

The new HZ Steel Wall System: HZ-M / AZ

The development of larger vessels for the movement of containers and bulk cargo around the world has resulted in an increase of the depth of major ports, and consequentially the need for more heavy load berthing facilities arose. To cope with these deeper structures, conventional steel sheet piles were replaced with 'combined walls' which consist of two complementary elements: a primary element (king pile) and a secondary element (intermediary sheet pile).

Aware of this inescapable evolution in the main application field for the high range of conventional steel sheet piles, 'Arbed' (ArcelorMittal since 2007) in Luxembourg started producing the **HZ-ZH** combined wall system in the 1970's. Quickly this system imposed itself as the first choice for the construction of new quay walls in major ports in Germany, Italy, the USA, and many emerging economies.

Later in the 1990's, the development of the AZ steel sheet piles led to the improvement of the system: introduction of new HZ king piles that were available in different thicknesses, and the brand new infill sheet, the AZ sheet pile. This **HZ-AZ** system encountered a matchless success and is still being utilized all over the world, in most large ports, in deep excavations, in deep watertight cofferdams, etc. Shipments of the HZ/AZ system during the last years confirmed this evolution.

Furthermore, larger sea-going vessels are being built, loads on the future berths are expected to continue to increase. Several new mega-ports

are on the planning stage, most existing ports are expanding, and will require the execution of a large amount of new quay walls and deepening of existing ones. New types of applications do also require larger high capacity retaining walls. As a consequence, a shortage of production capacity of the HZ-AZ combined walls was predicted for the long-term. In order to continue to supply state-of-the-art and competitive foundation solutions, the new challenge for our company consisted in developing deeper hot rolled HZ sections, with thicker flanges, and providing a substantial increase in productivity and production capacity. But above all, more cost-effective. An incredible amount of parameters and constraints, in other words, a fascinating challenge for any R&D department.

Many technical solutions were analysed, then several promising alternatives were investigated in very detail in order to retain the one that leads to the best choice: technically an outstanding and proven solution, based on existing experience and technology, and economically, a highly competitive solution compared to existing systems and alternative construction methods and materials.

The concept consists in hot rolling a wide flange beam with variable thickness of the flange, and milling a groove into the flanges, on which a connector will be threaded. The finished product is quite similar to the previous HZ/AZ system. This innovative solution requires an equipment that was specifically designed for this high-precision task, starting from scratch. The best suppliers were challenged to design and fabricate this new equipment that will

guarantee both a higher production capacity and productivity compared to the existing system. A supplemental advantage is that due to the very tight milling tolerances achievable it will allow us to provide a tighter and better mechanical connection between the flange of the king pile and the hot rolled connectors RH/RZ.

Several internal and external teams are following closely this project and the first trial tests proved that we are on the right track. We do not have any doubt about its success and we will supply the first **HZ-M / AZ** steel sheet pile system before the end of 2008. In the meantime and during an adequate transition period, the existing HZ / AZ system will still be available.

This flyer should enable project owners, construction companies and design engineers working on mid term and long term projects to base their design on our new HZ-M / AZ system. A more comprehensive brochure will be released in a short time. For more information, please contact our specialists in our sales and technical department in Luxembourg, or within our worldwide network.

Yours sincerely

Emile Reuter

Vice President
Long Carbon Europe
Head of Sales and Marketing of Rails, Piles and Special Sections

January 2008

The new HZ Steel wall system

The enhanced 'HZ Steel Wall System' is a combined wall system that comprises two elements:

- HZ-M king pile, a brand new wide flange beam with a specific flange geometry
- AZ infill sheet piles

Hot rolled sections RZD/RZU and RH connect infill sheets and HZ-M king piles in order to guarantee a continuous wall.

The general concept of the 'HZ steel wall system' bases on a **stiff king pile** with **light**

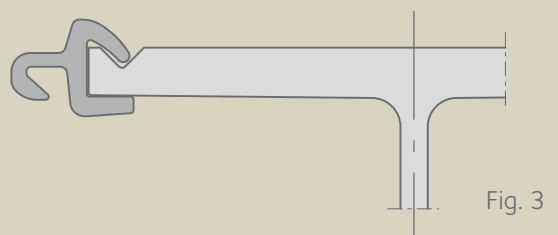
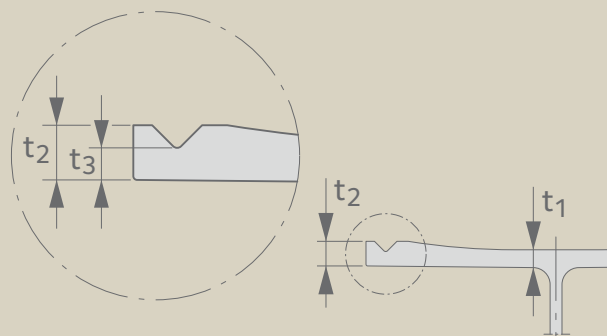
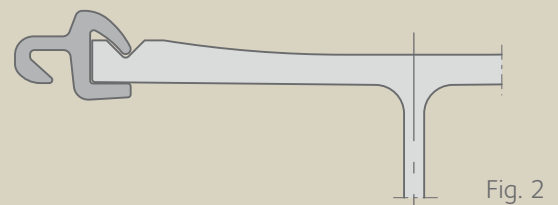
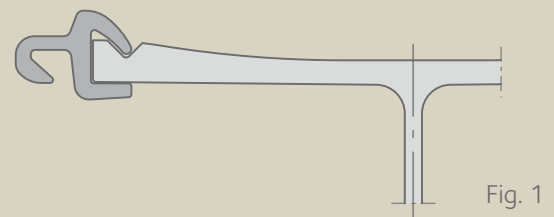
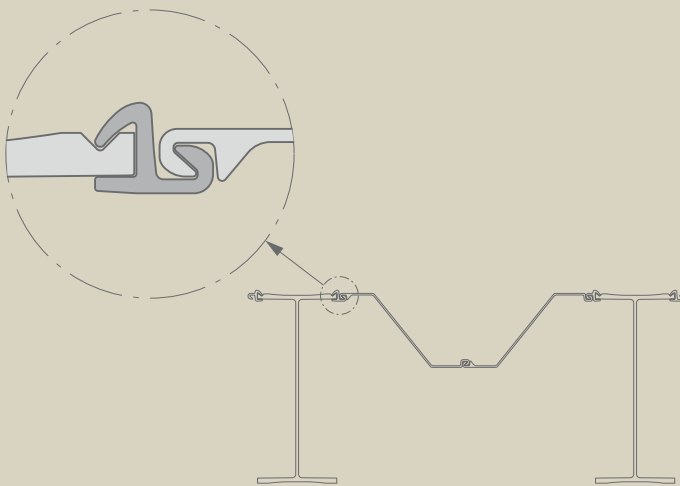
intermediary sheet piles resulting in an overall safe and cost-effective high capacity retaining structure, with a high stiffness.

There are three HZ-M king piles available, and each one can be rolled in different thicknesses. Six different 'solutions' have been retained for each HZ-M section.

The main improvement of the HZ-M king piles is the concave geometry of the flanges of the lighter HZ-M sections (Fig. 1 and Fig. 2), and the unmatched flange thickness of the heavier king pile sections (Fig. 3). To thread the RH/RZ

connectors, a groove is milled into the flange. The milling equipment was designed in order to guarantee very tight tolerances of the groove, which improves the minimum interlock hook connection and ensures a sufficient residual steel thickness t_3 . The groove will be milled only if required, i.e. sol. 12 and sol. C1 have only grooves on one flange.

The new HZ-M / AZ combinations can achieve equivalent elastic section moduli $W_{el,y}$ that can be roughly 30% higher than with the previous HZ / AZ system.



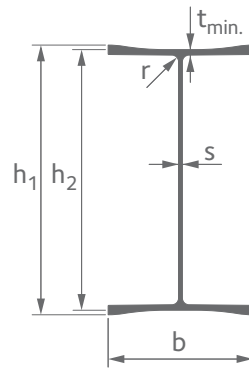
Notes

- The nominal width of a combination 'b_{sys}' has been rounded to a mean value valid for the whole range of a combination. However, the nominal width 'b' of the 'solutions' has been taken into account for the determination of the section properties. For installation purposes, the nominal system width of the combination 'b_{sys}' should be used.
- All the data in the tables in this flyer has been determined with a CAD software. The main section properties have been rounded. Section properties determined in a different way may differ slightly.
- Mass of HZ-M / AZ combinations: G_{60%}, G_{80%} & G_{100%} assume that the length of the connectors RZD/RZU and the RH on the back flange (Sol. 14 and Sol. 26) are the same as the length of the infill sheets AZ. The RH connecting two HZ-M king piles (Sol. 24 and Sol. 26) have the same length as the HZ-M king piles.

Conventions and symbols

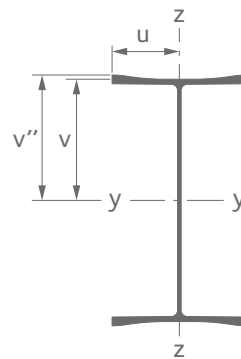
b	nominal width of the element [m]
b _{sys}	nominal width of the element / combination (system) [m]
h _i	height (depth) of the section [m]
t _f	thickness of the flange [m]
t _w	thickness of the web [m]
v _i	distance from neutral axis to extreme fiber of the HZ-M flange / connector RH/RZ [m]
i _y	radius of gyration about the y-y axis [m]. $i_y = I_y / \text{Sqrt}(A)$
r	inner radius of the HZ-M profile, between web and flange [m]
A	cross sectional steel area [m ²], [m ² /m]
A _{LS}	coating area on the soil side (back), excluding the inside of the interlocks, per element or system width, per unit length [m ² /m]
A _{LW}	coating area on the water side (front), excluding the inside of the interlocks, per element or system width, per unit length [m ² /m]
G	mass of the element / wall per unit length [kg/m], [kg/m ²]
G _{60%}	mass of the combination with length of the infill sheets AZ = 60% of length of the HZ-M king piles [kg/m ²]
G _{80%}	mass of the combination with length of the infill sheets AZ = 80% of length of the HZ-M king piles [kg/m ²]
G _{100%}	mass of the combination with length of the infill sheets AZ = 100% of length of the HZ-M king piles [kg/m ²]
I _y	moment of inertia about the main neutral axis y-y [m ⁴], [m ⁴ /m]
I _z	moment of inertia about the neutral axis z-z (weak axis) [m ⁴], [m ⁴ /m]
W _{el,y} *	equivalent elastic section modulus of the combination related to the extreme fiber of the flange of the HZ-M [m ³ /m]
W _{el,y} **	equivalent elastic section modulus of the combination related to the extreme fiber of the connector RZU/RZD/RH [m ³ /m]
W _{el,z}	elastic section modulus of the element related to neutral axis z-z (weak axis) [m ³]

HZ-M - King Piles



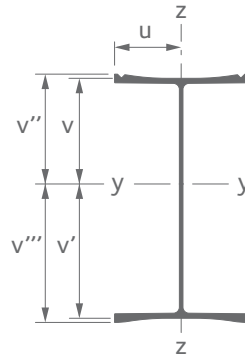
Section	h_1 mm	h_2 mm	b mm	t_{min} mm	s mm	r mm	Suitable connectors	
HZ 850M A	831.3	803.4	446	17.0	12.0	20	RZDU 16	RH 16
HZ 850M B	831.3	807.4	448	19.0	14.0	20	RZDU 16	RH 16
HZ 850M C	831.3	811.4	448	21.0	14.0	20	RZDU 16	RH 16
HZ 1075M A	1075.3	1047.4	448	17.0	14.0	20	RZDU 16	RH 16
HZ 1075M B	1075.3	1053.4	448	20.0	14.0	20	RZDU 16	RH 16
HZ 1075M C	1075.3	1059.4	450	23.0	16.0	20	RZDU 16	RH 16
HZ 1075M D	1075.3	1067.4	451	27.0	17.0	20	RZDU 16	RH 16
HZ 1100M A	1075.4	-	452	31.0	18.0	20	RZDU 16	RH 16
HZ 1100M B	1079.4	-	452	33.0	18.0	20	RZDU 16	RH 16
HZ 1100M C	1083.4	-	453	35.0	19.0	20	RZDU 18	RH 20
HZ 1100M D	1087.4	-	454	37.0	20.0	20	RZDU 18	RH 20

Solution 100



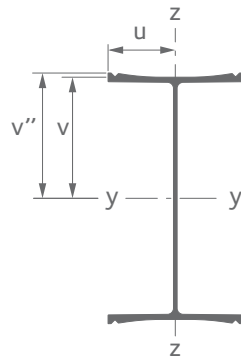
Section	Dimensions						Properties per solution								
	v mm	v' mm	v'' mm	v''' mm	u mm	u' mm	A cm ²	G kg/m	I_y cm ⁴	I_z cm ⁴	$W_{el,y}^*$ cm ³	$W_{el,y}^{**}$ cm ³	$W_{el,z}$ cm ³	A_{TW} m ² /m	A_{TS} m ² /m
HZ 850M A	401.7	-	415.7	-	223.0	-	280.9	220.5	341 730	36 430	8505	-	1 635	0.447	2.932
HZ 850M B	403.7	-	415.7	-	224.0	-	313.5	246.1	377 700	39 180	9355	-	1 750	0.449	2.934
HZ 850M C	405.7	-	415.7	-	224.0	-	328.0	257.5	401 720	40 760	9900	-	1 820	0.449	2.934
HZ 1075M A	523.7	-	537.7	-	224.0	-	331.7	260.4	631 340	37 040	12055	-	1 655	0.449	3.422
HZ 1075M B	526.7	-	537.7	-	224.0	-	355.1	278.7	696 650	40 020	13225	-	1 785	0.449	3.422
HZ 1075M C	529.7	-	537.7	-	225.0	-	397.1	311.7	775 070	42 630	14630	-	1 895	0.451	3.423
HZ 1075M D	533.7	-	537.7	-	225.5	-	431.1	338.4	851 460	44 600	15955	-	1 980	0.451	3.424
HZ 1100M A	537.7	-	537.7	-	226.0	-	458.3	359.8	909 130	45 590	16910	-	2 015	0.452	3.425
HZ 1100M B	539.7	-	539.7	-	226.0	-	476.4	373.9	961 540	48 660	17815	-	2 155	0.452	3.433
HZ 1100M C	541.7	-	541.7	-	226.5	-	505.3	396.6	1 025 000	52 100	18920	-	2 300	0.454	3.442
HZ 1100M D	543.7	-	543.7	-	227.0	-	534.3	419.4	1 089 130	55 580	20030	-	2 450	0.454	3.451

Solution 102



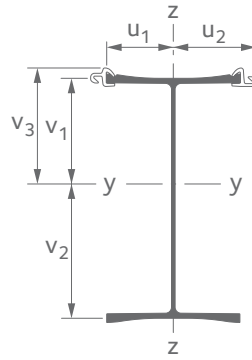
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	v	v'	v''	v'''	u	u'	A	G	I _y	I _z	W _{el,y} *	W _{el,y} **	W _{el,z}	A _{tW}	A _{tS}
	mm	mm	mm	mm	mm	mm	cm ²	kg/m	cm ⁴	cm ⁴	cm ³	cm ³	cm ³	m ² /m	m ² /m
HZ 850M A	406.1	397.3	420.1	411.2	223.0	-	277.9	218.2	336640	35230	8290	-	1580	0.465	2.932
HZ 850M B	408.3	399.1	420.3	411.1	224.0	-	310.1	243.4	371770	37780	9105	-	1685	0.469	2.934
HZ 850M C	410.1	401.3	420.0	411.3	224.0	-	324.5	254.8	395790	39360	9650	-	1755	0.468	2.934
HZ 1075M A	528.6	518.8	542.5	532.8	224.0	-	328.7	258.0	622710	35820	11780	-	1600	0.467	3.422
HZ 1075M B	532.0	521.4	542.9	532.4	224.0	-	351.6	276.0	686680	38620	12910	-	1725	0.468	3.422
HZ 1075M C	534.4	525.0	542.4	533.0	225.0	-	393.6	309.0	765110	41220	14315	-	1830	0.470	3.423
HZ 1075M D	538.0	529.4	542.0	533.3	225.5	-	427.6	335.7	841520	43180	15640	-	1915	0.471	3.424
HZ 1100M A	541.8	533.6	541.8	533.6	226.0	-	454.8	357.0	899110	44150	16595	-	1955	0.471	3.425
HZ 1100M B	545.0	534.4	545.0	534.4	226.0	-	471.7	370.3	948150	46750	17400	-	2070	0.475	3.433
HZ 1100M C	546.7	536.7	546.7	536.7	226.5	-	500.6	393.0	1011510	50180	18505	-	2215	0.476	3.460
HZ 1100M D	550.9	536.5	550.9	536.5	227.0	-	527.2	413.9	1068360	52660	19395	-	2320	0.481	3.462

Solution 104



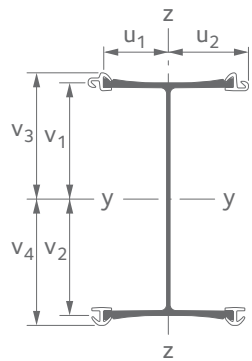
Section	Dimensions						Properties per solution								
	v	v'	v''	v'''	u	u'	A	G	I _y	I _z	W _{el,y} *	W _{el,y} **	W _{el,z}	A _{tW}	A _{tS}
	mm	mm	mm	mm	mm	mm	cm ²	kg/m	cm ⁴	cm ⁴	cm ³	cm ³	cm ³	m ² /m	m ² /m
HZ 850M A	401.7	-	415.7	-	223.0	-	274.9	215.8	331660	34040	8255	-	1525	0.465	2.949
HZ 850M B	403.7	-	415.7	-	224.0	-	306.6	240.7	365970	36380	9065	-	1625	0.469	2.953
HZ 850M C	405.7	-	415.7	-	224.0	-	321.1	252.0	389980	37960	9615	-	1695	0.468	2.953
HZ 1075M A	523.7	-	537.7	-	224.0	-	325.6	255.6	614230	34590	11730	-	1545	0.467	3.440
HZ 1075M B	526.7	-	537.7	-	224.0	-	348.1	273.3	676920	37220	12850	-	1660	0.468	3.441
HZ 1075M C	529.7	-	537.7	-	225.0	-	390.1	306.3	755330	39810	14260	-	1770	0.470	3.443
HZ 1075M D	533.7	-	537.7	-	225.5	-	424.1	332.9	831730	41760	15585	-	1850	0.471	3.443
HZ 1100M A	537.7	-	537.7	-	226.0	-	451.3	354.3	889250	42710	16540	-	1890	0.471	3.444
HZ 1100M B	539.7	-	539.7	-	226.0	-	467.1	366.7	935020	44850	17325	-	1985	0.475	3.456
HZ 1100M C	541.7	-	541.7	-	226.5	-	496.0	389.4	998270	48260	18430	-	2130	0.476	3.483
HZ 1100M D	543.7	-	543.7	-	227.0	-	520.2	408.3	1048180	49750	19280	-	2190	0.481	3.483

Solution 12



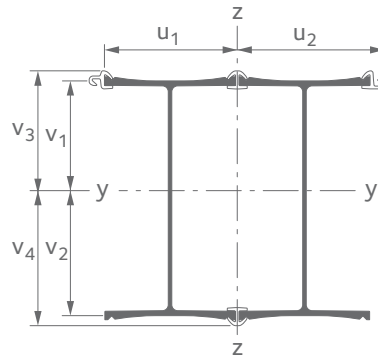
Section	Dimensions						Properties per solution								
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	mm	mm	mm	mm	mm	mm	cm ²	kg/m	cm ⁴	cm ⁴	cm ³	cm ³	cm ³	m ² /m	m ² /m
HZ 850M A	353.8	449.6	388.3	-	223.2	276.9	319.1	250.5	395 790	58 060	8 805	10 195	2 095	0.609	2.983
HZ 850M B	360.7	446.7	393.3	-	224.2	277.9	351.2	275.7	431 780	60 790	9 665	10 980	2 185	0.613	2.985
HZ 850M C	364.4	447.0	395.0	-	224.2	277.9	365.7	287.0	456 050	62 370	10 205	11 545	2 245	0.613	2.985
HZ 1075M A	469.8	577.6	504.3	-	224.2	277.9	369.8	290.3	724 910	58 830	12 550	14 375	2 115	0.611	3.474
HZ 1075M B	476.6	576.8	508.1	-	224.1	277.9	392.7	308.3	789 770	61 630	13 690	15 545	2 220	0.613	3.473
HZ 1075M C	484.4	575.0	513.0	-	225.1	278.9	434.7	341.3	869 140	64 430	15 115	16 945	2 310	0.614	3.475
HZ 1075M D	491.7	575.7	516.3	-	225.6	279.4	468.7	368.0	946 180	66 480	16 435	18 330	2 380	0.615	3.475
HZ 1100M A	498.0	577.4	518.6	-	226.1	279.9	495.9	389.3	1 004 240	67 550	17 395	19 365	2 415	0.616	3.476
HZ 1100M B	502.6	576.9	521.1	-	226.1	279.9	512.9	402.6	1 054 050	70 160	18 275	20 225	2 505	0.617	3.480
HZ 1100M C	502.4	581.0	521.9	-	226.6	280.4	546.5	429.0	1 128 560	75 890	19 425	21 625	2 705	0.630	3.319
HZ 1100M D	508.5	578.9	526.1	-	227.1	280.9	573.1	449.9	1 186 900	78 480	20 505	22 565	2 795	0.636	3.324

Solution 14



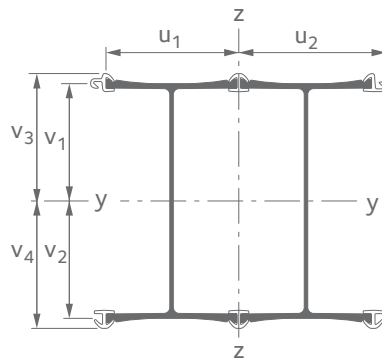
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	mm	mm	mm	mm	mm	mm	cm ²	kg/m	cm ⁴	cm ⁴	cm ³	cm ³	cm ³	m ² /m	m ² /m
HZ 850M A	401.5	401.9	436.1	436.2	223.2	276.9	356.8	280.1	464 640	78 550	11 560	10 655	2 835	0.609	3.222
HZ 850M B	403.5	403.9	436.1	436.2	224.2	277.9	388.5	305.0	498 950	81 280	12 355	11 440	2 925	0.613	3.226
HZ 850M C	405.5	405.9	436.1	436.1	224.2	277.9	403.0	316.3	522 970	82 860	12 885	11 990	2 980	0.613	3.225
HZ 1075M A	523.4	524.0	558.0	558.3	224.2	277.9	407.6	319.9	839 840	79 490	16 030	15 045	2 860	0.611	3.712
HZ 1075M B	526.4	527.0	558.0	558.2	224.1	277.9	430.0	337.6	902 530	82 120	17 125	16 165	2 955	0.613	3.714
HZ 1075M C	529.5	529.9	558.0	558.2	225.1	278.9	472.0	370.6	980 950	85 090	18 510	17 575	3 050	0.614	3.715
HZ 1075M D	533.5	533.9	558.0	558.2	225.6	279.4	506.0	397.2	1 057 350	87 230	19 805	18 940	3 125	0.615	3.716
HZ 1100M A	537.5	537.9	558.0	558.2	226.1	279.9	533.2	418.6	1 114 860	88 380	20 725	19 975	3 160	0.616	3.717
HZ 1100M B	539.5	539.9	558.1	558.2	226.1	279.9	549.0	431.0	1 160 630	90 510	21 495	20 795	3 235	0.617	3.718
HZ 1100M C	546.3	537.1	565.9	556.3	226.6	280.4	592.8	465.4	1 263 960	102 200	23 135	22 335	3 645	0.630	3.770
HZ 1100M D	548.2	539.2	565.7	556.5	227.1	280.9	617.0	484.4	1 313 880	103 910	23 970	23 225	3 700	0.636	3.776

Solution 24



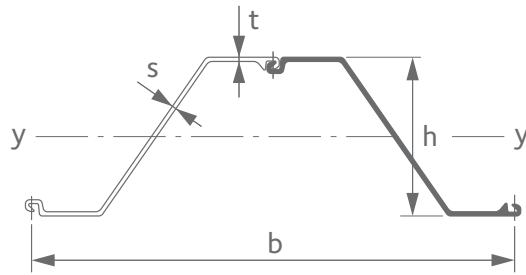
Section	Dimensions						Properties per solution								
	v_1 mm	v_2 mm	v_3 mm	v_4 mm	u_1 mm	u_2 mm	A cm ²	G kg/m	I_y cm ⁴	I_z cm ⁴	$W_{el,y}^*$ cm ³	$W_{el,y}^{**}$ cm ³	$W_{el,z}$ cm ³	A_{TW} m ² /m	A_{LS} m ² /m
HZ 850M A	375.6	427.9	410.1	462.1	453.3	507.1	631.8	495.9	791 990	448 330	18 510	17 140	8 840	1.121	3.513
HZ 850M B	379.9	427.5	412.5	459.7	455.3	509.0	695.1	545.6	861 000	490 100	20 140	18 730	9 630	1.129	3.521
HZ 850M C	382.9	428.5	413.4	458.8	455.3	509.0	724.0	568.4	909 180	508 750	21 215	19 815	9 995	1.128	3.520
HZ 1075M A	494.3	553.1	528.9	587.4	455.3	509.0	733.3	575.6	1 447 740	506 910	26 175	24 650	9 960	1.126	4.005
HZ 1075M B	499.0	554.4	530.6	585.7	455.3	509.0	778.1	610.8	1 573 490	536 170	28 385	26 865	10 535	1.128	4.008
HZ 1075M C	504.7	554.7	533.3	583.0	457.2	511.0	862.2	676.8	1 730 900	590 610	31 205	29 690	11 560	1.131	4.011
HZ 1075M D	510.5	556.9	535.1	581.1	458.2	512.0	930.2	730.2	1 884 090	633 490	33 835	32 420	12 375	1.133	4.012
HZ 1100M A	515.8	559.6	536.4	579.9	459.2	513.0	984.5	772.8	1 999 400	667 290	35 730	34 480	13 010	1.134	4.014
HZ 1100M B	518.5	560.9	537.1	579.2	459.2	513.0	1016.1	797.6	2 091 090	688 710	37 280	36 105	13 425	1.138	4.023
HZ 1100M C	519.7	563.7	539.2	583.0	461.2	515.0	1088.8	854.7	2 257 080	744 370	40 040	38 715	14 455	1.155	4.055
HZ 1100M D	522.6	564.8	540.2	582.1	462.2	516.0	1137.2	892.7	2 357 130	776 850	41 735	40 495	15 055	1.166	4.063

Solution 26



Section	Dimensions						Properties per solution								
	v_1 mm	v_2 mm	v_3 mm	v_4 mm	u_1 mm	u_2 mm	A cm ²	G kg/m	I_y cm ⁴	I_z cm ⁴	$W_{el,y}^*$ cm ³	$W_{el,y}^{**}$ cm ³	$W_{el,z}$ cm ³	A_{TW} m ² /m	A_{LS} m ² /m
HZ 850M A	401.6	401.8	436.2	436.1	453.3	507.1	672.5	527.9	862 860	534 780	21 475	19 785	10 545	1.121	3.734
HZ 850M B	403.6	403.8	436.2	436.1	455.3	509.0	735.8	577.6	931 480	577 300	23 070	21 355	11 340	1.129	3.742
HZ 850M C	405.6	405.8	436.2	436.1	455.3	509.0	764.8	600.4	979 510	595 940	24 140	22 460	11 710	1.128	3.741
HZ 1075M A	523.6	523.8	558.1	558.1	455.3	509.0	774.0	607.6	1 566 830	594 110	29 910	28 075	11 670	1.126	4.226
HZ 1075M B	526.6	526.8	558.1	558.1	455.3	509.0	818.9	642.8	1 692 210	623 370	32 120	30 320	12 245	1.128	4.229
HZ 1075M C	529.6	529.8	558.1	558.1	457.2	511.0	902.9	708.8	1 849 050	678 560	34 900	33 130	13 280	1.131	4.232
HZ 1075M D	533.6	533.8	558.1	558.1	458.2	512.0	970.9	762.2	2 001 840	721 820	37 500	35 865	14 100	1.133	4.233
HZ 1100M A	537.6	537.8	558.1	558.1	459.2	513.0	1025.3	804.8	2 116 870	756 010	39 360	37 925	14 740	1.134	4.235
HZ 1100M B	539.6	539.8	558.1	558.1	459.2	513.0	1056.8	829.6	2 208 410	777 420	40 910	39 565	15 155	1.138	4.238
HZ 1100M C	544.1	539.3	563.7	558.6	461.2	515.0	1139.8	894.7	2 402 740	856 730	44 160	42 625	16 635	1.155	4.295
HZ 1100M D	546.0	541.4	563.6	558.7	462.2	516.0	1188.1	932.7	2 502 560	889 690	45 835	44 405	17 245	1.166	4.306

AZ - Intermediary steel sheet piles

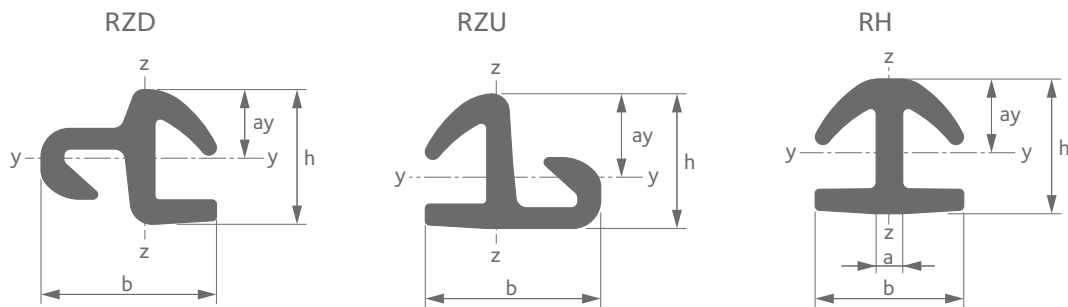


Section	Dimensions				Properties Double Piles					
	h	b	t	s	A	G	I _y	W _{el,y}	i _y	A _{LW}
	mm	mm	mm	mm	cm ²	kg/m	cm ⁴	cm ³	cm	m ² /m
AZ 13	303	1340	9.5	9.5	183.4	144.0	26 400	1 740	11.99	1.65
AZ 18	380	1260	9.5	9.5	189.6	148.8	43 080	2 270	15.07	1.71
AZ 26	427	1260	13.0	12.2	249.2	195.6	69 940	3 280	16.75	1.78
AZ 13-770	344	1540	9.0	9.0	193.8	152.1	34 440	2 000	13.33	1.85
AZ 18-700	420	1400	9.0	9.0	194.9	153.0	52 920	2 520	16.50	1.86
AZ 26-700	460	1400	12.2	12.2	262.1	205.7	83 610	3 635	17.86	1.93

Sheet piles with 10 mm thickness:

AZ 13-10/10	304	1340	10.0	10.0	191.6	150.4	27 440	1 810	11.97	1.65
AZ 18-10/10	381	1260	10.0	10.0	198.1	155.5	44 790	2 355	15.04	1.71
AZ 14-770-10/10	345	1540	10.0	10.0	211.2	165.8	37 330	2 165	13.30	1.85
AZ 20-700	421	1400	10.0	10.0	212.8	167.0	57 340	2 725	16.40	1.86

Connectors



Section	Dimensions				Properties							
	h	b	a	ay	A	G	I _y	I _z	W _{el,y}	W _{el,z}	A _{LW}	A _{Ls}
	mm	mm	mm	mm	cm ²	kg/m	cm ⁴	cm ⁴	cm ³	cm ³	m ² /m	m ² /m
RZD 16	62.0	81.0	-	31.5	20.7	16.2	57	96	18	22	0.12	0.06
RZU 16	62.0	81.0	-	38.2	20.5	16.1	68	96	18	22	0.09	0.10
RH 16	62.0	68.0	12.2	32.4	20.4	16.0	83	56	26	17	0.11	0.09
RZD 18	67.0	85.0	-	35.8	23.1	18.1	78	112	22	25	0.13	0.07
RZU 18	67.0	85.0	-	41.9	22.8	17.9	92	112	22	25	0.09	0.10
RH 20	67.0	79.0	14.2	36.4	25.5	20.0	123	91	34	23	0.12	0.10

Combination HZ - 12 / AZ 13

($b_{sys} = 1.860 \text{ m}$)

Section	Properties per meter of wall							Per system	
	A cm ² /m	I _y cm ⁴ /m	W _{ely} * cm ³ /m	W _{ely} ** cm ³ /m	G _{60%} kg/m ²	G _{80%} kg/m ²	G _{100%} kg/m ²	A _{LW} m ² /m	A _{LS} m ² /m
HZ 850M A	270.7	227 470	5 060	5 860	175	194	213	2.249	4.623
HZ 850M B	287.7	246 600	5 520	6 270	188	207	226	2.253	4.625
HZ 850M C	295.5	259 660	5 810	6 575	194	213	232	2.253	4.625
HZ 1075M A	297.7	404 360	7 000	8 020	196	215	234	2.251	5.114
HZ 1075M B	310.1	439 270	7 615	8 645	205	224	243	2.253	5.113
HZ 1075M C	332.3	481 470	8 375	9 385	223	242	261	2.254	5.115
HZ 1075M D	350.4	522 610	9 080	10 125	237	256	275	2.255	5.115
HZ 1100M A	364.8	553 510	9 585	10 675	249	267	286	2.256	5.116
HZ 1100M B	373.9	580 260	10 060	11 135	256	275	294	2.257	5.120
HZ 1100M C	391.8	619 950	10 670	11 880	269	288	308	2.270	4.959
HZ 1100M D	405.9	650 910	11 245	12 375	280	299	319	2.276	4.964

Combination HZ - 14 / AZ 13

($b_{sys} = 1.860 \text{ m}$)

HZ 850M A	291.1	264 570	6 585	6 065	184	206	228	2.249	4.862
HZ 850M B	307.8	282 750	7 000	6 485	197	219	242	2.253	4.866
HZ 850M C	315.6	295 680	7 285	6 780	203	225	248	2.253	4.865
HZ 1075M A	318.1	466 220	8 900	8 350	205	227	250	2.251	5.352
HZ 1075M B	330.2	499 960	9 490	8 955	214	237	259	2.253	5.353
HZ 1075M C	352.4	541 590	10 220	9 700	232	254	277	2.254	5.355
HZ 1075M D	370.5	582 350	10 905	10 430	246	268	291	2.255	5.356
HZ 1100M A	384.9	612 920	11 395	10 980	257	280	302	2.256	5.356
HZ 1100M B	393.3	637 510	11 810	11 420	264	286	309	2.257	5.358
HZ 1100M C	416.7	692 630	12 680	12 240	280	303	327	2.270	5.410
HZ 1100M D	429.4	719 030	13 115	12 710	290	313	337	2.276	5.416

Combination HZ - 24 / AZ 13

($b_{sys} = 2.325 \text{ m}$)

HZ 850M A	351.9	353 330	8 260	7 645	246	261	276	2.761	5.153
HZ 850M B	378.6	382 470	8 950	8 320	267	282	297	2.769	5.160
HZ 850M C	391.1	403 230	9 410	8 790	277	292	307	2.768	5.160
HZ 1075M A	395.1	635 350	11 490	10 815	280	295	310	2.766	5.645
HZ 1075M B	414.4	689 550	12 440	11 775	295	310	325	2.768	5.648
HZ 1075M C	449.9	756 090	13 630	12 970	323	338	353	2.771	5.651
HZ 1075M D	478.7	821 290	14 750	14 130	345	361	376	2.773	5.652
HZ 1100M A	501.6	870 110	15 550	15 005	364	379	394	2.774	5.654
HZ 1100M B	515.2	909 500	16 215	15 705	374	389	404	2.778	5.663
HZ 1100M C	545.5	979 110	17 370	16 795	397	413	428	2.795	5.694
HZ 1100M D	565.8	1 021 130	18 080	17 545	413	429	444	2.806	5.703

Combination HZ - 26 / AZ 13

($b_{sys} = 2.325 \text{ m}$)

HZ 850M A	369.5	383 930	9 555	8 805	254	272	290	2.761	5.374
HZ 850M B	396.2	412 840	10 225	9 465	275	293	311	2.769	5.381
HZ 850M C	408.7	433 540	10 685	9 940	285	303	321	2.768	5.381
HZ 1075M A	412.6	686 680	13 110	12 305	288	306	324	2.766	5.866
HZ 1075M B	432.0	740 720	14 060	13 270	303	321	339	2.768	5.869
HZ 1075M C	467.4	806 920	15 230	14 460	331	349	367	2.771	5.872
HZ 1075M D	496.2	871 910	16 335	15 620	354	372	390	2.773	5.873
HZ 1100M A	519.1	920 570	17 115	16 495	372	390	408	2.774	5.875
HZ 1100M B	532.7	959 890	17 780	17 200	382	400	418	2.778	5.878
HZ 1100M C	567.4	1 041 570	19 140	18 480	408	427	445	2.795	5.935
HZ 1100M D	587.6	1 083 440	19 840	19 225	424	442	461	2.806	5.946

Combination HZ - 12 / AZ 18

($b_{sys} = 1.780 \text{ m}$)

Section	Properties per meter of wall							Per system	
	A	I_y	W_{ely}^*	W_{ely}^{**}	$G_{60\%}$	$G_{80\%}$	$G_{100\%}$	A_{LW}	A_{Ls}
	cm ² /m	cm ⁴ /m	cm ³ /m	cm ³ /m	kg/m ²	kg/m ²	kg/m ²	m ² /m	m ² /m
HZ 850M A	286.4	247 110	5 495	6 365	184	204	225	2.310	4.684
HZ 850M B	304.2	267 080	5 980	6 790	198	218	239	2.314	4.686
HZ 850M C	312.3	280 730	6 280	7 105	204	225	245	2.313	4.686
HZ 1075M A	314.6	431 940	7 480	8 565	206	227	247	2.312	5.174
HZ 1075M B	327.5	468 420	8 120	9 220	216	237	257	2.313	5.174
HZ 1075M C	350.8	512 480	8 915	9 990	235	255	275	2.315	5.175
HZ 1075M D	369.6	555 450	9 650	10 760	249	270	290	2.316	5.176
HZ 1100M A	384.7	587 720	10 180	11 335	261	282	302	2.316	5.177
HZ 1100M B	394.2	615 670	10 675	11 815	269	289	309	2.318	5.181
HZ 1100M C	412.9	657 120	11 310	12 590	283	303	324	2.331	5.020
HZ 1100M D	427.5	689 450	11 910	13 105	294	315	336	2.337	5.025

Combination HZ - 14 / AZ 18

($b_{sys} = 1.780 \text{ m}$)

HZ 850M A	307.7	285 880	7 115	6 555	194	218	242	2.310	4.923
HZ 850M B	325.1	304 860	7 550	6 990	207	231	255	2.314	4.926
HZ 850M C	333.3	318 360	7 845	7 300	214	238	262	2.313	4.926
HZ 1075M A	335.9	496 580	9 475	8 895	216	240	264	2.312	5.413
HZ 1075M B	348.5	531 840	10 095	9 525	226	250	274	2.313	5.414
HZ 1075M C	371.7	575 300	10 855	10 305	244	268	292	2.315	5.416
HZ 1075M D	390.6	617 870	11 570	11 070	259	283	307	2.316	5.416
HZ 1100M A	405.6	649 800	12 080	11 640	271	294	318	2.316	5.417
HZ 1100M B	414.5	675 490	12 510	12 100	278	301	325	2.318	5.419
HZ 1100M C	438.8	733 060	13 420	12 955	294	319	344	2.331	5.471
HZ 1100M D	452.1	760 630	13 875	13 445	305	330	355	2.337	5.477

Combination HZ - 24 / AZ 18

($b_{sys} = 2.245 \text{ m}$)

HZ 850M A	367.3	373 430	8 730	8 080	256	272	288	2.822	5.214
HZ 850M B	394.9	403 570	9 440	8 780	278	294	310	2.829	5.221
HZ 850M C	407.8	425 080	9 920	9 265	288	304	320	2.829	5.221
HZ 1075M A	411.9	665 490	12 035	11 330	291	307	323	2.826	5.706
HZ 1075M B	432.0	721 620	13 015	12 320	307	323	339	2.829	5.709
HZ 1075M C	468.7	790 470	14 250	13 560	336	352	368	2.832	5.712
HZ 1075M D	498.5	857 970	15 405	14 765	359	375	391	2.833	5.713
HZ 1100M A	522.2	908 490	16 235	15 670	378	394	410	2.835	5.715
HZ 1100M B	536.3	949 280	16 925	16 390	389	405	421	2.838	5.724
HZ 1100M C	567.6	1 021 300	18 115	17 520	413	429	446	2.856	5.755
HZ 1100M D	588.6	1 064 770	18 855	18 295	429	446	462	2.867	5.764

Combination HZ - 26 / AZ 18

($b_{sys} = 2.245 \text{ m}$)

HZ 850M A	385.5	405 120	10 085	9 290	265	284	303	2.822	5.435
HZ 850M B	413.1	435 030	10 775	9 975	286	305	324	2.829	5.442
HZ 850M C	426.0	456 470	11 250	10 465	296	315	334	2.829	5.442
HZ 1075M A	430.1	718 650	13 720	12 875	300	319	338	2.826	5.927
HZ 1075M B	450.2	774 610	14 705	13 880	315	334	353	2.829	5.930
HZ 1075M C	486.8	843 120	15 915	15 105	344	363	382	2.832	5.933
HZ 1075M D	516.7	910 390	17 055	16 310	368	387	406	2.833	5.934
HZ 1100M A	540.4	960 750	17 865	17 215	386	405	424	2.835	5.936
HZ 1100M B	554.4	1 001 470	18 555	17 945	397	416	435	2.838	5.939
HZ 1100M C	590.3	1 085 970	19 960	19 265	423	443	463	2.856	5.996
HZ 1100M D	611.2	1 129 290	20 680	20 040	440	460	480	2.867	6.007

Combination HZ - 12 / AZ 26

($b_{sys} = 1.780 \text{ m}$)

Section	Properties per meter of wall							Per system	
	A cm ² /m	I _y cm ⁴ /m	W _{ely} * cm ³ /m	W _{ely} ** cm ³ /m	G _{60%} kg/m ²	G _{80%} kg/m ²	G _{100%} kg/m ²	A _{LW} m ² /m	A _{LS} m ² /m
HZ 850M A	320.0	262 240	5830	6 755	200	226	251	2.383	4.758
HZ 850M B	337.7	282 180	6315	7 175	214	239	265	2.387	4.760
HZ 850M C	345.8	295 830	6620	7 490	220	246	271	2.387	4.759
HZ 1075M A	348.2	447 050	7740	8 865	222	248	273	2.386	5.248
HZ 1075M B	361.0	483 530	8385	9 515	232	258	283	2.387	5.247
HZ 1075M C	384.2	527 570	9175	10 285	250	276	302	2.389	5.249
HZ 1075M D	403.1	570 530	9910	11 050	265	291	316	2.389	5.250
HZ 1100M A	418.1	602 790	10440	11 625	277	303	328	2.390	5.250
HZ 1100M B	427.6	630 750	10935	12 105	285	310	336	2.392	5.254
HZ 1100M C	446.3	672 180	11570	12 880	298	324	350	2.405	5.093
HZ 1100M D	460.9	704 510	12170	13 390	310	336	362	2.410	5.098

Combination HZ - 14 / AZ 26

($b_{sys} = 1.780 \text{ m}$)

HZ 850M A	341.2	301 000	7490	6 900	209	239	268	2.383	4.996
HZ 850M B	358.7	319 960	7920	7 335	223	252	282	2.387	5.000
HZ 850M C	366.8	333 470	8215	7 645	229	259	288	2.387	5.000
HZ 1075M A	369.4	511 790	9765	9 165	231	261	290	2.386	5.486
HZ 1075M B	382.0	546 950	10380	9 800	241	271	300	2.387	5.488
HZ 1075M C	405.2	590 390	11140	10 575	260	289	318	2.389	5.489
HZ 1075M D	424.1	632 950	11855	11 340	275	304	333	2.389	5.490
HZ 1100M A	439.1	664 870	12360	11 910	286	315	345	2.390	5.491
HZ 1100M B	447.9	690 560	12790	12 370	293	322	352	2.392	5.492
HZ 1100M C	472.3	748 120	13695	13 220	310	340	371	2.405	5.544
HZ 1100M D	485.5	775 680	14150	13 710	320	351	381	2.410	5.550

Combination HZ - 24 / AZ 26

($b_{sys} = 2.245 \text{ m}$)

HZ 850M A	394.0	385 440	9010	8 340	268	289	309	2.896	5.287
HZ 850M B	421.5	415 560	9720	9 040	290	311	331	2.903	5.295
HZ 850M C	434.4	437 070	10200	9 525	300	321	341	2.902	5.294
HZ 1075M A	438.5	677 480	12250	11 535	304	324	344	2.900	5.780
HZ 1075M B	458.6	733 610	13235	12 525	319	340	360	2.903	5.782
HZ 1075M C	495.2	802 440	14465	13 765	348	368	389	2.906	5.785
HZ 1075M D	525.1	869 930	15620	14 970	372	392	412	2.907	5.787
HZ 1100M A	548.8	920 440	16450	15 875	390	410	431	2.909	5.788
HZ 1100M B	562.8	961 230	17140	16 595	401	422	442	2.912	5.797
HZ 1100M C	594.1	1 033 220	18330	17 720	425	446	466	2.929	5.829
HZ 1100M D	615.0	1 076 690	19065	18 500	442	462	483	2.940	5.837

Combination HZ - 26 / AZ 26

($b_{sys} = 2.245 \text{ m}$)

HZ 850M A	412.2	417 140	10380	9 565	277	300	324	2.896	5.508
HZ 850M B	439.7	447 020	11070	10 250	299	322	345	2.903	5.516
HZ 850M C	452.6	468 460	11545	10 740	309	332	355	2.902	5.515
HZ 1075M A	456.7	730 640	13950	13 090	312	335	359	2.900	6.001
HZ 1075M B	476.8	786 600	14930	14 095	328	351	374	2.903	6.003
HZ 1075M C	513.4	855 090	16140	15 320	357	380	403	2.906	6.006
HZ 1075M D	543.2	922 350	17280	16 525	380	403	426	2.907	6.008
HZ 1100M A	566.9	972 690	18085	17 425	399	422	445	2.909	6.009
HZ 1100M B	580.9	1 013 410	18775	18 155	410	433	456	2.912	6.013
HZ 1100M C	616.7	1 097 890	20175	19 480	436	460	484	2.929	6.069
HZ 1100M D	637.6	1 141 200	20900	20 250	452	476	501	2.940	6.080

Combination HZ - 12 / AZ 13-770

($b_{sys} = 2.060 \text{ m}$)

Section	Properties per meter of wall							Per system	
	A cm ² /m	I _y cm ⁴ /m	W _{ely} * cm ³ /m	W _{ely} ** cm ³ /m	G _{60%} kg/m ²	G _{80%} kg/m ²	G _{100%} kg/m ²	A _{LW} m ² /m	A _{LS} m ² /m
HZ 850M A	249.4	209 260	4 655	5 390	160	178	196	2.446	4.820
HZ 850M B	264.8	226 540	5 070	5 760	172	190	208	2.450	4.822
HZ 850M C	271.9	238 340	5 330	6 035	178	195	213	2.449	4.822
HZ 1075M A	273.9	368 970	6 390	7 315	179	197	215	2.448	5.310
HZ 1075M B	285.0	400 490	6 945	7 880	188	206	224	2.449	5.310
HZ 1075M C	305.1	438 630	7 630	8 550	204	222	240	2.451	5.311
HZ 1075M D	321.5	475 800	8 265	9 215	217	234	252	2.452	5.312
HZ 1100M A	334.5	503 720	8 725	9 715	227	245	263	2.452	5.313
HZ 1100M B	342.7	527 880	9 150	10 130	233	251	269	2.454	5.317
HZ 1100M C	358.9	563 740	9 705	10 800	245	263	282	2.467	5.156
HZ 1100M D	371.6	591 740	10 220	11 250	255	273	292	2.473	5.161

Combination HZ - 14 / AZ 13-770

($b_{sys} = 2.060 \text{ m}$)

HZ 850M A	267.8	242 750	6 040	5 565	168	189	210	2.446	5.059
HZ 850M B	282.9	259 180	6 415	5 940	180	201	222	2.450	5.062
HZ 850M C	290.0	270 850	6 675	6 210	186	207	228	2.449	5.062
HZ 1075M A	292.2	424 820	8 110	7 610	187	208	229	2.448	5.549
HZ 1075M B	303.1	455 280	8 640	8 155	196	217	238	2.449	5.550
HZ 1075M C	323.2	492 910	9 300	8 830	212	233	254	2.451	5.552
HZ 1075M D	339.6	529 740	9 920	9 490	225	246	267	2.452	5.552
HZ 1100M A	352.6	557 370	10 360	9 985	235	256	277	2.452	5.553
HZ 1100M B	360.2	579 570	10 735	10 385	241	262	283	2.454	5.555
HZ 1100M C	381.3	629 380	11 520	11 120	255	277	299	2.467	5.607
HZ 1100M D	392.8	653 250	11 915	11 545	264	286	308	2.473	5.612

Combination HZ - 24 / AZ 13-770

($b_{sys} = 2.525 \text{ m}$)

HZ 850M A	328.1	328 440	7 675	7 105	228	243	258	2.958	5.350
HZ 850M B	352.7	355 300	8 310	7 730	248	262	277	2.965	5.357
HZ 850M C	364.2	374 420	8 740	8 160	257	271	286	2.965	5.356
HZ 1075M A	367.8	588 120	10 635	10 015	259	274	289	2.962	5.842
HZ 1075M B	385.7	638 020	11 510	10 895	273	288	303	2.965	5.845
HZ 1075M C	418.3	699 370	12 610	11 995	299	314	328	2.968	5.848
HZ 1075M D	444.9	759 450	13 640	13 070	320	335	349	2.969	5.849
HZ 1100M A	466.1	804 460	14 375	13 875	337	351	366	2.971	5.851
HZ 1100M B	478.5	840 730	14 990	14 515	346	361	376	2.974	5.860
HZ 1100M C	506.5	904 950	16 055	15 520	368	383	398	2.992	5.891
HZ 1100M D	525.2	943 720	16 710	16 215	383	397	412	3.003	5.900

Combination HZ - 26 / AZ 13-770

($b_{sys} = 2.525 \text{ m}$)

HZ 850M A	344.3	356 610	8 875	8 175	236	253	270	2.958	5.571
HZ 850M B	368.9	383 270	9 490	8 785	255	272	290	2.965	5.578
HZ 850M C	380.4	402 330	9 915	9 225	264	281	299	2.965	5.577
HZ 1075M A	384.0	635 370	12 130	11 385	267	284	301	2.962	6.063
HZ 1075M B	401.8	685 120	13 005	12 275	281	298	315	2.965	6.066
HZ 1075M C	434.5	746 170	14 085	13 370	307	324	341	2.968	6.069
HZ 1075M D	461.1	806 060	15 100	14 440	328	345	362	2.969	6.070
HZ 1100M A	482.2	850 930	15 820	15 245	344	361	379	2.971	6.072
HZ 1100M B	494.7	887 140	16 435	15 895	354	371	388	2.974	6.075
HZ 1100M C	526.7	962 470	17 690	17 075	377	395	413	2.992	6.131
HZ 1100M D	545.3	1 001 110	18 335	17 765	392	410	428	3.003	6.143

Combination HZ - 12 / AZ 18-700

($b_{sys} = 1.920 \text{ m}$)

Section	Properties per meter of wall							Per system	
	A cm ² /m	I _y cm ⁴ /m	W _{ely} * cm ³ /m	W _{ely} ** cm ³ /m	G _{60%} kg/m ²	G _{80%} kg/m ²	G _{100%} kg/m ²	A _{LW} m ² /m	A _{LS} m ² /m
HZ 850M A	268.2	234 190	5 210	6030	172	191	211	2.457	4.831
HZ 850M B	284.7	252 710	5 660	6 425	185	204	224	2.460	4.833
HZ 850M C	292.3	265 370	5 935	6 720	191	210	229	2.460	4.833
HZ 1075M A	294.4	405 540	7 020	8040	192	212	231	2.459	5.321
HZ 1075M B	306.4	439 360	7 615	8 645	202	221	241	2.460	5.321
HZ 1075M C	327.9	480 240	8 350	9 360	219	238	257	2.462	5.322
HZ 1075M D	345.5	520 090	9 035	10 075	233	252	271	2.462	5.323
HZ 1100M A	359.4	550 030	9 525	10 605	244	263	282	2.463	5.324
HZ 1100M B	368.2	575 950	9 985	11 055	251	270	289	2.465	5.328
HZ 1100M C	385.6	614 400	10 575	11 770	263	283	303	2.478	5.167
HZ 1100M D	399.2	644 400	11 130	12 250	274	294	313	2.484	5.172

Combination HZ - 14 / AZ 18-700

($b_{sys} = 1.920 \text{ m}$)

HZ 850M A	288.0	270 130	6 720	6 195	181	203	226	2.457	5.070
HZ 850M B	304.2	287 730	7 125	6 595	193	216	239	2.460	5.073
HZ 850M C	311.7	300 250	7 400	6 885	199	222	245	2.460	5.073
HZ 1075M A	314.1	465 470	8 885	8 340	201	224	247	2.459	5.560
HZ 1075M B	325.8	498 150	9 455	8 925	210	233	256	2.460	5.561
HZ 1075M C	347.4	538 470	10 160	9 645	227	250	273	2.462	5.563
HZ 1075M D	364.9	577 960	10 825	10 355	241	264	286	2.462	5.563
HZ 1100M A	378.8	607 590	11 295	10 885	252	275	297	2.463	5.564
HZ 1100M B	387.0	631 400	11 695	11 310	259	281	304	2.465	5.566
HZ 1100M C	409.6	684 810	12 535	12 100	274	298	322	2.478	5.618
HZ 1100M D	422.0	710 390	12 960	12 555	284	307	331	2.484	5.623

Combination HZ - 24 / AZ 18-700

($b_{sys} = 2.385 \text{ m}$)

HZ 850M A	347.9	355 570	8 310	7 695	242	258	273	2.969	5.360
HZ 850M B	373.9	383 970	8 985	8 350	262	278	294	2.976	5.368
HZ 850M C	386.1	404 210	9 435	8 810	272	287	303	2.976	5.367
HZ 1075M A	389.9	630 480	11 400	10 735	275	291	306	2.973	5.853
HZ 1075M B	408.8	683 310	12 325	11 665	290	305	321	2.976	5.856
HZ 1075M C	443.4	748 190	13 490	12 835	317	332	348	2.979	5.859
HZ 1075M D	471.5	811 750	14 575	13 970	339	355	370	2.980	5.860
HZ 1100M A	493.9	859 360	15 360	14 820	357	372	388	2.982	5.862
HZ 1100M B	507.1	897 750	16 005	15 500	367	383	398	2.985	5.871
HZ 1100M C	536.6	965 640	17 130	16 565	390	405	421	3.003	5.902
HZ 1100M D	556.4	1 006 620	17 825	17 295	405	421	437	3.014	5.910

Combination HZ - 26 / AZ 18-700

($b_{sys} = 2.385 \text{ m}$)

HZ 850M A	365.1	385 400	9 590	8 835	250	268	287	2.969	5.582
HZ 850M B	391.0	413 580	10 240	9 480	270	289	307	2.976	5.589
HZ 850M C	403.2	433 760	10 690	9 945	280	298	317	2.976	5.588
HZ 1075M A	407.1	680 510	12 990	12 195	283	301	320	2.973	6.074
HZ 1075M B	425.9	733 190	13 915	13 135	298	316	334	2.976	6.077
HZ 1075M C	460.5	797 740	15 055	14 295	325	343	361	2.979	6.080
HZ 1075M D	488.6	861 100	16 130	15 430	347	365	384	2.980	6.081
HZ 1100M A	510.9	908 550	16 895	16 280	365	383	401	2.982	6.083
HZ 1100M B	524.1	946 880	17 540	16 965	375	393	411	2.985	6.086
HZ 1100M C	557.9	1 026 530	18 865	18 210	400	419	438	3.003	6.142
HZ 1100M D	577.7	1 067 360	19 550	18 940	415	434	453	3.014	6.154

Combination HZ - 12 / AZ 26-700

($b_{sys} = 1.920 \text{ m}$)

Section	Properties per meter of wall							Per system	
	A	I_y	W_{ely}^*	W_{ely}^{**}	$G_{60\%}$	$G_{80\%}$	$G_{100\%}$	A_{LW}	A_{Ls}
	cm ² /m	cm ⁴ /m	cm ³ /m	cm ³ /m	kg/m ²	kg/m ²	kg/m ²	m ² /m	m ² /m
HZ 850M A	303.3	250 210	5 565	6 445	188	213	238	2.540	4.914
HZ 850M B	319.8	268 710	6 015	6 835	201	226	251	2.543	4.916
HZ 850M C	327.3	281 370	6 295	7 125	207	232	257	2.543	4.915
HZ 1075M A	329.5	421 540	7 300	8 360	209	234	259	2.542	5.404
HZ 1075M B	341.4	455 360	7 895	8 960	218	243	268	2.543	5.403
HZ 1075M C	362.9	496 220	8 630	9 675	235	260	285	2.545	5.405
HZ 1075M D	380.5	536 070	9 310	10 385	249	274	299	2.545	5.406
HZ 1100M A	394.4	566 000	9 805	10 915	260	285	310	2.546	5.406
HZ 1100M B	403.2	591 920	10 260	11 360	267	292	317	2.548	5.410
HZ 1100M C	420.5	630 360	10 850	12 075	280	305	330	2.561	5.249
HZ 1100M D	434.1	660 350	11 405	12 555	291	316	341	2.566	5.254

Combination HZ - 14 / AZ 26-700

($b_{sys} = 1.920 \text{ m}$)

HZ 850M A	323.0	286 150	7 120	6 560	197	225	254	2.540	5.152
HZ 850M B	339.2	303 740	7 520	6 965	210	238	266	2.543	5.156
HZ 850M C	346.7	316 260	7 790	7 250	216	244	272	2.543	5.156
HZ 1075M A	349.1	481 470	9 190	8 625	218	246	274	2.542	5.642
HZ 1075M B	360.9	514 150	9 755	9 210	227	255	283	2.543	5.644
HZ 1075M C	382.4	554 460	10 465	9 935	244	272	300	2.545	5.645
HZ 1075M D	399.9	593 940	11 125	10 640	258	286	314	2.545	5.646
HZ 1100M A	413.8	623 550	11 590	11 170	269	297	325	2.546	5.647
HZ 1100M B	422.0	647 370	11 990	11 600	275	303	331	2.548	5.648
HZ 1100M C	444.6	700 760	12 825	12 385	290	320	349	2.561	5.700
HZ 1100M D	456.9	726 340	13 250	12 840	300	329	359	2.566	5.706

Combination HZ - 24 / AZ 26-700

($b_{sys} = 2.385 \text{ m}$)

HZ 850M A	376.2	368 490	8 615	7 975	255	275	295	3.052	5.443
HZ 850M B	402.1	396 860	9 285	8 630	276	296	316	3.059	5.451
HZ 850M C	414.3	417 100	9 735	9 090	285	305	325	3.058	5.450
HZ 1075M A	418.2	643 370	11 635	10 955	288	308	328	3.056	5.936
HZ 1075M B	437.0	696 200	12 560	11 885	303	323	343	3.059	5.938
HZ 1075M C	471.6	761 060	13 720	13 055	330	350	370	3.062	5.941
HZ 1075M D	499.7	824 620	14 810	14 190	352	372	392	3.063	5.943
HZ 1100M A	522.0	872 210	15 585	15 040	370	390	410	3.065	5.944
HZ 1100M B	535.2	910 600	16 235	15 720	380	400	420	3.068	5.953
HZ 1100M C	564.7	978 470	17 360	16 785	403	423	443	3.085	5.985
HZ 1100M D	584.4	1 019 440	18 050	17 515	418	439	459	3.097	5.993

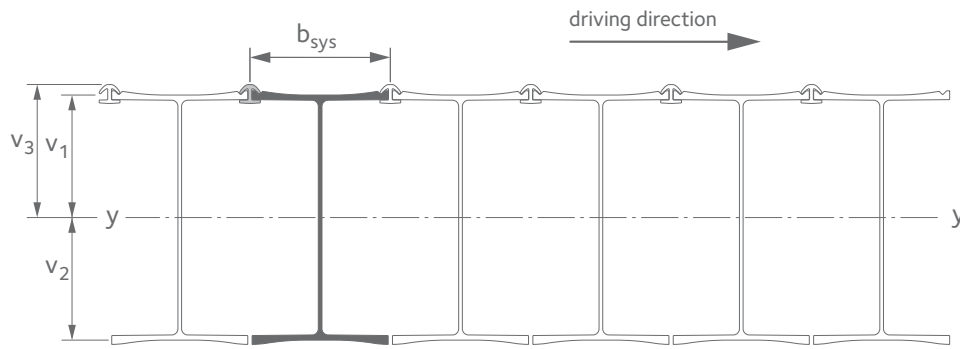
Combination HZ - 26 / AZ 26-700

($b_{sys} = 2.385 \text{ m}$)

HZ 850M A	393.3	398 310	9 915	9 130	263	286	309	3.052	5.664
HZ 850M B	419.3	426 470	10 560	9 780	284	306	329	3.059	5.672
HZ 850M C	431.4	446 650	11 005	10 240	293	316	339	3.058	5.671
HZ 1075M A	435.3	693 400	13 235	12 425	296	319	342	3.056	6.157
HZ 1075M B	454.2	746 080	14 160	13 370	311	334	357	3.059	6.159
HZ 1075M C	488.6	810 610	15 300	14 525	338	361	384	3.062	6.162
HZ 1075M D	516.7	873 960	16 370	15 660	360	383	406	3.063	6.164
HZ 1100M A	539.1	921 400	17 135	16 510	378	401	423	3.065	6.165
HZ 1100M B	552.3	959 730	17 780	17 195	388	411	434	3.068	6.169
HZ 1100M C	586.0	1 039 360	19 100	18 440	413	436	460	3.085	6.225
HZ 1100M D	605.7	1 080 180	19 785	19 165	428	452	475	3.097	6.236

Combination C 1

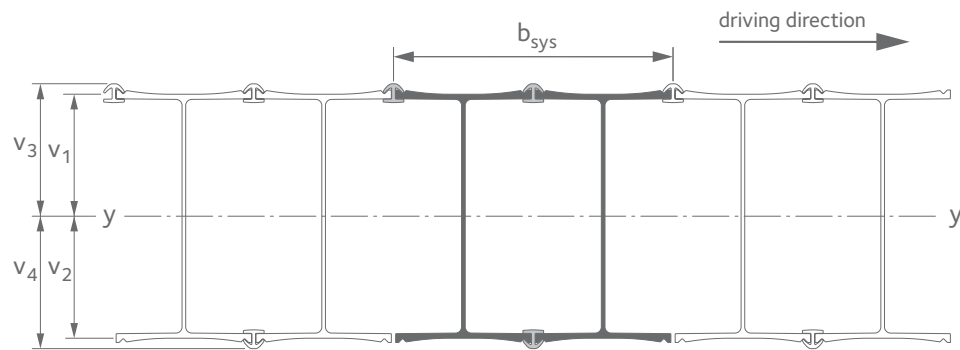
($b_{sys} = 0.462 / 0.464 / 0.469 \text{ m}$)



Section	Dimensions				Properties per meter of wall					Per system	
	v_1 mm	v_2 mm	v_3 mm	v_4 mm	A cm ² /m	G kg/m ²	I_y cm ⁴ /m	W_{ely}^* cm ³ /m	W_{ely}^{**} cm ³ /m	A_{LW} m ² /m	A_{LS} m ² /m
HZ 850M A	378.2	425.2	412.5	-	648.2	509	800360	18825	19400	0.540	2.955
HZ 850M B	383.1	424.3	415.4	-	714.9	561	873460	20585	21025	0.544	2.959
HZ 850M C	386.0	425.4	416.3	-	746.2	586	925550	21755	22235	0.544	2.958
HZ 1075M A	497.6	549.8	531.9	-	755.2	593	1464300	26635	27530	0.542	3.445
HZ 1075M B	502.9	550.5	534.2	-	804.8	632	1603320	29125	30015	0.544	3.446
HZ 1075M C	508.3	551.1	536.6	-	891.8	700	1765800	32040	32910	0.545	3.448
HZ 1075M D	513.9	553.5	538.2	-	963.0	756	1926530	34810	35795	0.546	3.449
HZ 1100M A	519.1	556.3	539.4	-	1019.3	800	2046170	36780	37935	0.547	3.450
HZ 1100M B	523.0	556.4	541.3	-	1055.5	829	2152050	38675	39760	0.549	3.457
HZ 1100M C	521.0	562.4	540.3	-	1121.3	880	2300960	40915	42585	0.554	3.490
HZ 1100M D	526.4	561.0	543.7	-	1175.4	923	2418540	43110	44485	0.560	3.493

Combination C 23

($b_{sys} = 0.924 / 0.928 / 0.938 \text{ m}$)



Section	Dimensions				Properties per meter of wall					Per system	
	v_1 mm	v_2 mm	v_3 mm	v_4 mm	A cm ² /m	G kg/m ²	I_y cm ⁴ /m	W_{ely}^* cm ³ /m	W_{ely}^{**} cm ³ /m	A_{LW} m ² /m	A_{LS} m ² /m
HZ 850M A	388.2	415.2	422.5	449.5	663.9	521	827905	19945	18420	1.052	3.467
HZ 850M B	391.5	415.9	423.8	448.2	729.5	573	898710	21610	20050	1.060	3.474
HZ 850M C	394.0	417.4	424.3	447.7	760.8	597	950710	22775	21235	1.059	3.474
HZ 1075M A	508.7	538.8	542.9	573.0	770.7	605	1510160	28030	26355	1.057	3.959
HZ 1075M B	512.6	540.8	543.8	572.1	819.3	643	1645890	30430	28770	1.059	3.962
HZ 1075M C	517.0	542.4	545.3	570.7	906.3	711	1807890	33330	31680	1.062	3.965
HZ 1075M D	521.9	545.5	546.2	569.8	977.4	767	1968340	36085	34545	1.064	3.966
HZ 1100M A	526.6	548.8	546.9	569.1	1033.6	811	2087560	38035	36680	1.065	3.968
HZ 1100M B	528.9	550.5	547.2	568.7	1067.5	838	2185790	39710	38430	1.069	3.977
HZ 1100M C	529.2	554.2	548.5	573.5	1138.5	894	2350320	42410	40985	1.079	4.015
HZ 1100M D	531.7	555.7	549.0	573.0	1187.5	932	2451540	44120	42790	1.090	4.023

Delivery conditions

Tolerances

Standard EN 10248	HZ-M	AZ
Weight ⁽¹⁾		± 5 %
Length		± 200 mm
Thickness	t,s ≤ 12.5 mm: + 2.0 mm / -1.0 mm t,s > 12.5 mm: + 2.5 mm / -1.5 mm	t,s > 8.5 mm : ± 6 %
Height	h ≥ 500 mm: ± 7.00 mm	h ≥ 300 mm: ± 7.00 mm
Width single pile ⁽²⁾		± 2 % b
Width interlocked elements ⁽²⁾		± 3 % b
Straightness ⁽³⁾		≤ 0.2 % L
Ends out of square ⁽²⁾		± 2 % b

⁽¹⁾ from the mass of the total delivery ⁽²⁾ b = width of the section ⁽³⁾ L = length of the section

Maximum rolling length ⁽¹⁾

HZ-M	33.0 m
AZ	31.0 m
RZD / RZU / RH	24.0 m

⁽¹⁾ Longer sections may be supplied. Please contact us.

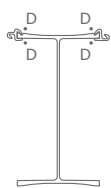
Steel Grades

Standard EN 10248	Min. yield point MPa	Min. tensile strength MPa	Min. elongation $L_0 = 5.65 \sqrt{S_0}$ %
S 240 GP	240	340	26
S 270 GP	270	410	24
S 320 GP	320	440	23
S 355 GP	355	480	22
S 390 GP	390	490	20
S 430 GP	430	510	19

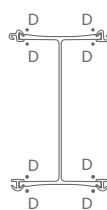
All the components of HZ Steel Wall System are available in **ASTM A 690** steel grade .
ASTM A 690 with higher yield point on request.

Standard Welding Configuration

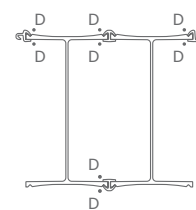
Sol 12



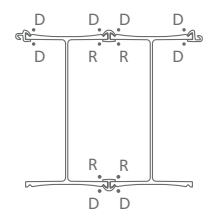
Sol 14



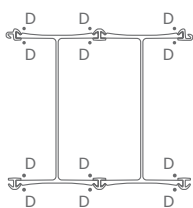
Sol 24 - Form 'a'



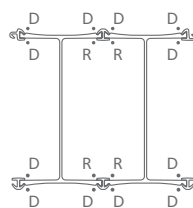
Sol 24 - Form 'b'



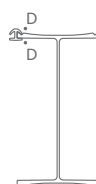
Sol 26 - Form 'a'



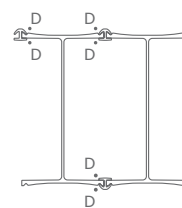
Sol 26 - Form 'b'



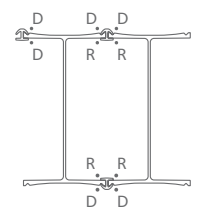
Sol C1



Sol C23 - Form 'a'



Sol C23 - Form 'b'



- D** discontinuous weld, a = 6 mm: 10% of length (100 mm/m) over whole connector length & 500 mm continuous weld at top and toe of connector
R continuous weld, a = 6 mm: 500 mm at top and toe of connector

Form 'a' is the standard delivery form. The HZ-M king piles can be driven separately if necessary (for instance, in hard driving conditions).

In **Form 'b'**, the HZ-M king piles are welded together and can only be driven as one piece (box pile).

If hard driving conditions are predicted, the length of the discontinuous weld 'D' should be increased. Please contact our technical department for more details.

Table of Combinations according to Section Modulus

W_{ely}^* cm ³ /m	$G_{100\%}$ kg/m ²	Section	Combination	W_{ely}^* cm ³ /m	$G_{100\%}$ kg/m ²	Section	Combination	W_{ely}^* cm ³ /m	$G_{100\%}$ kg/m ²	Section	Combination
4655	196	HZ 850M A	Sol. 12/AZ 13-770	7845	262	HZ 850M C	Sol. 14/AZ 18	9590	287	HZ 850M A	Sol. 26/AZ 18-700
5060	213	HZ 850M A	Sol. 12/AZ 13	7895	268	HZ 1075M B	Sol. 12/AZ 26-700	9650	290	HZ 1075M D	Sol. 12/AZ 18
5070	208	HZ 850M B	Sol. 12/AZ 13-770	7920	282	HZ 850M B	Sol. 14/AZ 26	9705	282	HZ 1100M C	Sol. 12/AZ 13-770
5210	211	HZ 850M A	Sol. 12/AZ 18-700	8110	229	HZ 1075M A	Sol. 14/AZ 13-770	9720	331	HZ 850M B	Sol. 24/AZ 26
5330	213	HZ 850M C	Sol. 12/AZ 13-770	8120	257	HZ 1075M B	Sol. 12/AZ 18	9735	325	HZ 850M C	Sol. 24/AZ 26-700
5495	225	HZ 850M A	Sol. 12/AZ 18	8215	288	HZ 850M C	Sol. 14/AZ 26	9755	283	HZ 1075M B	Sol. 14/AZ 26-700
5520	226	HZ 850M B	Sol. 12/AZ 13	8260	276	HZ 850M A	Sol. 24/AZ 13	9765	290	HZ 1075M A	Sol. 14/AZ 26
5565	238	HZ 850M A	Sol. 12/AZ 26-700	8265	252	HZ 1075M D	Sol. 12/AZ 13-770	9805	310	HZ 1100M A	Sol. 12/AZ 26-700
5660	224	HZ 850M B	Sol. 12/AZ 18-700	8310	277	HZ 850M B	Sol. 24/AZ 13-770	9910	316	HZ 1075M D	Sol. 12/AZ 26
5810	232	HZ 850M C	Sol. 12/AZ 13	8310	273	HZ 850M A	Sol. 24/AZ 18-700	9915	299	HZ 850M C	Sol. 26/AZ 13-770
5830	251	HZ 850M A	Sol. 12/AZ 26	8350	257	HZ 1075M C	Sol. 12/AZ 18-700	9915	309	HZ 850M A	Sol. 26/AZ 26-700
5935	229	HZ 850M C	Sol. 12/AZ 18-700	8375	261	HZ 1075M C	Sol. 12/AZ 13	9920	320	HZ 850M C	Sol. 24/AZ 18
5980	239	HZ 850M B	Sol. 12/AZ 18	8385	283	HZ 1075M B	Sol. 12/AZ 26	9920	267	HZ 1075M D	Sol. 14/AZ 13-770
6015	251	HZ 850M B	Sol. 12/AZ 26-700	8615	295	HZ 850M A	Sol. 24/AZ 26-700	9985	289	HZ 1100M B	Sol. 12/AZ 18-700
6040	210	HZ 850M A	Sol. 14/AZ 13-770	8630	285	HZ 1075M C	Sol. 12/AZ 26-700	10060	294	HZ 1100M B	Sol. 12/AZ 13
6280	245	HZ 850M C	Sol. 12/AZ 18	8640	238	HZ 1075M B	Sol. 14/AZ 13-770	10085	303	HZ 850M A	Sol. 26/AZ 18
6295	257	HZ 850M C	Sol. 12/AZ 26-700	8725	263	HZ 1100M A	Sol. 12/AZ 13-770	10095	274	HZ 1075M B	Sol. 14/AZ 18
6315	265	HZ 850M B	Sol. 12/AZ 26	8730	288	HZ 850M A	Sol. 24/AZ 18	10160	273	HZ 1075M C	Sol. 14/AZ 18-700
6390	215	HZ 1075M A	Sol. 12/AZ 13-770	8740	286	HZ 850M C	Sol. 24/AZ 13-770	10180	302	HZ 1100M A	Sol. 12/AZ 18
6415	222	HZ 850M B	Sol. 14/AZ 13-770	8875	270	HZ 850M A	Sol. 26/AZ 13-770	10200	341	HZ 850M C	Sol. 24/AZ 26
6585	228	HZ 850M A	Sol. 14/AZ 13	8885	247	HZ 1075M A	Sol. 14/AZ 18-700	10220	277	HZ 1075M C	Sol. 14/AZ 13
6620	271	HZ 850M C	Sol. 12/AZ 26	8900	250	HZ 1075M A	Sol. 14/AZ 13	10220	292	HZ 1100M D	Sol. 12/AZ 13-770
6675	228	HZ 850M C	Sol. 14/AZ 13-770	8915	275	HZ 1075M C	Sol. 12/AZ 18	10225	311	HZ 850M B	Sol. 26/AZ 13
6720	226	HZ 850M A	Sol. 14/AZ 18-700	8950	297	HZ 850M B	Sol. 24/AZ 13	10240	307	HZ 850M B	Sol. 26/AZ 18-700
6945	224	HZ 1075M B	Sol. 12/AZ 13-770	8985	294	HZ 850M B	Sol. 24/AZ 18-700	10260	317	HZ 1100M B	Sol. 12/AZ 26-700
7000	234	HZ 1075M A	Sol. 12/AZ 13	9010	309	HZ 850M A	Sol. 24/AZ 26	10360	277	HZ 1100M A	Sol. 14/AZ 13-770
7000	242	HZ 850M B	Sol. 14/AZ 13	9035	271	HZ 1075M D	Sol. 12/AZ 18-700	10380	300	HZ 1075M B	Sol. 14/AZ 26
7020	231	HZ 1075M A	Sol. 12/AZ 18-700	9080	275	HZ 1075M D	Sol. 12/AZ 13	10380	324	HZ 850M A	Sol. 26/AZ 26
7115	242	HZ 850M A	Sol. 14/AZ 18	9150	269	HZ 1100M B	Sol. 12/AZ 13-770	10440	328	HZ 1100M A	Sol. 12/AZ 26
7120	254	HZ 850M A	Sol. 14/AZ 26-700	9175	302	HZ 1075M C	Sol. 12/AZ 26	10465	300	HZ 1075M C	Sol. 14/AZ 26-700
7125	239	HZ 850M B	Sol. 14/AZ 18-700	9190	274	HZ 1075M A	Sol. 14/AZ 26-700	10560	329	HZ 850M B	Sol. 26/AZ 26-700
7285	248	HZ 850M C	Sol. 14/AZ 13	9285	316	HZ 850M B	Sol. 24/AZ 26-700	10575	303	HZ 1100M C	Sol. 12/AZ 18-700
7300	259	HZ 1075M A	Sol. 12/AZ 26-700	9300	254	HZ 1075M C	Sol. 14/AZ 13-770	10635	289	HZ 1075M A	Sol. 24/AZ 13-770
7400	245	HZ 850M C	Sol. 14/AZ 18-700	9310	299	HZ 1075M D	Sol. 12/AZ 26-700	10670	308	HZ 1100M C	Sol. 12/AZ 13
7480	247	HZ 1075M A	Sol. 12/AZ 18	9410	307	HZ 850M C	Sol. 24/AZ 13	10675	309	HZ 1100M B	Sol. 12/AZ 18
7490	268	HZ 850M A	Sol. 14/AZ 26	9435	303	HZ 850M C	Sol. 24/AZ 18-700	10685	321	HZ 850M C	Sol. 26/AZ 13
7520	266	HZ 850M B	Sol. 14/AZ 26-700	9440	310	HZ 850M B	Sol. 24/AZ 18	10690	317	HZ 850M C	Sol. 26/AZ 18-700
7550	255	HZ 850M B	Sol. 14/AZ 18	9455	256	HZ 1075M B	Sol. 14/AZ 18-700	10735	283	HZ 1100M B	Sol. 14/AZ 13-770
7615	243	HZ 1075M B	Sol. 12/AZ 13	9475	264	HZ 1075M A	Sol. 14/AZ 18	10775	324	HZ 850M B	Sol. 26/AZ 18
7615	241	HZ 1075M B	Sol. 12/AZ 18-700	9490	259	HZ 1075M B	Sol. 14/AZ 13	10825	286	HZ 1075M D	Sol. 14/AZ 18-700
7630	240	HZ 1075M C	Sol. 12/AZ 13-770	9490	290	HZ 850M B	Sol. 26/AZ 13-770	10850	330	HZ 1100M C	Sol. 12/AZ 26-700
7675	258	HZ 850M A	Sol. 24/AZ 13-770	9525	282	HZ 1100M A	Sol. 12/AZ 18-700	10855	292	HZ 1075M C	Sol. 14/AZ 18
7740	273	HZ 1075M A	Sol. 12/AZ 26	9555	290	HZ 850M A	Sol. 26/AZ 13	10905	291	HZ 1075M D	Sol. 14/AZ 13
7790	272	HZ 850M C	Sol. 14/AZ 26-700	9585	286	HZ 1100M A	Sol. 12/AZ 13	10935	336	HZ 1100M B	Sol. 12/AZ 26

Table of Combinations according to Section Modulus

W_{ely}^* cm ³ /m	$G_{100\%}$ kg/m ²	Section	Combination	W_{ely}^* cm ³ /m	$G_{100\%}$ kg/m ²	Section	Combination	W_{ely}^* cm ³ /m	$G_{100\%}$ kg/m ²	Section	Combination
11005	339	HZ 850M C	Sol. 26/AZ 26-700	13015	339	HZ 1075M B	Sol. 24/AZ 18	16215	404	HZ 1100M B	Sol. 24/AZ 13
11070	345	HZ 850M B	Sol. 26/AZ 26	13110	324	HZ 1075M A	Sol. 26/AZ 13	16235	410	HZ 1100M A	Sol. 24/AZ 18
11125	314	HZ 1075M D	Sol. 14/AZ 26-700	13115	337	HZ 1100M D	Sol. 14/AZ 13	16235	420	HZ 1100M B	Sol. 24/AZ 26-700
11130	313	HZ 1100M D	Sol. 12/AZ 18-700	13235	360	HZ 1075M B	Sol. 24/AZ 26	16335	390	HZ 1075M D	Sol. 26/AZ 13
11140	318	HZ 1075M C	Sol. 14/AZ 26	13235	342	HZ 1075M A	Sol. 26/AZ 26-700	16370	406	HZ 1075M D	Sol. 26/AZ 26-700
11245	319	HZ 1100M D	Sol. 12/AZ 13	13250	359	HZ 1100M D	Sol. 14/AZ 26-700	16435	388	HZ 1100M B	Sol. 26/AZ 13-770
11250	334	HZ 850M C	Sol. 26/AZ 18	13420	344	HZ 1100M C	Sol. 14/AZ 18	16450	431	HZ 1100M A	Sol. 24/AZ 26
11295	297	HZ 1100M A	Sol. 14/AZ 18-700	13490	348	HZ 1075M C	Sol. 24/AZ 18-700	16710	412	HZ 1100M D	Sol. 24/AZ 13-770
11310	324	HZ 1100M C	Sol. 12/AZ 18	13630	353	HZ 1075M C	Sol. 24/AZ 13	16895	401	HZ 1100M A	Sol. 26/AZ 18-700
11395	302	HZ 1100M A	Sol. 14/AZ 13	13640	349	HZ 1075M D	Sol. 24/AZ 13-770	16925	421	HZ 1100M B	Sol. 24/AZ 18
11400	306	HZ 1075M A	Sol. 24/AZ 18-700	13695	371	HZ 1100M C	Sol. 14/AZ 26	17055	406	HZ 1075M D	Sol. 26/AZ 18
11405	341	HZ 1100M D	Sol. 12/AZ 26-700	13720	338	HZ 1075M A	Sol. 26/AZ 18	17115	408	HZ 1100M A	Sol. 26/AZ 13
11490	310	HZ 1075M A	Sol. 24/AZ 13	13720	370	HZ 1075M C	Sol. 24/AZ 26-700	17130	421	HZ 1100M C	Sol. 24/AZ 18-700
11510	303	HZ 1075M B	Sol. 24/AZ 13-770	13875	355	HZ 1100M D	Sol. 14/AZ 18	17135	423	HZ 1100M A	Sol. 26/AZ 26-700
11520	299	HZ 1100M C	Sol. 14/AZ 13-770	13915	334	HZ 1075M B	Sol. 26/AZ 18-700	17140	442	HZ 1100M B	Sol. 24/AZ 26
11545	355	HZ 850M C	Sol. 26/AZ 26	13950	359	HZ 1075M A	Sol. 26/AZ 26	17280	426	HZ 1075M D	Sol. 26/AZ 26
11570	307	HZ 1075M D	Sol. 14/AZ 18	14060	339	HZ 1075M B	Sol. 26/AZ 13	17360	443	HZ 1100M C	Sol. 24/AZ 26-700
11570	350	HZ 1100M C	Sol. 12/AZ 26	14085	341	HZ 1075M C	Sol. 26/AZ 13-770	17370	428	HZ 1100M C	Sol. 24/AZ 13
11590	325	HZ 1100M A	Sol. 14/AZ 26-700	14150	381	HZ 1100M D	Sol. 14/AZ 26	17540	411	HZ 1100M B	Sol. 26/AZ 18-700
11635	328	HZ 1075M A	Sol. 24/AZ 26-700	14160	357	HZ 1075M B	Sol. 26/AZ 26-700	17690	413	HZ 1100M C	Sol. 26/AZ 13-770
11695	304	HZ 1100M B	Sol. 14/AZ 18-700	14250	368	HZ 1075M C	Sol. 24/AZ 18	17780	418	HZ 1100M B	Sol. 26/AZ 13
11810	309	HZ 1100M B	Sol. 14/AZ 13	14375	366	HZ 1100M A	Sol. 24/AZ 13-770	17780	434	HZ 1100M B	Sol. 26/AZ 26-700
11855	333	HZ 1075M D	Sol. 14/AZ 26	14465	389	HZ 1075M C	Sol. 24/AZ 26	17825	437	HZ 1100M D	Sol. 24/AZ 18-700
11910	336	HZ 1100M D	Sol. 12/AZ 18	14575	370	HZ 1075M D	Sol. 24/AZ 18-700	17865	424	HZ 1100M A	Sol. 26/AZ 18
11915	308	HZ 1100M D	Sol. 14/AZ 13-770	14705	353	HZ 1075M B	Sol. 26/AZ 18	18050	459	HZ 1100M D	Sol. 24/AZ 26-700
11990	331	HZ 1100M B	Sol. 14/AZ 26-700	14750	376	HZ 1075M D	Sol. 24/AZ 13	18080	444	HZ 1100M D	Sol. 24/AZ 13
12035	323	HZ 1075M A	Sol. 24/AZ 18	14810	392	HZ 1075M D	Sol. 24/AZ 26-700	18085	445	HZ 1100M A	Sol. 26/AZ 26
12080	318	HZ 1100M A	Sol. 14/AZ 18	14930	374	HZ 1075M B	Sol. 26/AZ 26	18115	446	HZ 1100M C	Sol. 24/AZ 18
12130	301	HZ 1075M A	Sol. 26/AZ 13-770	14990	376	HZ 1100M B	Sol. 24/AZ 13-770	18330	466	HZ 1100M C	Sol. 24/AZ 26
12170	362	HZ 1100M D	Sol. 12/AZ 26	15055	361	HZ 1075M C	Sol. 26/AZ 18-700	18335	428	HZ 1100M D	Sol. 26/AZ 13-770
12250	344	HZ 1075M A	Sol. 24/AZ 26	15100	362	HZ 1075M D	Sol. 26/AZ 13-770	18555	435	HZ 1100M B	Sol. 26/AZ 18
12325	321	HZ 1075M B	Sol. 24/AZ 18-700	15230	367	HZ 1075M C	Sol. 26/AZ 13	18775	456	HZ 1100M B	Sol. 26/AZ 26
12360	345	HZ 1100M A	Sol. 14/AZ 26	15300	384	HZ 1075M C	Sol. 26/AZ 26-700	18855	462	HZ 1100M D	Sol. 24/AZ 18
12440	325	HZ 1075M B	Sol. 24/AZ 13	15360	388	HZ 1100M A	Sol. 24/AZ 18-700	18865	438	HZ 1100M C	Sol. 26/AZ 18-700
12510	325	HZ 1100M B	Sol. 14/AZ 18	15405	391	HZ 1075M D	Sol. 24/AZ 18	19065	483	HZ 1100M D	Sol. 24/AZ 26
12535	322	HZ 1100M C	Sol. 14/AZ 18-700	15550	394	HZ 1100M A	Sol. 24/AZ 13	19100	460	HZ 1100M C	Sol. 26/AZ 26-700
12560	343	HZ 1075M B	Sol. 24/AZ 26-700	15585	410	HZ 1100M A	Sol. 24/AZ 26-700	19140	445	HZ 1100M C	Sol. 26/AZ 13
12610	328	HZ 1075M C	Sol. 24/AZ 13-770	15620	412	HZ 1075M D	Sol. 24/AZ 26	19550	453	HZ 1100M D	Sol. 26/AZ 18-700
12680	327	HZ 1100M C	Sol. 14/AZ 13	15820	379	HZ 1100M A	Sol. 26/AZ 13-770	19785	475	HZ 1100M D	Sol. 26/AZ 26-700
12790	352	HZ 1100M B	Sol. 14/AZ 26	15915	382	HZ 1075M C	Sol. 26/AZ 18	19840	461	HZ 1100M D	Sol. 26/AZ 13
12825	349	HZ 1100M C	Sol. 14/AZ 26-700	16005	398	HZ 1100M B	Sol. 24/AZ 18-700	19960	463	HZ 1100M C	Sol. 26/AZ 18
12960	331	HZ 1100M D	Sol. 14/AZ 18-700	16055	398	HZ 1100M C	Sol. 24/AZ 13-770	20175	484	HZ 1100M C	Sol. 26/AZ 26
12990	320	HZ 1075M A	Sol. 26/AZ 18-700	16130	384	HZ 1075M D	Sol. 26/AZ 18-700	20680	480	HZ 1100M D	Sol. 26/AZ 18
13005	315	HZ 1075M B	Sol. 26/AZ 13-770	16140	403	HZ 1075M C	Sol. 26/AZ 26	20900	501	HZ 1100M D	Sol. 26/AZ 26

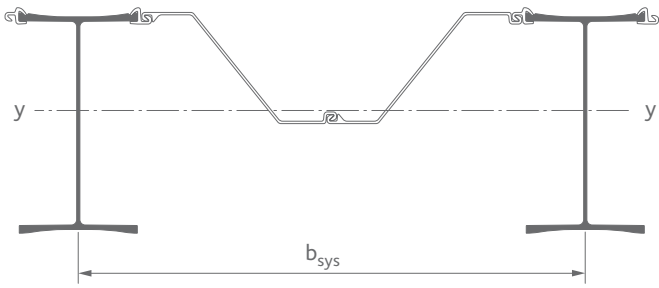
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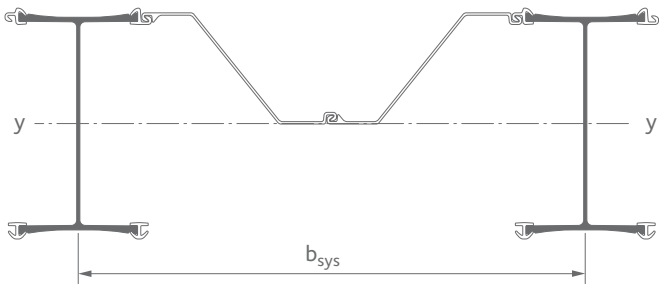
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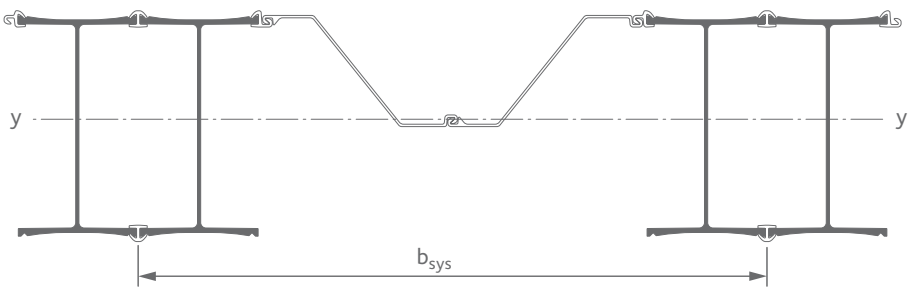
Combination 12



Combination 14



Combination 24



Combination 26

