<h ±10mm
Thickness	5mm = ± 0.29 6mm = ± 0.31	8mm = ± 0.35 9mm = ± 0.40	10mm ± 0.40 12mm ± 0.43	13mm ± 0.46 15mm ± 0.46
Width	± 2%	± 2%	± 2%	± 2%
Width of two Piles	±3%			
Straightness - Bending	< 0.25 % L			
- Curving	< 0.25 % L			
- Twisting	< 2% L but no more than 100mm			
Squareness of Ends	< 2% W			

All Tolerances are as per BS EN 10249-2 : 1996 Cold formed sheet piling of non alloy steels - Part 2. Tolerances on shape and dimensions.

STEEL GRADES AND PARAMETERS

The ESC Group manufacturer sheet piles from hot rolled steel plate or coil. To ensure fast delivery of their custom made piles, ESC purchase steel from various mills depending on availability of the sizes required thus the standards which apply to the steel also vary.

Yield Range MPa	Applicable Standards and Grade				
	BS EN 10025	BS 4360 (BS 1449)	ASTM	DIN 17100	GB/T 1591
250-290	S275JRC	43A (HR43/25)	A36	St 44.2	Q 295 B
320-360	S355JOC	50B (HR50/35)	A572, 50	St 52.3 U	Q 345B

The above grades are ESC's standard grades. Other special grades are available upon request.

CLIENT OPTIONS

At the time of requesting a quotation, clients have the option of specifying requirements for tolerances, testing and inspection which may vary from the standard parameters adopted by ESC. The client is referred to BS EN 10249 for full details on the options available.

MANUFACTURING STANDARDS

Manufacturing and Design Standards

Subject	Standard	Short Title
Design	BS 5950:2001	Structural use of steelwork in building.
	BS EN 1993-5:2007	Design of steel structures – Part 5: Piling.
Manufacturing	BS EN 10219-1&2: 1997	Cold formed welded structural hollow sections of non-alloy and fine grain steel.
	BS EN 10248-1&2: 1996	Hot rolled sheet piling of non alloy steels.
	BS EN 10249-1&2: 1996	Cold formed sheet piling of non alloy steels.
Steel	BS EN 10021: 2006	General technical delivery requirements for steel and iron products.
	BS EN 10025-1:2004	Hot rolled products of structural steels. General technical delivery conditions.
	GB/T 1591:1994	High strength low alloy structural steels.
	ASTM A242: 1989	Standard specification for high strength low alloy structural steel.
	AS/NZS 3678: 1996	Structural steel – hot rolled plates, floor plates and slabs.
	API 5L:2007	Specification for line pipe.
Welding	BS EN 1011-1: 1998	Recommendations for welding of metallic materials. General guidance for arc welding.
	BS EN 29692: 1994	Metal-arc welding with covered electrodes – Joint preparations.
	BS EN 287-1:2004	Qualification test of welders. Fusion welding. Steels.
	BS EN 970: 1997	Non-destructive examination of fusion welds. Visual examination.
	BS EN 1435: 1997	Non-destructive examination of welded joints – Radiographic examination of welded joints
Coatings	ISO 8503:1995	Preparation of steel substrates before application of paints and related products.
	ISO12944: 1998	Paints and varnishes – Corrosion protection of steel structures by protective paint systems.
	ISO 1461: 1999	Hot dip galvanized coatings on fabricated iron and steel articles. Specifications and test methods.

The above list of National and International Standards represents the principle standards used by ESC Group in the specification of design, materials and products. If required by the Client, ESC are able to produce sheet piles and related products to comply with virtually any standard.

ESC SHEET PILE PURCHASING OPTIONS

As set out in the following standards, the purchaser has several options available when placing an order for Cold Formed Sheet Piles.

BS EN 10249 - 1 Cold formed sheet piling of non-alloy steels. Part 1. Technical delivery conditions.

BS EN 10249 - 2 Cold formed sheet piling of non-alloy steels. Part 2. Tolerances on shape and dimensions.

PURCHASE OPTIONS:

1. **Steel Specifications:** The standard steel specifications are S235JRC, Q235B, S275JRC, Q345B, S355JOC or Q390B. However at the purchasers request, any steel specification may be used provided it can be defined by EN 10025, prEN 10111, EN 10113: Part 2 to Part 3 or prEN 10149: Part 2 to Part 3.
2. **Manufacturing Process:** If a specific manufacturing process is required it should be specified at the time of inquiry.
3. **Delivery Condition:** If an alternative condition to cold formed is required it should be specified at the time of inquiry.
4. **Hot Dip Zinc Coating:** If hot dip zinc coating is required or there is a requirement for the material to be suitable for hot dip zinc coating it should be specified at the time of inquiry.
5. **Inspection and Testing:** ESC follow all inspection and testing requirements of the above mentioned standards. Should special testing be required the following should be specified at the time of inquiry: Type of inspection / Testing required / Frequency of inspection / Testing documentation required.
6. **Determination of Chemical Composition and Mechanical Properties on Finished Products:** ESC randomly test feedstock materials to ensure compliance to the steel specifications. Should determination of the chemical composition and mechanical properties on the finished products be required it should be specified at the time of inquiry.
7. **Results of Feedstock Material Tests:** At the request of the purchaser ESC will furnish the results of the third party feedstock material tests for any given batch of finished product.
8. **Inspection at ESC's Premises:** At the request of the purchaser ESC will arrange and provide assistance to allow the purchaser to carry out inspection at our premises.
9. **Marking:** Should marking other than ESC's standard marking (shown to the right) be required, it should be specified at the time of inquiry of purchase.
10. **Tolerances:** Should it be required, a reduction in the tolerances specified in the standards maybe specified at the time of inquiry or purchase. The parameters available for reduced tolerance are as follows:
    Length of Profile
    Flange Angle
    Mass of Profiles (Actual vs. Calculated)

ESC PILE

SERIAL NO.:

COLD FORMED SHEET PILING

ESC- EN 10249-S J C

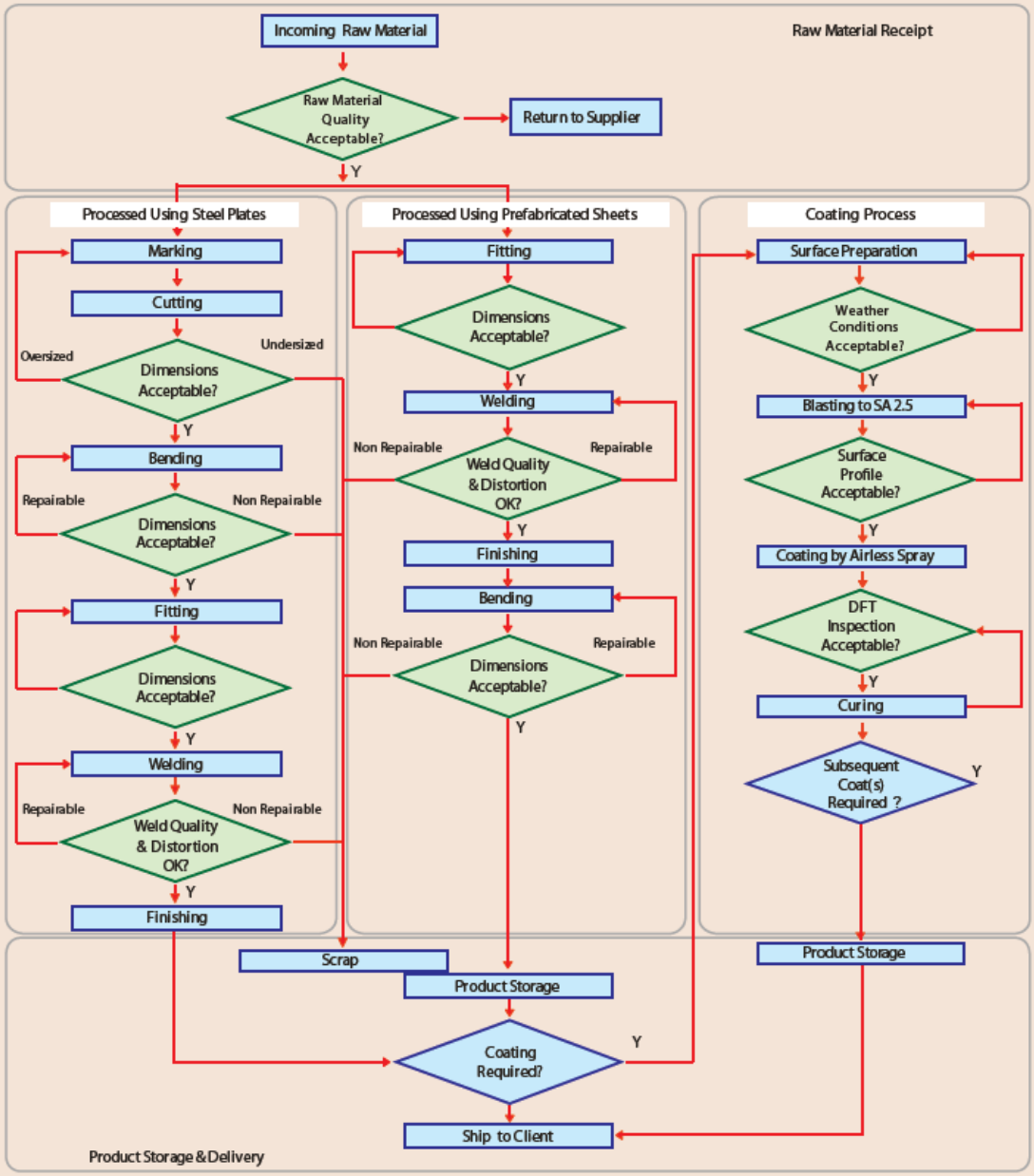
Date of Manufacture:

Job No.:

Pile Length: m

Pile Type: T

ISO9001 : 2000 Certified By Lloyd's Register Quality Assurance Certification No. 404026



ESC provides QA documentation including but not restricted to:

1. Manufacturing Planning Schedule (MPS)
2. Inspection and Test Plan (ITP)
3. Welding Procedure Qualification Records (WPQR's)
4. Welding Procedure Specifications (WPS)

PROCESS INSPECTION AND TESTING

1. Raw Materials Inspection: All raw materials are inspected upon receipt for dimension, physical condition, quantity according to delivery documents and material mill certificates. Mill certificates are verified to ensure that mechanical and chemical properties comply with material specifications with random material samples verified in 3rd party laboratory analysis to ensure accuracy of mill certificates.

2. Confirmation of Dimensions: After each of the cutting, bending and fitting processes, dimensional checks are made to ensure the quality of the finished product. Non-complying materials are reprocessed or rejected depending on the nature and extent of the non-compliance.

3. Welding and Final Dimension Inspection: All welding is 100% visually inspected in accordance with ESC's welding quality procedure and the dimensions are checked against BS EN 10249-2 : 1996.

Measuring Equipment: All measuring equipment used to check the dimensions of the products are calibrated according to manufacturers specifications.

Detailed Inspection and Test Procedures (ITP) are available on request.

HEAD QUARTERS

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ESC Piling (M) Sdn. Bhd.
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