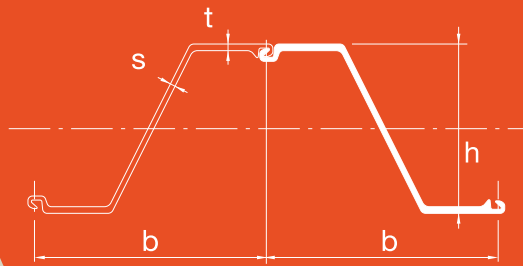


Z-Sections

The essential characteristics of Z-sections are the continuous form of the web and the location of the interlock symmetrically on each side of the neutral axis. Both aspects have a positive influence on the section modulus. The AZ® series, a section with extraordinary characteristics and the proven qualities of the Larssen interlock, has the following advantages:



- extremely competitive section-modulus-to-mass ratio;
- increased inertia for reduced deflection;
- large width, resulting in good installation performance;
- good corrosion resistance, the steel being thickest at the critical corrosion points.



Section	Width		Height		Thickness		Sectional area	Mass		Moment of inertia	Elastic section modulus	Static moment	Plastic section modulus	Class ¹⁾																		
	b	h	t	s	cm ² /m	single pile		wall	cm ⁴ /m					cm ³ /m	cm ³ /m	cm ³ /m	S240 GP	S270 GP	S320 GP	S355 GP	S390 GP	S430 GP	S460 AP									
AZ®-800																																
AZ 18-800	800	449	8.5	8.5	129	80.7	101	41320	1840	1065	2135	3	3	3	3	3	4	4														
AZ 20-800	800	450	9.5	9.5	141	88.6	111	45050	2000	1165	2330	3	3	3	3	3	3	3														
AZ 22-800	800	451	10.5	10.5	153	96.4	120	48790	2165	1260	2525	2	2	3	3	3	3	3														
AZ 23-800	800	474	11.5	9.0	151	94.6	118	55260	2330	1340	2680	2	2	2	3	3	3	3														
AZ 25-800	800	475	12.5	10.0	163	102.6	128	59410	2500	1445	2890	2	2	2	2	2	3	3														
AZ 27-800	800	476	13.5	11.0	176	110.5	138	63570	2670	1550	3100	2	2	2	2	2	2	2														
AZ®-750																																
AZ 28-750	750	509	12.0	10.0	171	100.8	134	71540	2810	1620	3245	2	2	2	2	3	3	3														
AZ 30-750	750	510	13.0	11.0	185	108.8	145	76670	3005	1740	3485	2	2	2	2	2	2	3														
AZ 32-750	750	511	14.0	12.0	198	116.7	156	81800	3200	1860	3720	2	2	2	2	2	2	2														
AZ®-700 and AZ®-770																																
AZ 12-770	770	344	8.5	8.5	120	72.6	94	21430	1245	740	1480	2	2	3	3	3	3	3														
AZ 13-770	770	344	9.0	9.0	126	76.1	99	22360	1300	775	1546	2	2	3	3	3	3	3														
AZ 14-770	770	345	9.5	9.5	132	79.5	103	23300	1355	805	1611	2	2	2	2	3	3	3														
AZ 14-770-10/10	770	345	10.0	10.0	137	82.9	108	24240	1405	840	1677	2	2	2	2	2	3	3														
AZ 12-700	700	314	8.5	8.5	123	67.7	97	18880	1205	710	1415	2	2	3	3	3	3	3														
AZ 13-700	700	315	9.5	9.5	135	74.0	106	20540	1305	770	1540	2	2	2	3	3	3	3														
AZ 13-700-10/10	700	316	10.0	10.0	140	77.2	110	21370	1355	800	1600	2	2	2	2	3	3	3														
AZ 14-700	700	316	10.5	10.5	146	80.3	115	22190	1405	835	1665	2	2	2	2	2	3	3														
AZ 17-700	700	420	8.5	8.5	133	73.1	104	36230	1730	1015	2027	2	2	3	3	3	3	3														
AZ 18-700	700	420	9.0	9.0	139	76.5	109	37800	1800	1060	2116	2	2	3	3	3	3	3														
AZ 19-700	700	421	9.5	9.5	146	80.0	114	39380	1870	1105	2206	2	2	2	3	3	3	3														
AZ 20-700	700	421	10.0	10.0	152	83.5	119	40960	1945	1150	2296	2	2	2	2	2	3	3														
AZ 24-700	700	459	11.2	11.2	174	95.7	137	55820	2430	1435	2867	2	2	2	2	2	2	3														
AZ 26-700	700	460	12.2	12.2	187	102.9	147	59720	2600	1535	3070	2	2	2	2	2	2	2														
AZ 28-700	700	461	13.2	13.2	200	110.0	157	63620	2760	1635	3273	2	2	2	2	2	2	2														

Section	Width	Height	Thickness		Sectional area	Mass		Moment of inertia	Elastic section modulus	Static moment	Plastic section modulus	Class ¹⁾						
			b	h		t	s					cm ² /m	single pile kg/m	wall kg/m ²	cm ⁴ /m	cm ³ /m	cm ³ /m	S 240 GP

AZ[®]-700 and AZ[®]-770

AZ 36-700N	700	499	15.0	11.2	216	118.6	169	89610	3590	2055	4110	2	2	2	2	2	2	2
AZ 38-700N	700	500	16.0	12.2	230	126.4	181	94840	3795	2180	4360	2	2	2	2	2	2	2
AZ 40-700N	700	501	17.0	13.2	244	134.2	192	100080	3995	2305	4605	2	2	2	2	2	2	2
AZ 42-700N	700	499	18.0	14.0	259	142.1	203	104930	4205	2425	4855	2	2	2	2	2	2	2
AZ 44-700N	700	500	19.0	15.0	273	149.9	214	110150	4405	2550	5105	2	2	2	2	2	2	2
AZ 46-700N	700	501	20.0	16.0	287	157.7	225	115370	4605	2675	5350	2	2	2	2	2	2	2
AZ 48-700	700	503	22.0	15.0	288	158.5	226	119650	4755	2745	5490	2	2	2	2	2	2	2
AZ 50-700	700	504	23.0	16.0	303	166.3	238	124890	4955	2870	5735	2	2	2	2	2	2	2
AZ 52-700	700	505	24.0	17.0	317	174.1	249	130140	5155	2990	5985	2	2	2	2	2	2	2

AZ[®]

AZ 18 ²⁾	630	380	9.5	9.5	150	74.4	118	34200	1800	1050	2104	2	2	2	3	3	3	3
AZ 18-10/10	630	381	10.0	10.0	157	77.8	123	35540	1870	1095	2189	2	2	2	2	3	3	3
AZ 26 ²⁾	630	427	13.0	12.2	198	97.8	155	55510	2600	1530	3059	2	2	2	2	2	2	2
AZ 46	580	481	18.0	14.0	291	132.6	229	110450	4595	2650	5295	2	2	2	2	2	2	2
AZ 48	580	482	19.0	15.0	307	139.6	241	115670	4800	2775	5553	2	2	2	2	2	2	2
AZ 50	580	483	20.0	16.0	322	146.7	253	121060	5015	2910	5816	2	2	2	2	2	2	2

¹⁾ Classification according to EN 1993-5. Class 1 is obtained by verification of the rotation capacity for a class-2 cross-section. A set of tables with all the data required for design in accordance with EN 1993-5 is available from our Technical Department. Steel grade S 460 AP following specifications of the mill is available on request.

²⁾ AZ[®] sections can be rolled-up or down by 0.5 mm and 1.0 mm on request.

The new AZ series are available for shipment since:

- AZ 25-800 & AZ 30-750: 4th quarter of 2015
- AZ 20-800 & AZ 50-700: 1st semester of 2016

Please contact us for more detailed information.



Section

S = Single pile
D = Double pileSectional
area

Mass

Moment
of inertiaElastic
section
modulusRadius of
gyrationCoating
area¹⁾cm²

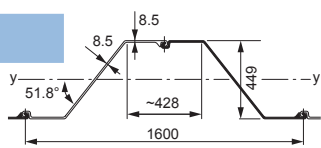
kg/m

cm⁴cm³

cm

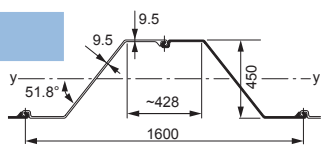
m²/mAZ[®]-800

AZ 18-800



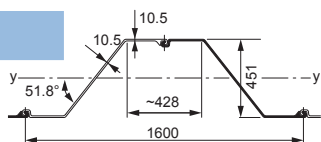
Per S	102.9	80.7	33055	1470	17.93	1.04
Per D	205.7	161.5	66110	2945	17.93	2.08
Per m of wall	128.6	100.9	41320	1840	17.93	1.30

AZ 20-800



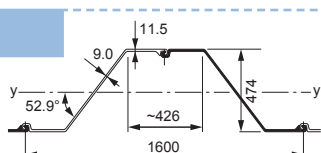
Per S	112.8	88.6	36040	1600	17.87	1.04
Per D	225.6	177.1	72070	3205	17.87	2.08
Per m of wall	141.0	110.7	45050	2000	17.87	1.30

AZ 22-800



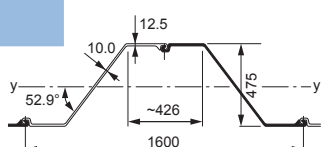
Per S	122.8	96.4	39035	1730	17.83	1.04
Per D	245.6	192.8	78070	3460	17.83	2.08
Per m of wall	153.5	120.5	48790	2165	17.83	1.30

AZ 23-800



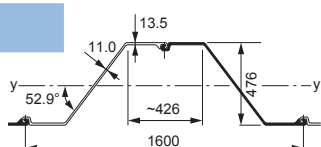
Per S	120.5	94.6	44200	1865	19.15	1.06
Per D	241.0	189.2	88410	3730	19.15	2.11
Per m of wall	150.6	118.2	55260	2330	19.15	1.32

AZ 25-800



Per S	130.6	102.6	47530	2000	19.07	1.06
Per D	261.3	205.1	95060	4005	19.07	2.11
Per m of wall	163.3	128.2	59410	2500	19.07	1.32

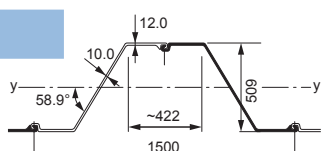
AZ 27-800



Per S	140.8	110.5	50860	2135	19.01	1.06
Per D	281.6	221.0	101720	4275	19.01	2.11
Per m of wall	176.0	138.1	63570	2670	19.01	1.32

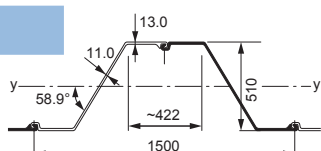
AZ[®]-750

AZ 28-750



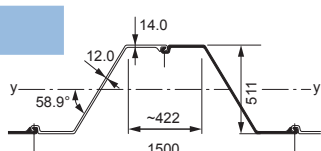
Per S	128.4	100.8	53650	2110	20.44	1.06
Per D	256.8	201.6	107310	4215	20.44	2.11
Per m of wall	171.2	134.4	71540	2810	20.44	1.41

AZ 30-750



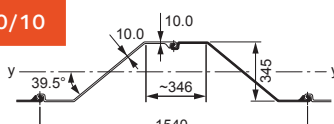
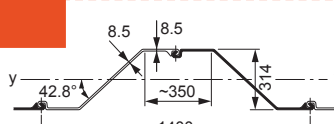
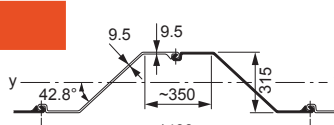
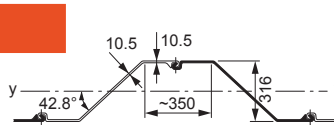
Per S	138.5	108.8	57500	2255	20.37	1.06
Per D	277.1	217.5	115000	4510	20.37	2.11
Per m of wall	184.7	145.0	76670	3005	20.37	1.41

AZ 32-750

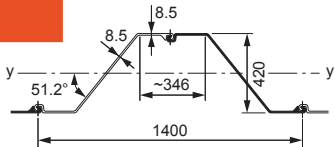
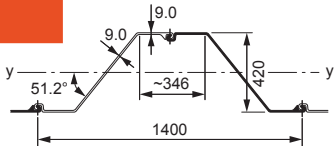
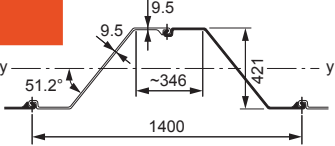
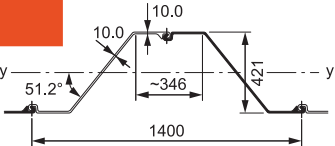
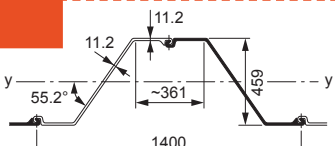
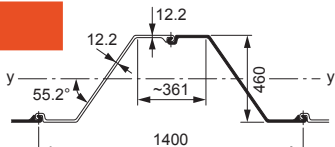
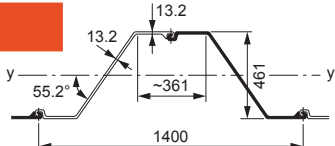
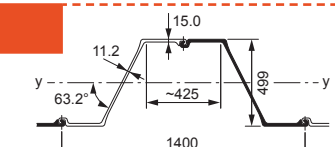
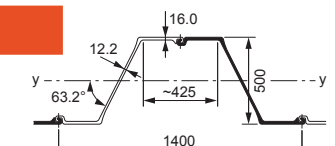
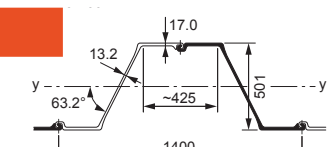


Per S	148.7	116.7	61350	2400	20.31	1.06
Per D	297.4	233.5	122710	4805	20.31	2.11
Per m of wall	198.3	155.6	81800	3200	20.31	1.41

¹⁾ One side, excluding inside of interlocks.

Section	S = Single pile D = Double pile	Sectional area	Mass	Moment of inertia	Elastic section modulus	Radius of gyration	Coating area ¹⁾
		cm ²	kg/m	cm ⁴	cm ³	cm	m ² /m
AZ[®]-700 and AZ[®]-770							
AZ 12-770 	Per S	92.5	72.6	16500	960	13.36	0.93
	Per D	185.0	145.2	33000	1920	13.36	1.85
	Per m of wall	120.1	94.3	21430	1245	13.36	1.20
AZ 13-770 	Per S	96.9	76.1	17220	1000	13.33	0.93
	Per D	193.8	152.1	34440	2000	13.33	1.85
	Per m of wall	125.8	98.8	22360	1300	13.33	1.20
AZ 14-770 	Per S	101.3	79.5	17940	1040	13.31	0.93
	Per D	202.6	159.0	35890	2085	13.31	1.85
	Per m of wall	131.5	103.2	23300	1355	13.31	1.20
AZ 14-770-10/10 	Per S	105.6	82.9	18670	1085	13.30	0.93
	Per D	211.2	165.8	37330	2165	13.30	1.85
	Per m of wall	137.2	107.7	24240	1405	13.30	1.20
AZ 12-700							
AZ 12-700 	Per S	86.2	67.7	13220	840	12.38	0.86
	Per D	172.5	135.4	26440	1685	12.38	1.71
	Per m of wall	123.2	96.7	18880	1205	12.38	1.22
AZ 13-700 	Per S	94.3	74.0	14370	910	12.35	0.86
	Per D	188.5	148.0	28750	1825	12.35	1.71
	Per m of wall	134.7	105.7	20540	1305	12.35	1.22
AZ 13-700-10/10 	Per S	98.3	77.2	14960	945	12.33	0.86
	Per D	196.6	154.3	29910	1895	12.33	1.71
	Per m of wall	140.4	110.2	21370	1355	12.33	1.22
AZ 14-700 	Per S	102.3	80.3	15530	980	12.32	0.86
	Per D	204.6	160.6	31060	1965	12.32	1.71
	Per m of wall	146.1	114.7	22190	1405	12.32	1.22

¹⁾ One side, excluding inside of interlocks.

Section	S = Single pile D = Double pile	Sectional area	Mass	Moment of inertia	Elastic section modulus	Radius of gyration	Coating area ¹⁾
AZ 17-700 	Per S	93.1	73.1	25360	1210	16.50	0.93
	Per D	186.2	146.2	50720	2420	16.50	1.86
	Per m of wall	133.0	104.4	36230	1730	16.50	1.33
AZ 18-700 	Per S	97.5	76.5	26460	1260	16.47	0.93
	Per D	194.9	153.0	52920	2520	16.47	1.86
	Per m of wall	139.2	109.3	37800	1800	16.47	1.33
AZ 19-700 	Per S	101.9	80.0	27560	1310	16.44	0.93
	Per D	203.8	160.0	55130	2620	16.44	1.86
	Per m of wall	145.6	114.3	39380	1870	16.44	1.33
AZ 20-700 	Per S	106.4	83.5	28670	1360	16.42	0.93
	Per D	212.8	167.0	57340	2725	16.42	1.86
	Per m of wall	152.0	119.3	40960	1945	16.42	1.33
AZ 24-700 	Per S	121.9	95.7	39080	1700	17.90	0.97
	Per D	243.8	191.4	78150	3405	17.90	1.93
	Per m of wall	174.1	136.7	55820	2430	17.90	1.38
AZ 26-700 	Per S	131.0	102.9	41800	1815	17.86	0.97
	Per D	262.1	205.7	83610	3635	17.86	1.93
	Per m of wall	187.2	146.9	59720	2600	17.86	1.38
AZ 28-700 	Per S	140.2	110.0	44530	1930	17.83	0.97
	Per D	280.3	220.1	89070	3865	17.83	1.93
	Per m of wall	200.2	157.2	63620	2760	17.83	1.38
AZ 36-700N 	Per S	151.1	118.6	62730	2510	20.37	1.03
	Per D	302.2	237.3	125450	5030	20.37	2.05
	Per m of wall	215.9	169.5	89610	3590	20.37	1.47
AZ 38-700N 	Per S	161.0	126.4	66390	2655	20.31	1.03
	Per D	322.0	252.8	132780	5310	20.31	2.05
	Per m of wall	230.0	180.6	94840	3795	20.31	1.47
AZ 40-700N 	Per S	170.9	134.2	70060	2795	20.25	1.03
	Per D	341.9	268.4	140110	5595	20.25	2.05
	Per m of wall	244.2	191.7	100080	3995	20.25	1.47

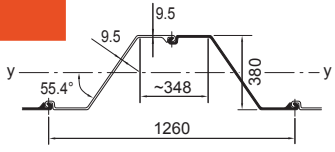
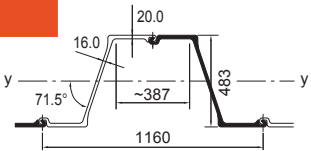
¹⁾ One side, excluding inside of interlocks.

Section	S = Single pile D = Double pile	Sectional area	Mass	Moment of inertia	Elastic section modulus	Radius of gyration	Coating area ¹⁾
AZ 42-700N 	Per S	181.1	142.1	73450	2945	20.14	1.03
	Per D	362.1	284.3	146900	5890	20.14	2.06
	Per m of wall	258.7	203.1	104930	4205	20.14	1.47
AZ 44-700N 	Per S	191.0	149.9	77100	3085	20.09	1.03
	Per D	382.0	299.8	154210	6170	20.09	2.06
	Per m of wall	272.8	214.2	110150	4405	20.09	1.47
AZ 46-700N 	Per S	200.9	157.7	80760	3220	20.05	1.03
	Per D	401.8	315.4	161520	6450	20.05	2.06
	Per m of wall	287.0	225.3	115370	4605	20.05	1.47
New AZ 48-700 	Per S	201.9	158.5	83760	3330	20.37	1.02
	Per D	403.8	317.0	167510	6660	20.37	2.04
	Per m of wall	288.4	226.4	119650	4755	20.37	1.46
AZ 50-700 	Per S	211.8	166.3	87430	3470	20.32	1.02
	Per D	423.6	332.5	174850	6940	20.32	2.04
	Per m of wall	302.6	237.5	124890	4955	20.32	1.46
AZ 52-700 	Per S	221.7	174.1	91100	3610	20.27	1.02
	Per D	443.5	348.1	182200	7215	20.27	2.04
	Per m of wall	316.8	248.7	130140	5155	20.27	1.46

¹⁾ One side, excluding inside of interlocks.

Costal defense project, Colwyn Bay, UK



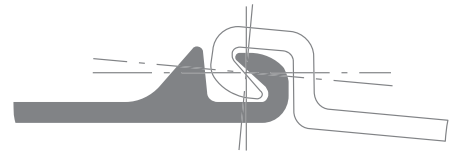
Section	S = Single pile D = Double pile	Sectional area cm ²	Mass kg/m	Moment of inertia cm ⁴	Elastic section modulus cm ³	Radius of gyration cm	Coating area ¹⁾ m ² /m
AZ[®]							
AZ 18 	Per S	94.8	74.4	21540	1135	15.07	0.86
	Per D	189.6	148.8	43080	2270	15.07	1.71
	Per m of wall	150.4	118.1	34200	1800	15.07	1.35
AZ 18-10/10 	Per S	99.1	77.8	22390	1175	15.04	0.86
	Per D	198.1	155.5	44790	2355	15.04	1.71
	Per m of wall	157.2	123.4	35540	1870	15.04	1.35
AZ 26 	Per S	124.6	97.8	34970	1640	16.75	0.90
	Per D	249.2	195.6	69940	3280	16.75	1.78
	Per m of wall	197.8	155.2	55510	2600	16.75	1.41
AZ 46 	Per S	168.9	132.6	64060	2665	19.48	0.95
	Per D	337.8	265.2	128120	5330	19.48	1.89
	Per m of wall	291.2	228.6	110450	4595	19.48	1.63
AZ 48 	Per S	177.8	139.6	67090	2785	19.43	0.95
	Per D	355.6	279.2	134180	5570	19.43	1.89
	Per m of wall	306.5	240.6	115670	4800	19.43	1.63
AZ 50 	Per S	186.9	146.7	70215	2910	19.38	0.95
	Per D	373.8	293.4	140430	5815	19.38	1.89
	Per m of wall	322.2	252.9	121060	5015	19.38	1.63

¹⁾ One side, excluding inside of interlocks.

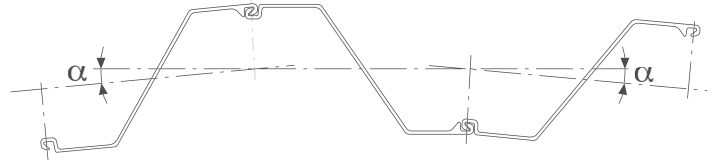
Boardwalk, Aarschot, Belgium



Interlock



AZ® Larssen interlock in accordance with EN 10248.
All available AZ sheet piles can be interlocked.
Theoretical interlock swing: $\alpha_{\max} = 5^\circ$.



Delivery form

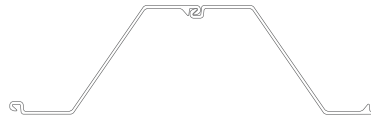
Single Pile
Position A



Single Pile
Position B



Double Pile
Form I (standard)

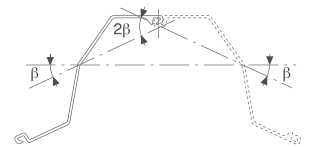
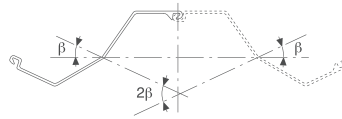


Double Pile
Form II (on request)



Bent piles

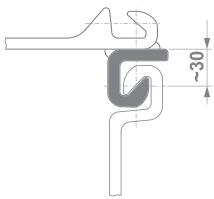
Maximum bending angle: $\beta = 25^\circ$. Z-piles are bent in the middle of the web. They are generally delivered as single piles. Double piles are available upon request.



Corner sections

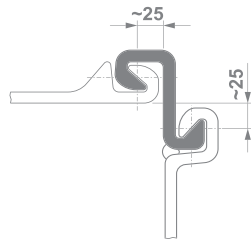
C 9

Mass ~ 9.3 kg/m



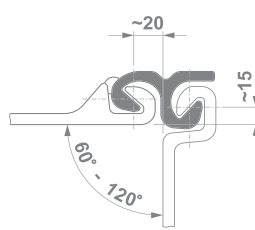
C 14

Mass ~ 14.4 kg/m



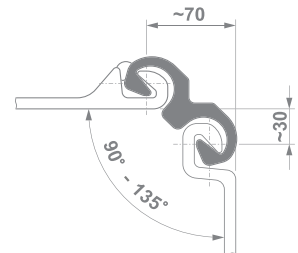
DELTA 13

Mass ~ 13.1 kg/m



OMEGA 18

Mass ~ 18.0 kg/m

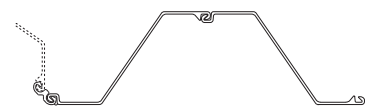
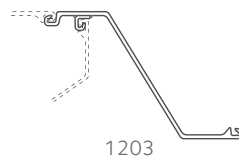
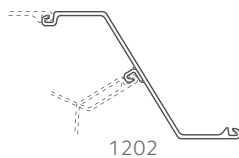
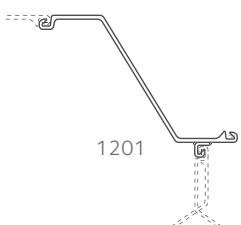


Special corner sections interlocking with Z-sections make it possible to form corner or junction piles without using fabricated special piles. Corner sections are fixed to the sheet pile in accordance with EN 12063.

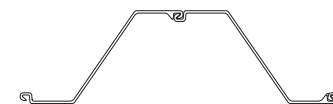
Different welding specifications are available on request. The corner sections are threaded and welded with a 200 mm setback from the top of the piles.

Corner and junction piles

The following special piles, among others, are available as single and double piles on request.



1051



1052

Crimping

Threaded AZ® double piles are recommended for facilitating the installation process. AZ double piles are not crimped for statical reasons. However, due to customer demand, most of our AZ piles are crimped according to our standard specification, for the following reasons:

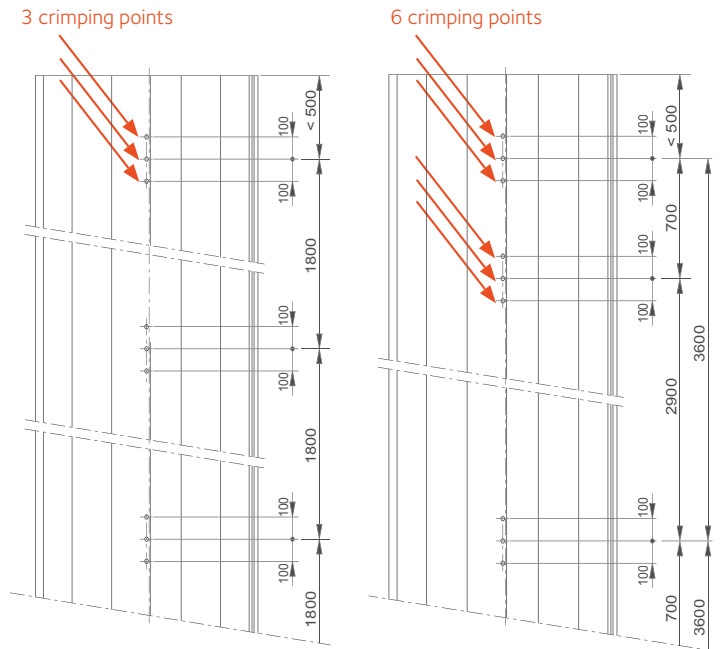
- Single piles easily bend around the weak axis under driving;
- Faster installation progress with double piles.



¹⁾ Amount and layout of crimping points may differ at both ends.
Special crimping on request.

Pile length < 6 m:
3 crimping points per 1.8 m
= 1.7 crimping points per m¹⁾

Pile length ≥ 6 m:
6 crimping points per 3.6 m
= 1.7 crimping points per m¹⁾



Tie back system

Most sheet pile retaining walls need supplementary support at the top, in addition to embedment in the soil. Temporary cofferdams generally use waler and strut bracing inside the excavation. Permanent or large retaining walls are often tied back to an anchor wall installed a certain distance behind the main wall. Other anchor systems, like injection anchors or anchor piles, can also be used. The drawing shows a typical horizontal tie-rod connection for sheet pile walls. The following components can be seen:

- | | |
|-----------------------------|----------------------|
| 1 Plain tie-rod | 7 Waling |
| 2 Upset end tie-rod | 8 Spacer |
| 3 Nut | 9 Supporting bracket |
| 4 Turnbuckle | 10 Splicing plate |
| 5 Bearing plate | 11 Splicing bolt |
| 6 Bearing plate on concrete | 12 Fixing bolt |
| | 13 |
| | 14 Fixing plate |
| | 15 |

