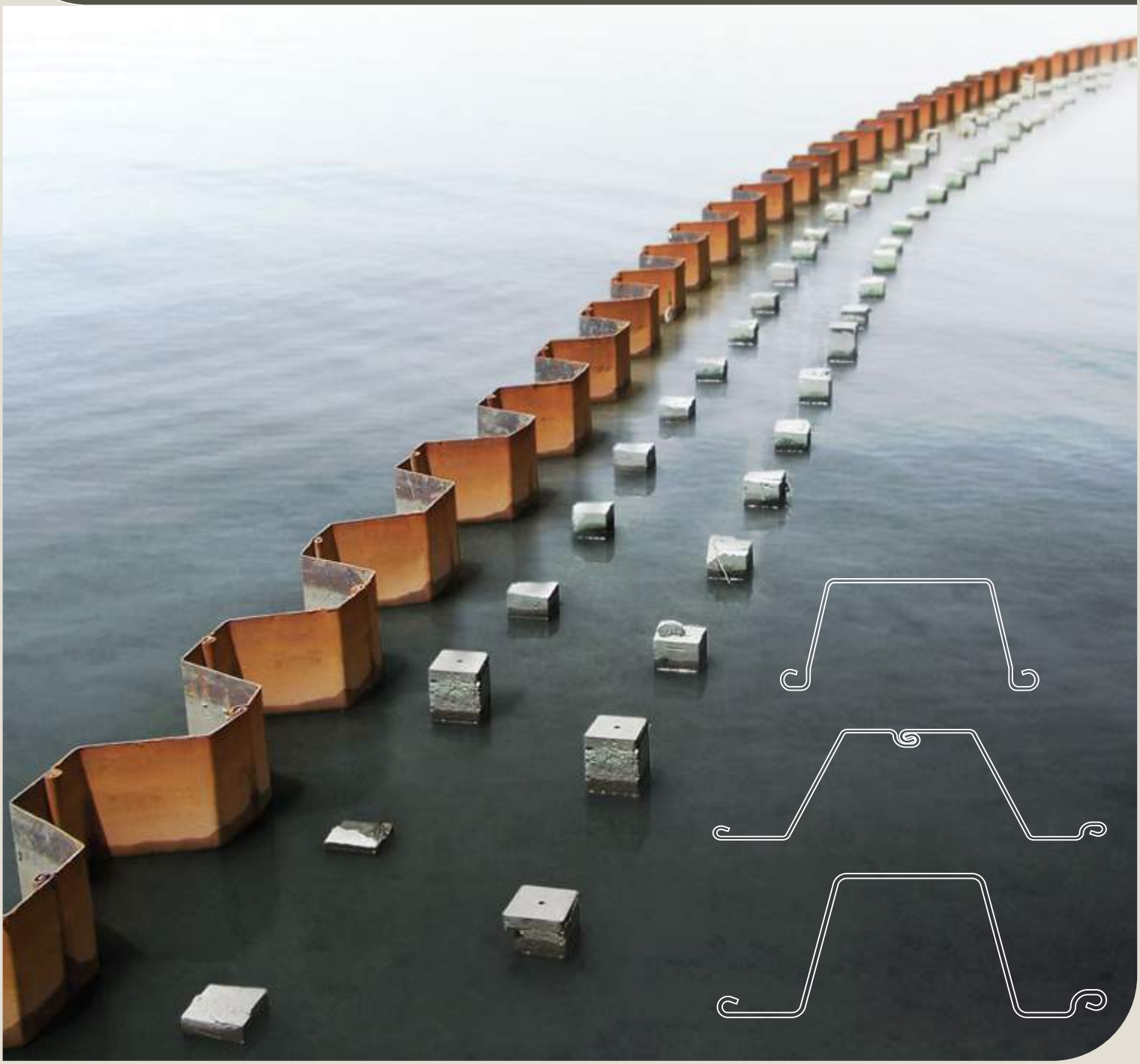
Edition 2014

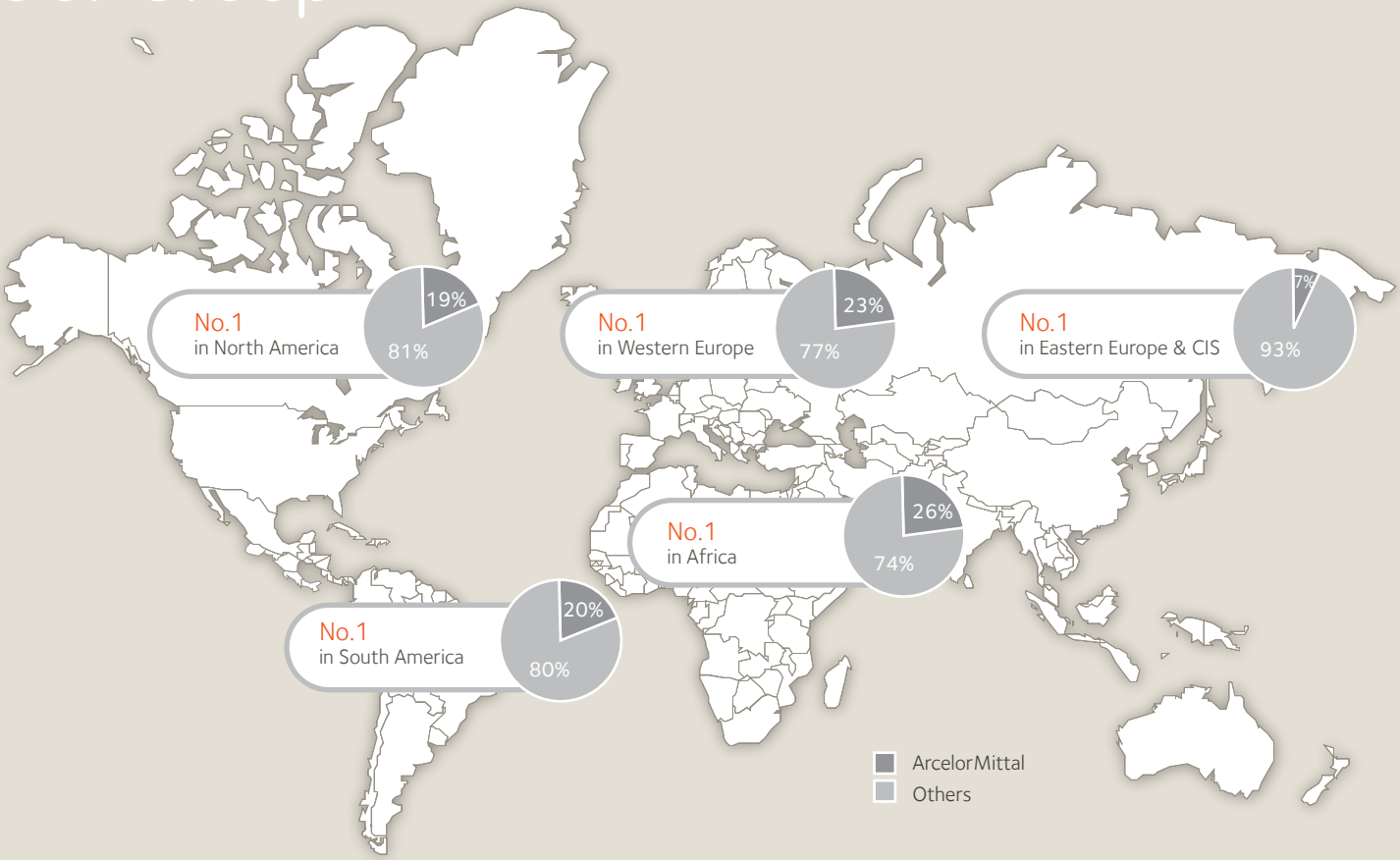
ORIENTAL SHEET PILING | ArcelorMittal

Cold Formed Sheet Piles



Contents

ArcelorMittal
Our Group



Number 1 in 5 Regions & 4 Continents

* Market position and market share estimates by region*
* Source ArcelorMittal estimates based on IISI crude steel production

Leading Position in the most attractive markets

ArcelorMittal is the world's number one steel company, with 130 million tonnes of annual production capacity and 232,000 employees across 60 countries. It has led the consolidation of the world steel industry and today ranks as the only truly global steelmaker.

ArcelorMittal is the leader in all major global markets, including automotive, construction, household appliances and packaging. The Group leads in R&D and technology, holds sizeable captive supplies of raw materials and operates extensive distribution networks.

Its industrial presence in Europe, Asia, Africa and America gives the Group exposure to all the key steel markets, from emerging to mature. We are focusing our efforts for future growth on the emerging economies, particularly Brazil and India, with joint ventures under way in the Middle East and China.

ArcelorMittal is listed on the stock exchanges of New York (under the trading symbol MT), Amsterdam (MT), Paris (MT), Luxembourg (MT), Barcelona (MTS), Bilbao (MTS), Madrid (MTS) and Valencia (MTS).

ArcelorMittal Principles

Our Vision
- To be the world's most admired steel company: "The reference in the global steel industry"

Our Mission
- To achieve unrivalled leadership
- To achieve critical mass

Our Strategy
- Consolidate relevant markets
- Industrial excellence and market leadership
- Continue growth strategy

Our Philosophy
- Safety first
- Multicultural and ethical
- Forward looking
- Performance oriented
- Aiming at speed and sustainability
- Team work

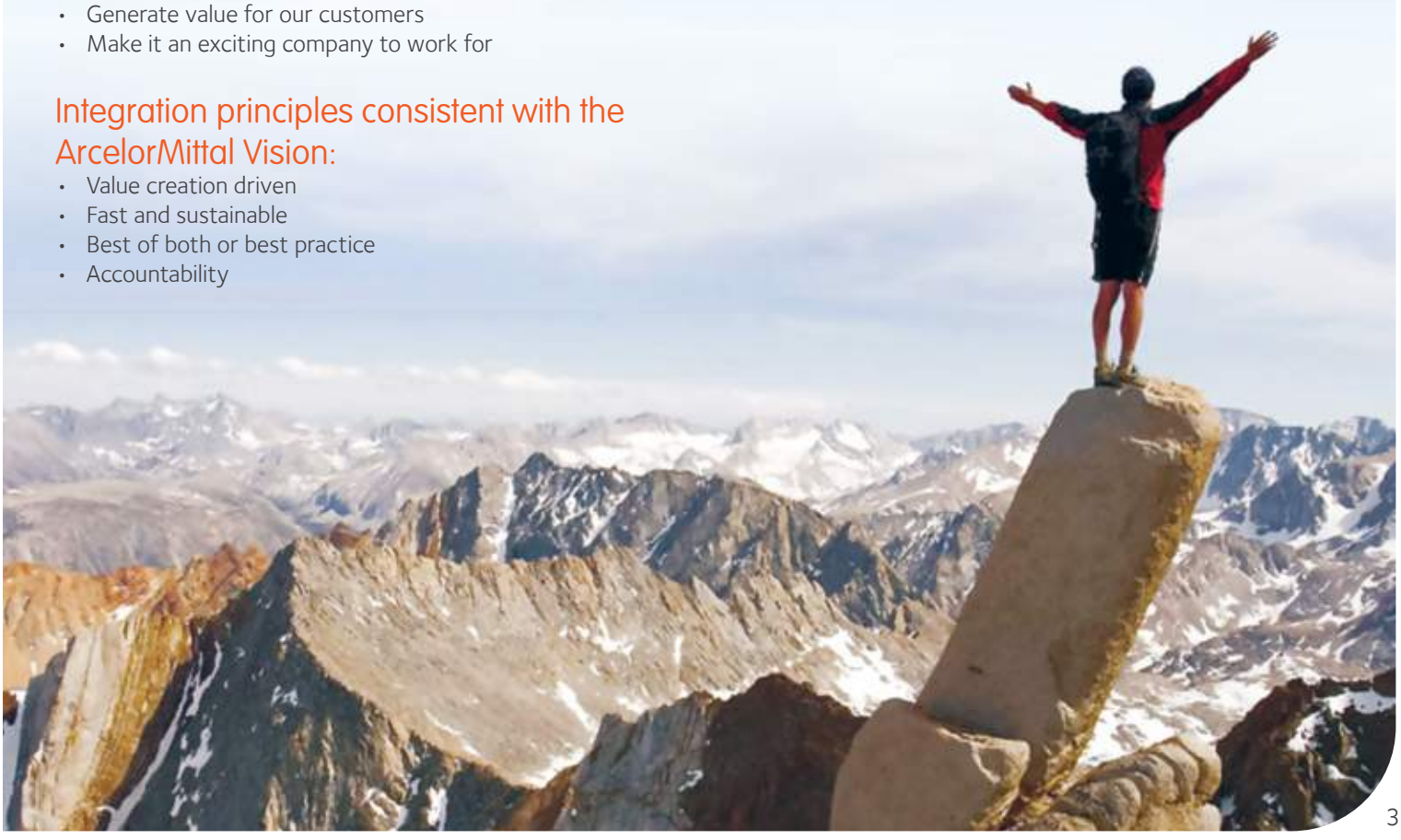
Our Commitments
- Exceed the value creation expected by our shareholders
- Generate value for our customers
- Make it an exciting company to work for

Integration principles consistent with the ArcelorMittal Vision:
- Value creation driven
- Fast and sustainable
- Best of both or best practice
- Accountability

Health and Safety

As a steel and mining company, our employees and contractors work in potentially dangerous environments every day, and our single most important priority is to ensure their safety. In our everyday work, we strive to live our philosophy of making only safe, sustainable steel. Our operations around the world are prioritizing health and safety, with a number of plants having set an impressive lead for the rest to follow.

Our top priority is safety and our goal is to be the world's safest steel and mining company. With our Journey to Zero campaign to reduce workplace accidents, injuries and occupational health problems to zero, we have set ourselves the challenge of becoming the safest steel and mining company in the world.



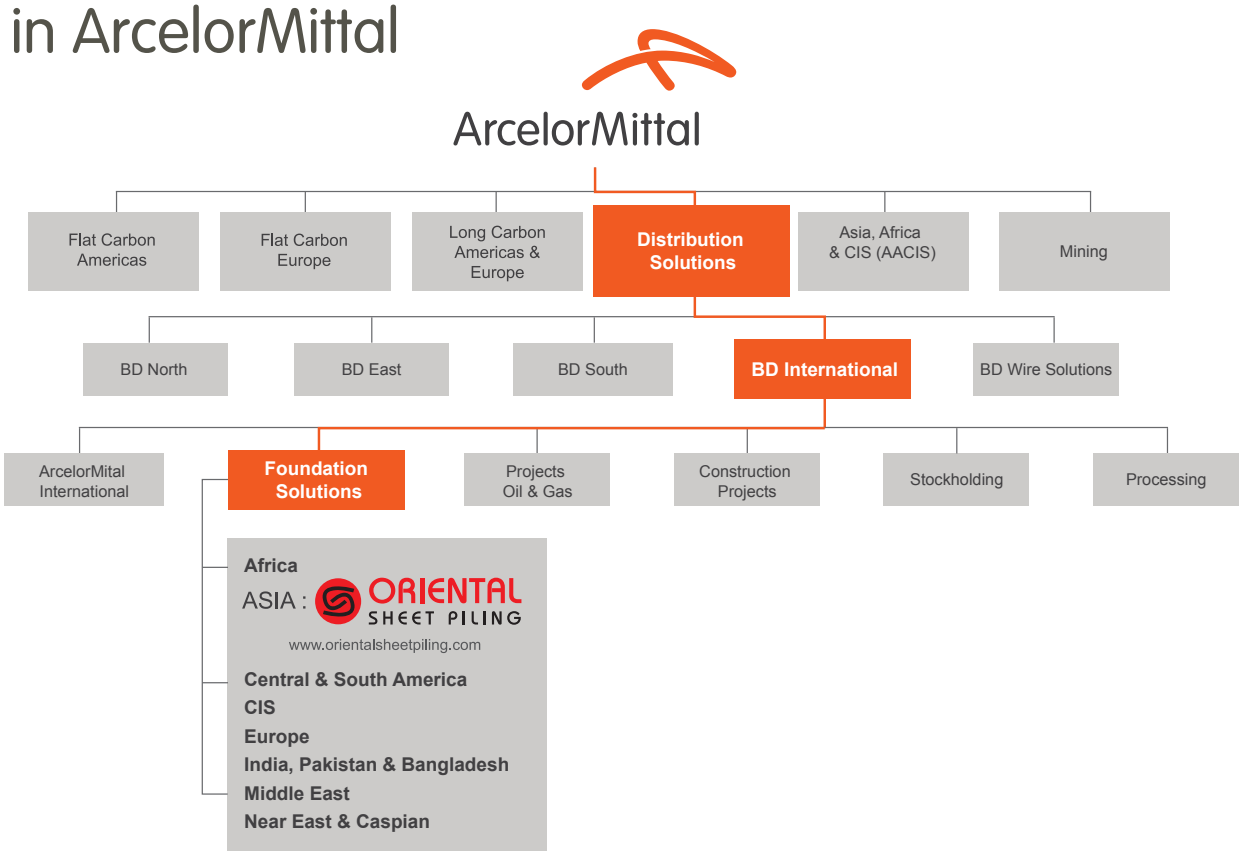
Oriental Sheet Piling
Our Company

Oriental Sheet Piling (OSP) is a business unit of ArcelorMittal Foundations. OSP provides complete foundations solutions answering its customers' requirements in terms of cost, time efficiency and structural reliability.

Oriental Sheet Piling has expanded in Asia and beyond with sales offices present in all major countries in South East Asia and in China and has built up a comprehensive network bringing our Products, Services and Commercial facilities closer to our customers.

Organizational Overview

OSP in ArcelorMittal



Our Services

Sales Network

- Sales
- Sales & Buyback
- Leasing

Stock and Service Centre

- Comprehensive stock
- Lease material
- Fabrication
- Coating
- Reconditioning
- Logistics

Sales Support

- Technical expertise and support for design and project feasibility
- Tailor made and optimized foundation solutions

Installation Guidance

Cold Formed Sheet Piling
Z Sections

OZ Series

The OZ series were specially designed and produced locally with optimized section to facilitate immediate and fast delivery requirements.

The heavy gauge cold forming process allows persistent and precise profile, high speed manufacturing up to 10m length per minute in a single process.

Extensive FEA were carried out to ensure product quality and technical conformity.

The advantages of OZ series are as follows:

- Interlocks located at the outer fibre thus optimizing section profile for high strength and low material weight
- High inertia enabling reduction of deflection for serviceability
- High steel grade provide efficient section with high bending moment resistant
- Uniform section thickness for good driving stiffness
- Improved system width compared to standard sheet piling. Higher width reduces handling & installation time with usual driving equipment
- Higher width reduces the number of interlocks per meter run of wall and directly improves water tightness control of wall

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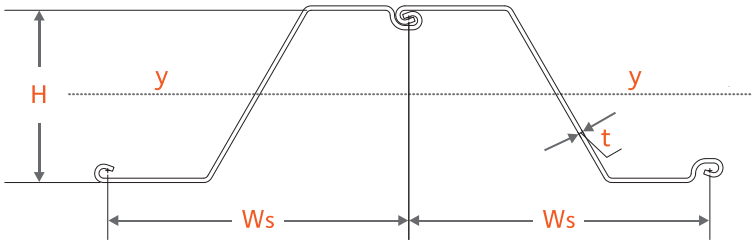
Cold Formed Sheet Piling - Z sections

OZ Series



Type	S=Single D=Double	Thickness (t) mm	Single Pile c/c Width (Ws) mm	Inner Height (H) mm	Cross Section Area (Ac) cm^2	Surface Coating Area* (As) m^2/m^2	Weight (Wt) kg/m	Moment of Inertia (I) cm^4	Section Modulus (Z) cm^3
OZ 13A**	Per S	6.50	675	392	70.7		55.5	18388	909
	Per D						111.0	36789	1847
	Per m of wall					1.46	82.2	27251	1370
OZ 14A	Per S	7.00	675	392	76.1		59.7	19758	976
	Per D						119.5	39529	1981
	Per m of wall					1.46	88.5	29281	1470
OZ 15A	Per S	7.50	675	392	81.5		64.0	21137	1042
	Per D						128.0	42289	2117
	Per m of wall					1.46	94.8	31325	1570
OZ 16A**	Per S	8.00	675	392	86.9		68.2	22504	1109
	Per D						136.5	45023	2251
	Per m of wall					1.46	101.1	33350	1670
OZ 17A	Per S	8.50	685	392	92.1		72.3	24350	1199
	Per D						144.7	48715	2433
	Per m of wall					1.46	105.6	35558	1780
OZ 18A	Per S	9.00	685	392	97.6		76.6	25735	1266
	Per D						153.2	51485	2568
	Per m of wall					1.46	111.8	37580	1880
OZ 19A	Per S	9.50	685	392	102.9		80.8	27115	1333
	Per D						161.7	54245	2702
	Per m of wall					1.46	118.0	39595	1970
OZ 20A**	Per S	10.00	685	392	108.4		85.1	28488	1398
	Per D						170.2	56994	2836
	Per m of wall					1.46	124.2	41601	2070

S, D : considered neutral axis y-y

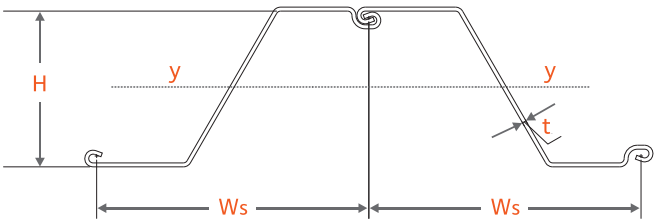
*Average of both sides (excl inside of interlocks)

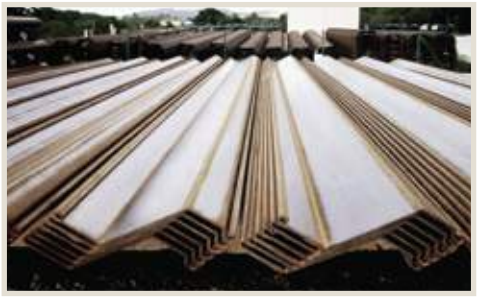
**Available within short period

ORIENTAL SHEET PILING | ArcelorMittal

Cold Formed Sheet Piling - Z sections

OZ Series





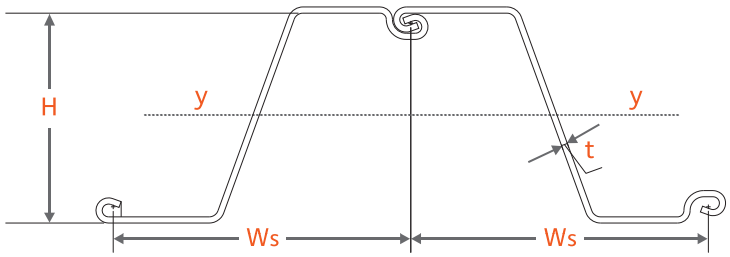
Type	S=Single D=Double	Thickness (t) mm	Single Pile c/c Width (Ws) mm	Inner Height (H) mm	Cross Section Area (Ac) cm^2	Surface Coating Area* (As) m^2/m^2	Weight (Wt) kg/m	Moment of Inertia (I) cm^4	Section Modulus (Z) cm^3
OZ 20	Per S	8.0	650	429	90.2		70.8	28151	1285
	Per D						141.6	56303	2574
	Per m of wall					1.57	108.8	43293	1980
OZ 21	Per S	8.5	650	429	95.6		75.1	29854	1361
	Per D						150.2	59709	2727
	Per m of wall					1.57	115.5	45912	2100
OZ 22	Per S	9.0	650	429	101.1		79.4	31551	1436
	Per D						158.7	63102	2878
	Per m of wall					1.57	122.1	48521	2220
OZ 23A	Per S	9.5	650	429	106.5		83.6	33240	1511
	Per D						167.3	66482	3029
	Per m of wall					1.57	128.6	51120	2330
OZ 24A**	Per S	10.0	650	429	112.0		87.9	34924	1586
	Per D						175.8	69848	3179
	Per m of wall					1.57	135.2	53709	2450
OZ 26	Per S	10.50	675	429	122.2		95.9	38733	1869
	Per D						191.8	77504	3527
	Per m of wall					1.58	142.1	57410	2620
OZ 27	Per S	11.00	675	429	127.1		99.8	40509	1809
	Per D						199.7	81058	3684
	Per m of wall					1.58	147.9	60043	2730
OZ 28A**	Per S	11.50	675	429	133.0		104.4	42279	1886
	Per D						208.7	84600	3841
	Per m of wall					1.58	154.6	62667	2850
OZ 29A	Per S	12.00	675	429	138.7		108.9	44043	1962
	Per D						217.8	88130	3997
	Per m of wall					1.58	161.3	65281	2960
OZ 31A	Per S	12.70	675	429	146.8		115.2	46502	2068
	Per D						230.4	93052	4213
	Per m of wall					1.58	170.7	68927	3120

S, D : considered neutral axis y-y

*Average of both sides (excl inside of interlocks) | **Available within short period

Cold Formed Sheet Piling - Z sections

OZ Series



Type	S=Single D=Double	Thickness (t) mm	Single Pile c/c Width (Ws) mm	Inner Height (H) mm	Cross Section Area (Ac) cm^2	Surface Coating Area* (As) m^2/m^2	Weight (Wt) kg/m	Moment of Inertia (I) cm^4	Section Modulus (Z) cm^3
OZ 32	Per S	11.00	675	476	138.0		108.3	52029	2037
	Per D						216.7	104446	4289
	Per m of wall					1.66	160.5	77367	3180
OZ 33	Per S	11.50	675	476	144.0		113.1	54302	2124
	Per D						226.1	109012	4472
	Per m of wall					1.66	167.5	80750	3320
OZ 34A	Per S	12.00	675	476	150.1		117.8	56735	2273
	Per D						235.7	113563	4654
	Per m of wall					1.66	174.6	84121	3450
OZ 36	Per S	12.50	675	476	156.1		122.5	58953	2340
	Per D						245.1	118089	4835
	Per m of wall					1.66	181.5	87473	3580
OZ 37	Per S	13.00	675	476	162.1		127.3	61210	2426
	Per D						254.5	122621	5015
	Per m of wall					1.66	188.5	90830	3720
OZ 38A	Per S	13.50	675	476	168.1		132.0	63462	2514
	Per D						263.9	127125	5194
	Per m of wall					1.66	195.5	94167	3850
OZ 40	Per S	14.00	675	476	174.1		136.6	65703	2600
	Per D						273.3	131615	5372
	Per m of wall					1.66	202.4	97493	3980

S, D : considered neutral axis y-y

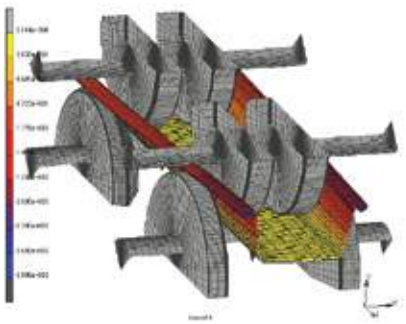
*Average of both sides (excl inside of interlocks)

Cold Formed Sheet Piling
U Sections

OT Series

The OT series were designed and produced locally to meet immediate requirements. Similar to the OZ series, the OT series can also be produced in a single piece without jointing or welding.

The flexibility of the interlock design allows the OT series to be applied both in temporary and permanent solutions.

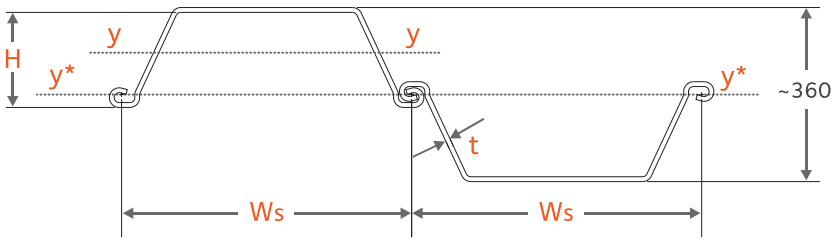


The advantages of OT series are as follows:

- Symmetrical form has made it convenient for reuse. It also allows easy connections of various strutting system & tie rod connections, even under water
- Optimized section profile height & width, high steel grade and special design interlocking system to allow multiple reuse
- Combination of great wave depth & high steel grade give excellent statical properties with low weight
- Uniform section thickness for good driving stiffness
- Improved system width compared to standard sheet piling. Higher width reduces handling & installation time with usual driving equipment
- Higher width reduces the number of interlocks per meter run of wall and directly improves water tightness control of wall

Cold Formed Sheet Piling - U sections

OT Series



Type	S=Single D=Double	Thickness (t) mm	Single Pile c/c Width (Ws) mm	Inner Height (H) mm	Cross Section Area (Ac) cm^2	Surface Coating Area* (As) m^2/m^2	Weight (Wt) kg/m	Moment of Inertia (I) cm^4	Section Modulus (Z) cm^3
OT11A	Per S	8.0	600	197	79.1		62.1	4736	384
	Per D						124.2	24918	1384
	Per m of wall					1.47	103.5	20765	1160
OT12	Per S	8.5	600	197	84.1		66.0	5034	407
	Per D						132.0	26374	1465
	Per m of wall					1.47	110.0	21978	1220
OT13	Per S	9.0	600	197	89.0		69.9	5332	431
	Per D						139.7	27818	1545
	Per m of wall					1.48	116.4	23182	1290
OT13A	Per S	9.5	600	197	93.9		73.7	5631	454
	Per D						147.4	29250	1625
	Per m of wall					1.48	122.9	24375	1360
OT14**	Per S	10.0	600	197	98.9		77.6	5928	478
	Per D						155.3	30671	1704
	Per m of wall					1.48	129.4	25559	1420

S: considered neutral axis y-y
D: considered neutral axis y'-y'
Shear transfer in the interlock must be assured in order to guarantee the given value of moment of inertia
*Average of both sides (excl inside of interlocks)
**Available within short period

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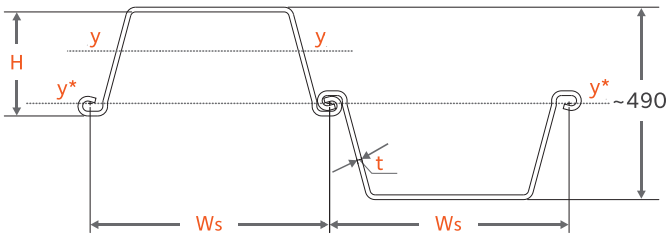
Cold Formed Sheet Piling - U sections

OT Series



Type	S=Single D=Double	Thickness (t) mm	Single Pile c/c Width (Ws) mm	Inner Height (H) mm	Cross Section Area (Ac) cm^2	Surface Coating Area* (As) m^2/m^2	Weight (Wt) kg/m	Moment of Inertia (I) cm^4	Section Modulus (Z) cm^3
OT18	Per S	8.0	600	260	90.2		70.8	9287	577
	Per D						141.7	52106	2141
	Per m of wall					1.70	118.0	43422	1790
OT19	Per S	8.5	600	260	95.8		75.2	9869	612
	Per D						150.5	55185	2268
	Per m of wall					1.71	125.4	45988	1890
OT20	Per S	9.0	600	260	101.5		79.7	10452	648
	Per D						159.3	58244	2394
	Per m of wall					1.71	132.7	48537	2000
OT21	Per S	9.5	600	260	107.1		84.1	11035	683
	Per D						168.1	61283	2518
	Per m of wall					1.71	140.1	51069	2100
OT22**	Per S	10.0	600	260	112.7		88.5	11618	719
	Per D						176.9	64301	2642
	Per m of wall					1.71	147.4	53584	2200
OT23	Per S	10.5	610	265	122.4		96.1	13441	839
	Per D						192.3	68440	2793
	Per m of wall					1.72	157.6	56098	2290
OT24	Per S	11.0	610	265	128.3		100.7	14082	879
	Per D						210.4	71471	2917
	Per m of wall					1.72	165.1	58583	2390
OT25**	Per S	11.5	610	265	134.1		105.3	14724	918
	Per D						210.6	74482	3040
	Per m of wall					1.72	172.6	61051	2490
OT26	Per S	12.0	610	265	140.0		109.9	15366	959
	Per D						219.7	77474	3162
	Per m of wall					1.72	180.1	63503	2590

S: considered neutral axis y-y
D: considered neutral axis y'-y'
Shear transfer in the interlock must be assured in order to guarantee the given value of moment of inertia
*Average of both sides (excl inside of interlocks) | **Available within short period

Cold Formed Sheet Piling - U sections

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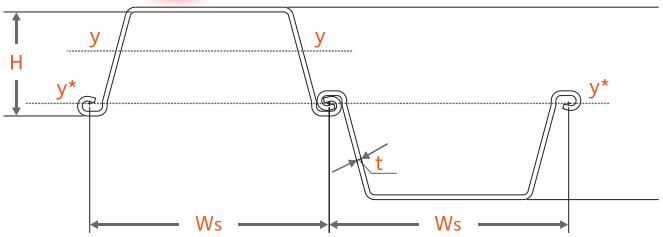
OT Series New



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OT13A-625	Per S	9.50	625	196.5	96.1		75.3	5754	718
	Per D						150.6	30512	1699
	Per m of wall					1.46	120.5	24409	1359
OT14-625	Per S	10.00	625	197	101.4		79.3	6075	754
	Per D						158.6	32042	1784
	Per m of wall					1.46	126.9	25634	1427
OT23-625	Per S	10.50	625	265.5	124.5		98.1	13547	1191
	Per D						196.2	69181	2839
	Per m of wall					1.70	156.9	55345	2271
OT24-625	Per S	11.00	625	265	130.6		102.8	14215	1244
	Per D						205.5	72248	2965
	Per m of wall					1.70	164.4	57798	2372
OT25-625	Per S	11.50	625	265.5	136.8		107.4	14898	1300
	Per D						214.9	75430	3095
	Per m of wall					1.70	171.9	60344	2476
OT26-625	Per S	12.00	625	265	143.1		112.1	15583	1355
	Per D						224.2	78604	3225
	Per m of wall					1.70	179.4	62883	2580
OT23-650	Per S	10.50	650	265.5	127.1		100.2	13849	1242
	Per D						200.3	72167	2961
	Per m of wall					1.67	154.1	55513	2278
OT24-650	Per S	11.00	650	265	133.4		104.9	14534	1298
	Per D						209.8	75370	3093
	Per m of wall					1.68	161.4	57977	2379
OT25-650	Per S	11.50	650	265.5	139.7		109.7	15232	1356
	Per D						219.4	78688	3229
	Per m of wall					1.68	168.7	60529	2484
OT26-650	Per S	12.00	650	265	146.1		114.5	15932	1413
	Per D						228.9	81996	3365
	Per m of wall					1.68	176.1	63074	2588

ORIENTAL SHEET PILING | ArcelorMittal

Cold Formed Sheet Piling - U sections

OT Series

New

Type	S=Single D=Double	Thickness (t) mm	Single Pile c/c Width (Ws) mm	Inner Height (H) mm	Cross Section Area (Ac) cm^2	Surface Coating Area* (As) m^2/m^2	Weight (Wt) kg/m	Moment of Inertia (I) cm^4	Section Modulus (Z) cm^3
OT24-675	Per S	11.00	675	265	136.1		107.1	14840	1351
	Per D						214.1	78493	3221
	Per m of wall					1.65	158.6	58143	2386
OT25-675	Per S	11.50	675	265.5	142.6		111.9	15552	1411
	Per D						223.9	81945	3363
	Per m of wall					1.65	165.8	60700	2491
OT26-675	Per S	12.00	675	265	149.1		116.8	16268	1471
	Per D						233.6	85388	3504
	Per m of wall					1.65	173.1	63251	2595
OT26-700	Per S	12.00	700	265	152.1		119.2	16590	1529
	Per D						238.3	88781	3643
	Per m of wall					1.63	170.2	63415	2602
OT31-700N	Per S	11.50	700	311.5	155.8		122.1	23090	1780
	Per D						244.1	125696	4342
	Per m of wall					1.75	174.4	89783	3101
OT32-700N	Per S	12.00	700	311	162.4		127.2	24051	1853
	Per D						254.3	131474	4534
	Per m of wall					1.75	181.7	93910	3238
OT33-700N	Per S	12.00	700	323	167.0		131.9	26749	1938
	Per D						263.8	139018	4665
	Per m of wall					1.79	188.4	99298	3332
OT35-700N	Per S	12.70	700	323.3	177.5		139.6	28564	2058
	Per D						279.1	147888	4951
	Per m of wall					1.79	199.4	105634	3536
OT36A-700N	Per S	13.00	700	324	182.3		142.9	29393	2115
	Per D						285.7	152119	5088
	Per m of wall					1.80	204.1	108656	3634
OT39-700N	Per S	14.00	700	325	196.5		153.9	31887	2265
	Per D						307.7	163373	5446
	Per m of wall					1.80	219.8	116695	3890

S: considered neutral axis y-y
D: considered neutral axis y'-y'
Shear transfer in the interlock must be assured in order to guarantee the given value of moment of inertia

*Average of both sides (excl inside of interlocks)

Cold Formed Sheet Piling
Omega Sections

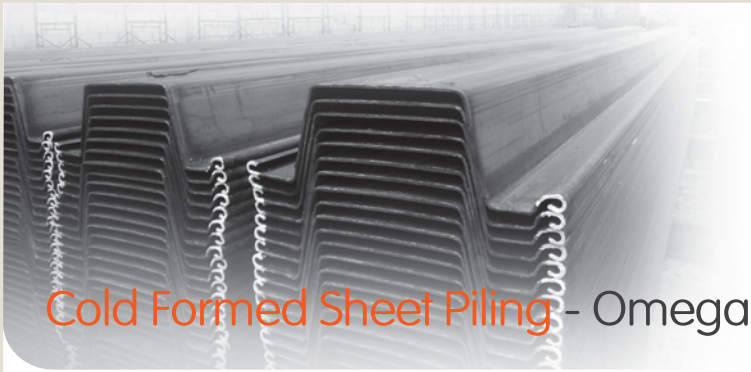
OΩ Series

The new 730mm wide Omega sections have been specially designed as a very light section with reliable and good durability.

The purpose of the new range of Omega section from Oriental Sheet Piling is to create tailor made solutions for canalization, permeability cut off wall, riverbank structural protection and other types of applications that require light weight retaining walls.

The advantages of the Omega (OΩ) series are as follows:

- Innovative section to ease sheet piling installation that is adjacent to existing building, river embankment, bridge abutment, etc
- Light weight section makes the OΩ series easy to handle and install compared to other solutions
- Higher section width of 730mm reduces weight and number of interlock per meter run of wall; reduces piling numbers and installation time; and directly improves water tightness control of wall



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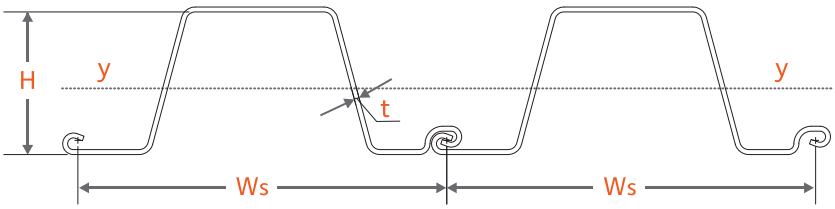
Cold Formed Sheet Piling - Omega sections

OΩ Series New

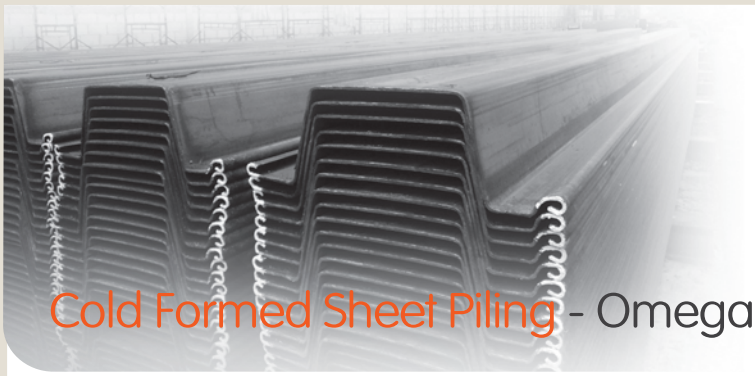


Type	S=Single D=Double	Thickness (t) mm	Single Pile c/c Width (Ws) mm	Inner Height (H) mm	Cross Section Area (Ac) cm^2	Surface Coating Area* (As) m^2/m^2	Weight (Wt) kg/m	Moment of Inertia (I) cm^4	Section Modulus (Z) cm^3
OΩ500/730**	Per S	4.00	730	235	49.7		39.0	4705	392
	Per D						78.0	9410	784
	Per m of wall					1.57	53.4	6446	537
OΩ600/730**	Per S	4.50	730	235	55.8		43.8	5285	440
	Per D						87.6	10570	880
	Per m of wall					1.57	60.0	7240	602
OΩ650/730	Per S	5.00	730	235	61.9		48.6	5862	488
	Per D						97.2	11724	976
	Per m of wall					1.57	66.6	8031	668
OΩ700/730	Per S	5.50	730	235	68.0		53.4	6438	535
	Per D						106.8	12876	1070
	Per m of wall					1.57	73.1	8819	733
OΩ800/730	Per S	6.00	730	235	74.0		58.1	7012	581
	Per D						116.2	14024	1162
	Per m of wall					1.57	79.6	9605	796
OΩ850/730	Per S	6.50	730	235	80.1		62.9	7584	626
	Per D						125.8	15168	1252
	Per m of wall					1.57	86.1	10388	857
OΩ900/730	Per S	7.00	730	235	86.1		67.6	8153	670
	Per D						135.2	16306	1340
	Per m of wall					1.57	92.6	11169	918
OΩ950/730	Per S	7.50	730	235	92.1		72.3	8721	714
	Per D						144.6	17442	1428
	Per m of wall					1.58	99.1	11947	979
OΩ1000/730	Per S	8.00	730	235	98.1		77.0	9287	758
	Per D						154.0	18574	1516
	Per m of wall					1.58	105.5	12722	1038

S, D : considered neutral axis y-y

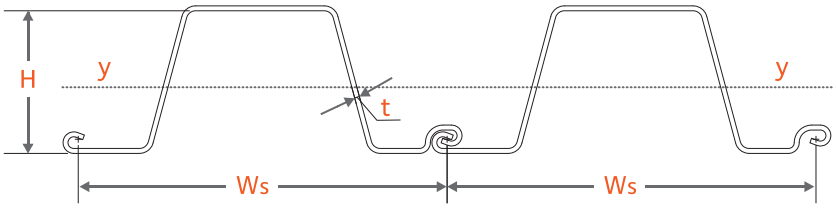
*Average of both sides (excl inside of interlocks)

**Available within short period



Cold Formed Sheet Piling - Omega sections

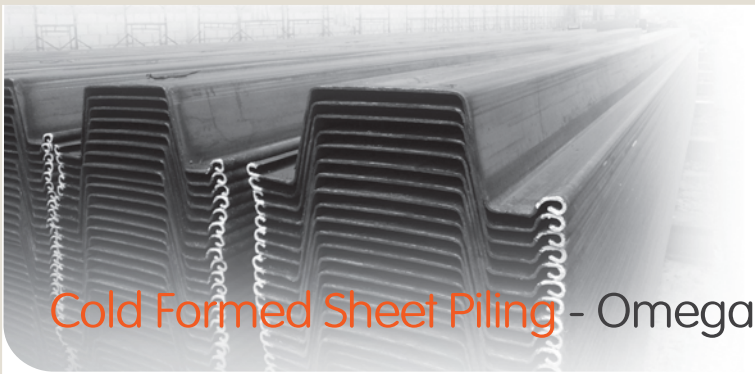
OΩ Series



Type	S=Single D=Double	Thickness (t) mm	Single Pile c/c Width (Ws) mm	Inner Height (H) mm	Cross Section Area (Ac) cm^2	Surface Coating Area* (As) m^2/m^2	Weight (Wt) kg/m	Moment of Inertia (I) cm^4	Section Modulus (Z) cm^3
OΩ600/600	Per S	5.00	600	232	54.6		42.9	4703	361
	Per D						85.8	9406	721
	Per m of wall					1.69	71.5	7838	600
OΩ650/600	Per S	5.50	600	232	60.1		47.2	5171	396
	Per D						94.4	10342	791
	Per m of wall					1.69	78.6	8618	660
OΩ725/600	Per S	6.00	600	232	65.6		51.5	5639	430
	Per D						102.9	11277	860
	Per m of wall					1.69	85.8	9398	720
OΩ775/600	Per S	6.50	600	232	71.0		55.7	6106	465
	Per D						111.5	12211	929
	Per m of wall					1.69	92.9	10176	780
OΩ825/600	Per S	7.00	600	232	76.4		60.0	6572	499
	Per D						120.0	13145	998
	Per m of wall					1.69	100.0	10954	830
OΩ900/600	Per S	7.50	600	232	81.9		64.3	7039	533
	Per D						128.6	14078	1066
	Per m of wall					1.69	107.1	11732	890
OΩ950/600	Per S	8.00	600	232	87.3		68.6	7505	567
	Per D						137.1	15010	1133
	Per m of wall					1.69	114.3	12508	950

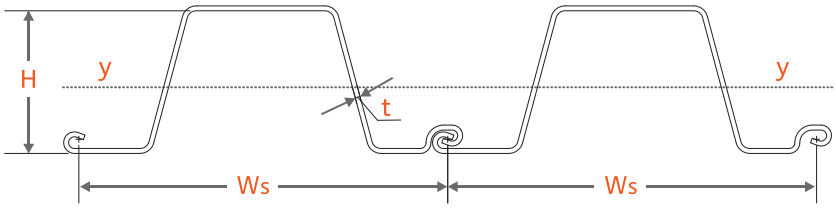
S, D : considered neutral axis y-y

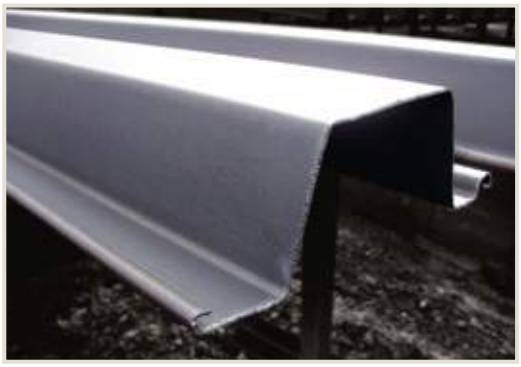
*Average of both sides (excl inside of interlocks)



Cold Formed Sheet Piling - Omega sections

OΩ Series

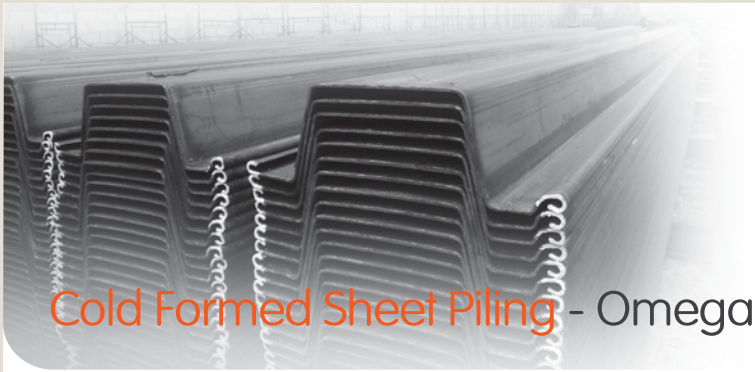




Type	S=Single D=Double	Thickness (t) mm	Single Pile c/c Width (Ws) mm	Inner Height (H) mm	Cross Section Area (Ac) cm^2	Surface Coating Area* (As) m^2/m^2	Weight (Wt) kg/m	Moment of Inertia (I) cm^4	Section Modulus (Z) cm^3
OΩ625/650	Per S	5.00	650	232	57.1		44.9	5094	408
	Per D						89.7	10188	816
	Per m of wall					1.63	69.0	7837	630
OΩ675/650	Per S	5.50	650	232	62.9		49.3	5602	448
	Per D						98.7	11204	895
	Per m of wall					1.63	75.9	8618	690
OΩ750/650	Per S	6.00	650	232	68.6		53.8	6109	487
	Per D						107.6	12218	974
	Per m of wall					1.63	82.8	9398	750
OΩ800/650	Per S	6.50	650	232	74.2		58.3	6616	526
	Per D						116.6	13233	1052
	Per m of wall					1.64	89.7	10179	810
OΩ875/650	Per S	7.00	650	232	79.9		62.8	7123	565
	Per D						125.5	14246	1129
	Per m of wall					1.64	96.5	10958	870
OΩ925/650	Per S	7.50	650	232	85.6		67.2	7630	603
	Per D						134.4	15259	1206
	Per m of wall					1.64	103.4	11738	930
OΩ975/650	Per S	8.00	650	232	91.3		71.7	8136	642
	Per D						143.4	16272	1283
	Per m of wall					1.64	110.3	12517	990

S, D : considered neutral axis y-y

*Average of both sides (excl inside of interlocks)



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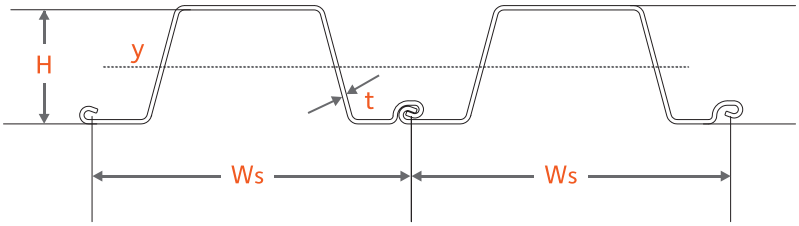
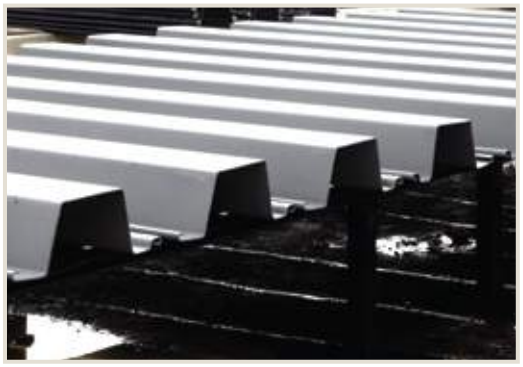
Cold Formed Sheet Piling - Omega sections

OΩ Series

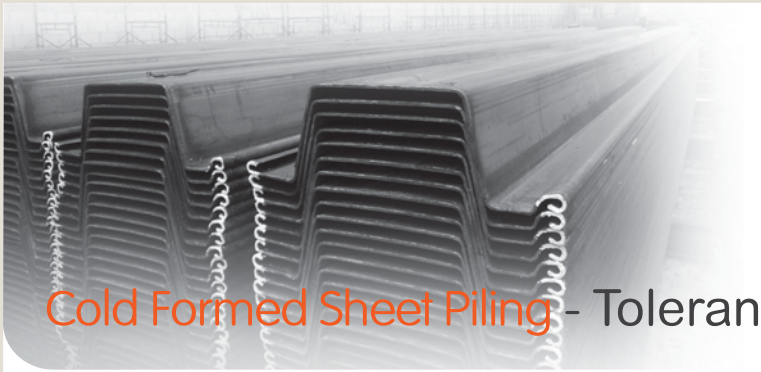




Type	S=Single D=Double	Thickness (t) mm	Single Pile c/c Width (Ws) mm	Inner Height (H) mm	Cross Section Area (Ac) cm^2	Surface Coating Area* (As) m^2/m^2	Weight (Wt) kg/m	Moment of Inertia (I) cm^4	Section Modulus (Z) cm^3
OΩ650/700	Per S	5.00	700	232	59.6		46.8	5453	456
	Per D						93.6	10905	911
	Per m of wall					1.59	66.9	7789	650
OΩ700/700	Per S	5.50	700	232	65.6		51.5	5997	500
	Per D						103.0	11993	999
	Per m of wall					1.59	73.6	8566	720
OΩ775/700	Per S	6.00	700	232	71.6		56.2	6541	544
	Per D						112.3	13081	1087
	Per m of wall					1.59	80.2	9344	780
OΩ825/700	Per S	6.50	700	232	77.5		60.8	7084	587
	Per D						121.7	14168	1174
	Per m of wall					1.59	86.9	10120	840
OΩ900/700	Per S	7.00	700	232	83.4		65.5	7628	630
	Per D						131.0	15255	1261
	Per m of wall					1.59	93.6	10896	900
OΩ950/700	Per S	7.50	700	232	89.4		70.2	8171	673
	Per D						140.3	16342	1347
	Per m of wall					1.59	100.2	11673	960
OΩ1025/700	Per S	8.00	700	232	95.3		74.8	8714	716
	Per D						149.7	17428	1433
	Per m of wall					1.59	106.9	12448	1030

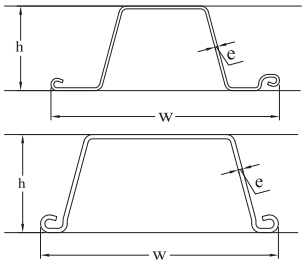
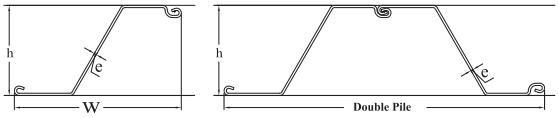
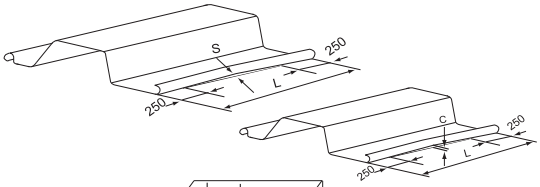
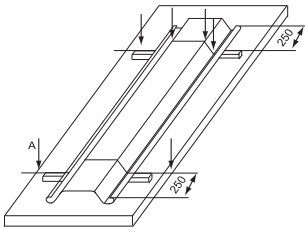
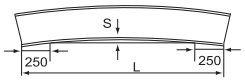
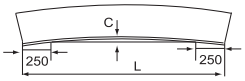
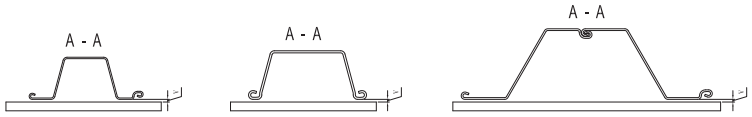
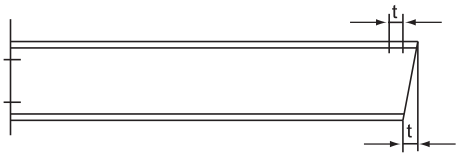
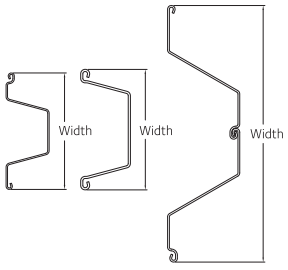
S, D : considered neutral axis y-y

*Average of both sides (excl inside of interlocks)



Cold Formed Sheet Piling - Tolerances on Sheet Piles

All sheet piles are formed in continuous rolling process to the required sections with interlock able to fit into each other
Tolerances On Sheet Piles (reference standard: BS EN 10249)

Characteristics	Figures	Nominal size (mm)	Tolerances (mm)
Sectional Height (h)		h ≤200 200< h <300 300< h ≤400 400< h	± 4 ± 6 ± 8 ±10
Sectional Width (w)		single sheet pile double sheet piles	± 2% W ± 3% W
Sectional thickness (e)		e = 3 3.00 < e ≤ 4.00 4.00 < e ≤ 5.00 5.00 < e ≤ 6.00 6.00 < e ≤ 8.00 8.00 < e ≤ 10.0 10.0 < e ≤ 12.7	± 0.26 ± 0.27 ± 0.29 ± 0.31 ± 0.35 ± 0.40 ± 0.46
Bending (Deflection S)			0.25% L
Curving (Deflection c)			0.25% L
Twist (Dimension v)			2% L with max 100mm
Length			± 50mm
Squareness of ends (Out of squareness of end cuts)			2% of width
Mass of Section (Difference between total actual and total theoretical mass delivered)			± 7% max

Steel Grade

Grade	Min Yield Point N/mm²	Min Tensile Strength N/mm²	Min Enlongation %	Comparable to other standards France	UK BS 4360	Germany
S 275 JRC	275	410	22	E 28-2	Gr. 43B	St 44-2
S 355 JOC	355	490	22	E 36-3	Gr. 50C	St 52-3U
*ASTM A690	345	485	21	-	-	-

*High-strength low alloy steel grade for use in Marine Environments

Corrosion Protection for Sheet Piles

The Eurocode 3 – Design of steel structures – Part 5: Piling; has tabulated the mean loss of thickness due to corrosion for the following environments in temperate climates over a given life span:

Table 4-1: Recommended value for the loss of thickness [mm] due to corrossion for piles and sheet piles in soils, with or without groundwater

Required design working life	5years	25 years	50 years	75 years	100 years
Undisturbed natural soils (sand, silt, clay, schist, ...)	0,00	0,30	0,60	0,90	1,20
Polluted natural soils and industrial sites	0,15	0,75	1,50	2,25	3,00
Aggressive natural soils (swamp, marsh, peat, ...)	0,20	1,00	1,75	2,50	3,25
Non-compacted and non-aggressive fills (clay, schist, sand, silt, ...)	0,18	0,70	1,20	7,70	2,20
Non-compacted and aggressive fills (ashes, slag, ...)	0,50	2,00	3,25	4,50	5,75

Notes:
1) Corrosion rates in compacted fills are lower than those in non-compacted ones.
In compacted fills the figures in the table should be divided by two.
2) The values given for 5 and 25 years are based on measurements, whereas the other values are expolated.

Table 4-2: Recommended value for the loss of thickness [mm] due to corrossion for piles and sheet piles in fresh water or in the sea water

Required design working life	5years	25 years	50 years	75 years	100 years
Common fresh water (river, ship canal, ...)	0,15	0,55	0,90	1,15	1,40
Very polluted fresh water (sewage, industrial effluent, ...) in the zone of high attack (water line)	0,30	1,30	2,30	3,30	4,30
Sea water in temperate climate in the zone of high attack (low water and splash zones)	0,55	1,90	3,75	5,60	7,50
Sea water in temperate climate in the zone of immersion or in the intertidal zone	0,25	0,90	1,75	2,60	3,50

Notes:
1) The highest corrosion rates in usually found in the splash zone or at the low water level in tidal waters.
However, in most cases, the highest bending stresses occur in the permanent immersion zone, Figure 4-1.
2) The values given for 5 and 25 years are based on measurements, whereas the other values are expolated.

To optimize the service life of pile structures, proper coating system can be designed according to EN ISO 12944. Depending on the corrosivity of the exposed environment and required service life, the following can be proposed:

Surface Preparation - Blasting

Establishing and maintaining high standard of surface preparation is the most important criteria for ensuring performance and service life of protecting coating. The following table outline the standards for surface preparation acceptance.

Atmospheric exposure

Proposal (EN ISO 12944 - Table A4, corrosivity category C4)
Zinc silicate epoxy primer (50 µm)
Recoatable epoxy intermediate coating (140 µm)
Aliphatic polyurethane topcoat (40 µm)
Nominal dry film thickness of the system: 230 µm

Freshwater immersion

Proposal (EN ISO 12944 - Table A8, corrosivity category lm 1)
2 coats of polyamide cured epoxy coating (150 + 150 µm)
Nominal dry film thickness of the system: 300 µm

Seawater immersion

Proposal 1 (EN ISO 12944 - Table A8, corrosivity category lm 2)
Polyamide cured epoxy coating (40 µm)
2 coats of polyamide cured coaltar epoxy coating (210 + 200 µm)
Nominal dry film thickness of the system: 450 µm

Proposal 2 (EN ISO 12944 - Table A8, corrosivity category lm 2)
Polyamide cured epoxy coating (40 µm)
Glassflake reinforced polyamide cured epoxy coating (400 µm)
Nominal dry film thickness of the system: 450 µm

(Paint tables given are only examples. Other paint systems having the same performance are possible. Further advice can be provided by the paint manufacturer according to the type of exposure and expected durability)

Requirement	ISO 8501-1 1988 BS7079:A1 1988	Swedish Standard SIS055900 1967	Steel Structure Painting Council 1982	Nace	Japan Shipbuilding Research Association
White Metal	Sa 3	Sa 3	SP5	1	Sh(d) 3
Near White	Sa 2.5	Sa 2.5	SP10	2	Sh(d) 2
Commercial Blast	Sa 2	Sa 2	SP6	3	Sh(d) 1
Brush-off Blast	Sa 1	Sa 1	SP7	4	-

Certificates


LESEN PENSIJILAN BARANGAN
Product Certification Licence


PRODUCT CERTIFICATE OF CONFORMITY


TESTING OF STEEL SHEET PILING


BUREAU VERITAS Certification

Certification

ORIENTAL SP STEELWORKS SDN BHD
PTD 3054, BATU 2, JALAN TANJUNG KUPANG,
81550 GELANG PATAH, JOHOR DARUL TAKZIM, MALAYSIA.

ISO 9001:2008

MANUFACTURING OF HEAVY GAUGE COLD FORMED SECTIONS/ PROFILES.

06 May 2014
05 May 2017
05 May 2011

Ir. Hj Othman Abdul Kadir


BUREAU VERITAS Certification

Certification

ORIENTAL SP STEELWORKS SDN BHD
PTD 3054, BATU 2, JALAN TANJUNG KUPANG,
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ISO 14001:2004

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OHSAS 18001:2007

MANUFACTURING OF HEAVY GAUGE COLD FORMED SECTIONS/ PROFILES.

06 May 2014
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05 May 2011

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