

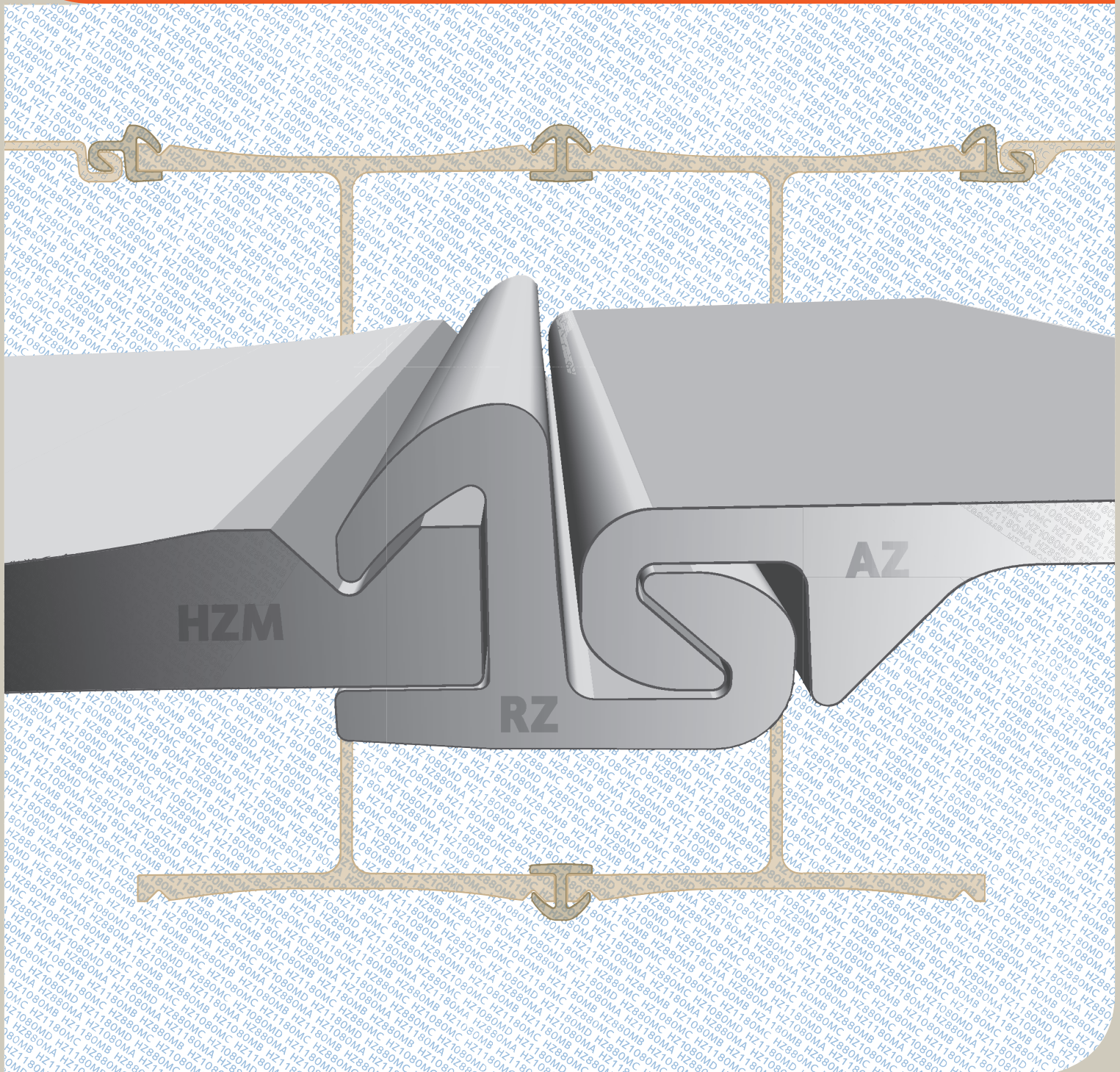


ArcelorMittal

Foundation Solutions for Projects

Steel Sheet Piles

The new HZM Steel Wall System



The new HZM Steel Wall System: HZM / 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 consequently 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 **HZM / 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 HZM / 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

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The new HZM Steel Wall System: HZM / AZ

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

- **HZM** 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 HZM 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**

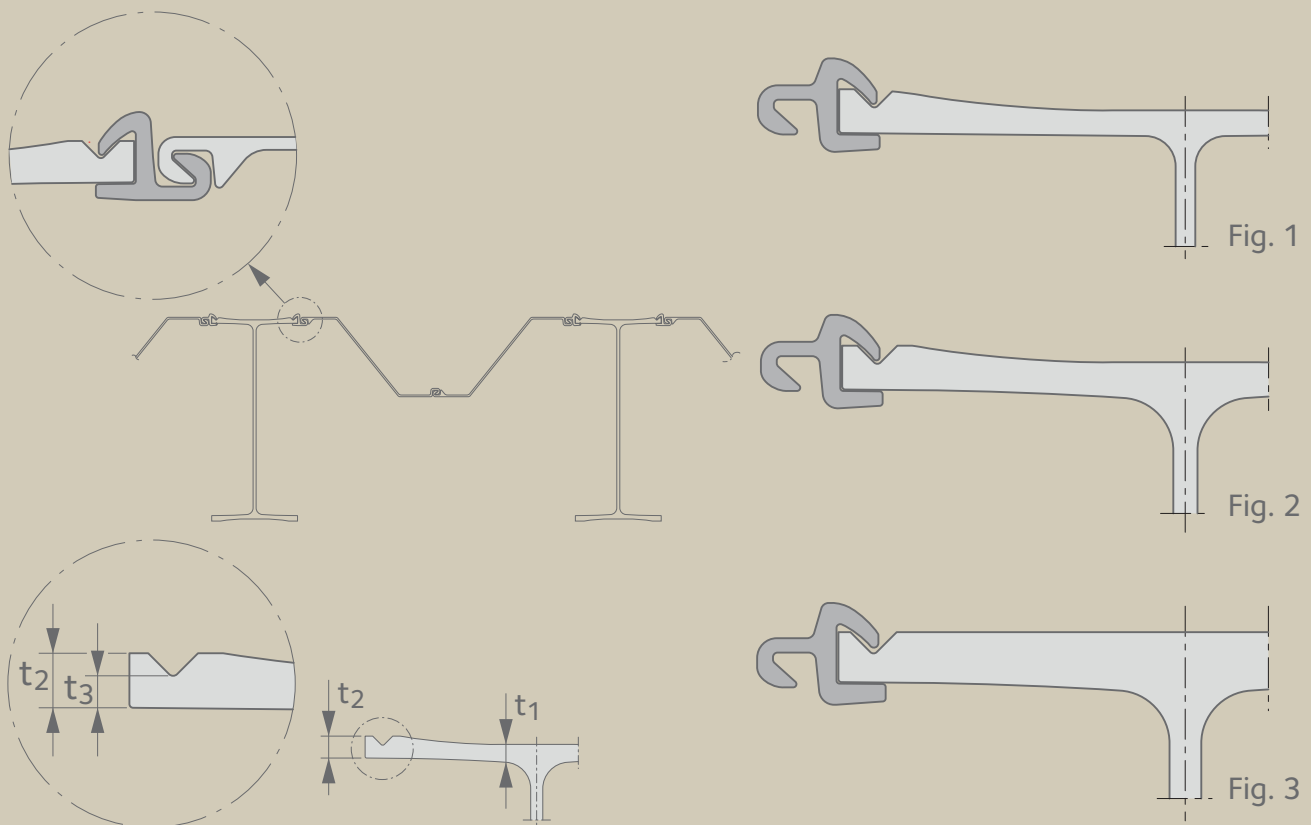
intermediary sheet piles resulting in an overall safe and cost-effective high capacity retaining structure, with a high stiffness.

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

The main improvement of the HZM king piles is the concave geometry of the flanges of the lighter HZM 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 HZM / AZ combinations can achieve equivalent elastic section moduli $W_{el,y}$ that are more than 30% higher than with the previous HZ / AZ system.



Combination HZM ... - 12 / AZ 13-770

($b_{sys} = 2.067 \text{ m}$)

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 880M A	255.0	215 290	4 815	5 515	164	182	200	2.466	4.862
HZ 880M B	270.4	232 560	5 230	5 890	177	194	212	2.469	4.864
HZ 880M C	277.4	244 270	5 485	6 160	182	200	218	2.469	4.864
HZ 1080M A	293.6	404 030	7 065	7 925	195	213	230	2.462	5.293
HZ 1080M B	304.8	435 500	7 615	8 490	203	221	239	2.463	5.293
HZ 1080M C	324.8	473 410	8 295	9 160	219	237	255	2.464	5.294
HZ 1080M D	341.1	510 400	8 920	9 825	232	250	268	2.465	5.295
HZ 1180M A	354.1	538 200	9 375	10 320	242	260	278	2.466	5.295
HZ 1180M B	362.4	562 590	9 800	10 740	249	267	284	2.467	5.299
HZ 1180M C	378.5	598 400	10 355	11 400	261	279	297	2.480	5.308
HZ 1180M D	391.2	626 580	10 875	11 855	271	289	307	2.486	5.313

Combination HZM ... - 14 / AZ 13-770

($b_{sys} = 2.067 \text{ m}$)

HZ 880M A	272.9	247 840	6 160	5 675	172	193	214	2.466	5.098
HZ 880M B	288.1	264 490	6 540	6 055	184	205	226	2.469	5.101
HZ 880M C	295.1	276 090	6 795	6 320	190	211	232	2.469	5.100
HZ 1080M A	311.6	458 340	8 740	8 200	203	224	245	2.462	5.528
HZ 1080M B	322.6	488 980	9 270	8 750	211	232	253	2.463	5.529
HZ 1080M C	342.6	526 470	9 925	9 420	227	248	269	2.464	5.530
HZ 1080M D	358.9	563 170	10 540	10 080	240	261	282	2.465	5.531
HZ 1180M A	371.9	590 720	10 975	10 575	250	271	292	2.466	5.532
HZ 1180M B	379.6	613 190	11 350	10 975	256	277	298	2.467	5.533
HZ 1180M C	400.6	662 840	12 140	11 725	270	292	314	2.480	5.567
HZ 1180M D	412.2	686 980	12 540	12 160	280	302	324	2.486	5.573

Combination HZM ... - 24 / AZ 13-770

($b_{sys} = 2.538 \text{ m}$)

HZ 880M A	336.1	336 390	7 885	7 295	235	249	264	2.989	5.404
HZ 880M B	360.7	363 500	8 525	7 920	254	269	283	2.995	5.410
HZ 880M C	372.1	382 440	8 945	8 350	263	278	292	2.995	5.410
HZ 1080M A	399.3	642 930	11 690	11 000	284	299	313	2.981	5.830
HZ 1080M B	417.2	693 020	12 565	11 885	298	313	328	2.983	5.832
HZ 1080M C	449.7	753 960	13 650	12 980	324	338	353	2.986	5.835
HZ 1080M D	476.1	813 690	14 665	14 045	345	359	374	2.987	5.836
HZ 1180M A	497.2	858 450	15 390	14 845	361	376	390	2.989	5.838
HZ 1180M B	509.8	895 090	16 005	15 495	371	386	400	2.992	5.847
HZ 1180M C	537.7	959 240	17 070	16 500	393	407	422	3.009	5.860
HZ 1180M D	556.4	998 320	17 725	17 200	407	422	437	3.021	5.870

Combination HZM ... - 26 / AZ 13-770

($b_{sys} = 2.538 \text{ m}$)

HZ 880M A	351.9	363 910	9 050	8 335	242	259	276	2.989	5.621
HZ 880M B	376.5	390 830	9 675	8 955	262	279	296	2.995	5.627
HZ 880M C	387.9	409 710	10 090	9 385	271	288	305	2.995	5.627
HZ 1080M A	415.2	689 160	13 150	12 340	292	309	326	2.981	6.047
HZ 1080M B	433.1	739 130	14 025	13 235	306	323	340	2.983	6.049
HZ 1080M C	465.6	799 810	15 090	14 320	331	348	365	2.986	6.053
HZ 1080M D	492.0	859 380	16 090	15 390	352	369	386	2.987	6.054
HZ 1180M A	513.0	904 000	16 805	16 190	369	386	403	2.989	6.055
HZ 1180M B	525.6	940 590	17 420	16 845	379	396	413	2.992	6.058
HZ 1180M C	557.5	1 015 780	18 675	18 035	402	420	438	3.009	6.096
HZ 1180M D	576.3	1 054 750	19 325	18 730	417	434	452	3.021	6.109

Combination HZM ... - 12 / AZ 18-700

($b_{sys} = 1.927 \text{ m}$)

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 880M A	274.1	240 500	5 380	6 160	177	196	215	2.477	4.873
HZ 880M B	290.5	259 000	5 820	6 560	190	209	228	2.480	4.875
HZ 880M C	298.0	271 570	6 100	6 850	196	215	234	2.479	4.875
HZ 1080M A	315.5	443 030	7 745	8 690	209	228	248	2.472	5.304
HZ 1080M B	327.5	476 790	8 340	9 295	219	238	257	2.474	5.303
HZ 1080M C	349.0	517 420	9 065	10 010	235	255	274	2.475	5.305
HZ 1080M D	366.4	557 070	9 735	10 720	249	268	288	2.476	5.305
HZ 1180M A	380.4	586 870	10 220	11 255	260	279	299	2.476	5.306
HZ 1180M B	389.3	613 030	10 680	11 705	267	286	306	2.478	5.310
HZ 1180M C	406.5	651 410	11 275	12 410	280	300	319	2.491	5.319
HZ 1180M D	420.2	681 600	11 830	12 895	291	310	330	2.497	5.324

Combination HZM ... - 14 / AZ 18-700

($b_{sys} = 1.927 \text{ m}$)

HZ 880M A	293.3	275 420	6 845	6 305	185	208	230	2.477	5.108
HZ 880M B	309.6	293 250	7 255	6 715	198	221	243	2.480	5.112
HZ 880M C	317.1	305 690	7 525	7 000	204	226	249	2.479	5.111
HZ 1080M A	334.8	501 290	9 560	8 970	218	240	263	2.472	5.539
HZ 1080M B	346.6	534 170	10 130	9 560	227	250	272	2.474	5.540
HZ 1080M C	368.1	574 330	10 830	10 280	244	266	289	2.475	5.541
HZ 1080M D	385.5	613 680	11 485	10 985	258	280	303	2.476	5.542
HZ 1180M A	399.4	643 200	11 950	11 510	269	291	314	2.476	5.543
HZ 1180M B	407.7	667 300	12 350	11 945	275	298	320	2.478	5.544
HZ 1180M C	430.3	720 530	13 200	12 750	290	314	338	2.491	5.578
HZ 1180M D	442.7	746 380	13 625	13 210	300	324	348	2.497	5.584

Combination HZM ... - 24 / AZ 18-700

($b_{sys} = 2.398 \text{ m}$)

HZ 880M A	356.1	363 720	8 525	7 885	249	264	280	3.000	5.415
HZ 880M B	382.2	392 360	9 200	8 550	269	285	300	3.006	5.421
HZ 880M C	394.2	412 400	9 645	9 005	279	294	309	3.006	5.420
HZ 1080M A	423.2	688 290	12 515	11 775	301	317	332	2.992	5.841
HZ 1080M B	442.1	741 310	13 440	12 715	316	332	347	2.994	5.843
HZ 1080M C	476.4	805 720	14 585	13 870	343	359	374	2.997	5.846
HZ 1080M D	504.4	868 900	15 660	15 000	365	381	396	2.998	5.847
HZ 1180M A	526.6	916 220	16 425	15 845	383	398	413	3.000	5.849
HZ 1180M B	540.0	955 000	17 075	16 535	393	408	424	3.003	5.858
HZ 1180M C	569.5	1 022 790	18 200	17 595	416	431	447	3.020	5.871
HZ 1180M D	589.3	1 064 090	18 895	18 330	431	447	463	3.032	5.881

Combination HZM ... - 26 / AZ 18-700

($b_{sys} = 2.398 \text{ m}$)

HZ 880M A	372.9	392 840	9 770	9 000	257	275	293	3.000	5.632
HZ 880M B	398.9	421 280	10 425	9 650	277	295	313	3.006	5.638
HZ 880M C	411.0	441 260	10 870	10 110	287	305	323	3.006	5.638
HZ 1080M A	440.0	737 220	14 065	13 200	309	327	345	2.992	6.058
HZ 1080M B	458.9	790 110	14 990	14 145	324	342	360	2.994	6.060
HZ 1080M C	493.2	854 250	16 115	15 295	351	369	387	2.997	6.063
HZ 1080M D	521.2	917 260	17 175	16 425	373	391	409	2.998	6.064
HZ 1180M A	543.4	964 440	17 925	17 270	390	409	427	3.000	6.066
HZ 1180M B	556.7	1 003 160	18 575	17 965	401	419	437	3.003	6.069
HZ 1180M C	590.5	1 082 630	19 905	19 225	425	445	464	3.020	6.107
HZ 1180M D	610.3	1 123 800	20 590	19 955	441	460	479	3.032	6.120

Combination HZM ... - 12 / AZ 26-700

($b_{sys} = 1.927 \text{ m}$)

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 880M A	308.9	256 420	5 735	6 565	193	218	243	2.551	4.948
HZ 880M B	325.4	274 900	6 180	6 960	206	231	255	2.554	4.949
HZ 880M C	332.9	287 470	6 455	7 250	212	237	261	2.554	4.949
HZ 1080M A	350.5	458 990	8 025	9 000	226	250	275	2.547	5.378
HZ 1080M B	362.4	492 740	8 615	9 610	235	260	285	2.548	5.378
HZ 1080M C	383.9	533 350	9 345	10 320	252	277	301	2.549	5.379
HZ 1080M D	401.3	573 000	10 015	11 030	266	290	315	2.550	5.380
HZ 1180M A	415.2	602 790	10 500	11 560	277	301	326	2.551	5.381
HZ 1180M B	424.1	628 950	10 960	12 010	284	308	333	2.552	5.385
HZ 1180M C	441.3	667 320	11 550	12 715	296	321	346	2.565	5.394
HZ 1180M D	455.0	697 500	12 105	13 195	307	332	357	2.571	5.399

Combination HZM ... - 14 / AZ 26-700

($b_{sys} = 1.927 \text{ m}$)

HZ 880M A	328.2	291 340	7 240	6 670	202	230	258	2.551	5.183
HZ 880M B	344.4	309 150	7 645	7 080	214	242	270	2.554	5.186
HZ 880M C	351.9	321 600	7 915	7 365	220	248	276	2.554	5.186
HZ 1080M A	369.8	517 240	9 860	9 255	234	262	290	2.547	5.613
HZ 1080M B	381.5	550 120	10 430	9 845	243	271	300	2.548	5.614
HZ 1080M C	403.0	590 270	11 130	10 565	260	288	316	2.549	5.616
HZ 1080M D	420.4	629 600	11 785	11 270	274	302	330	2.550	5.616
HZ 1180M A	434.3	659 120	12 245	11 795	285	313	341	2.551	5.617
HZ 1180M B	442.6	683 220	12 645	12 230	291	319	347	2.552	5.619
HZ 1180M C	465.1	736 440	13 490	13 030	307	336	365	2.565	5.652
HZ 1180M D	477.5	762 290	13 915	13 490	317	346	375	2.571	5.659

Combination HZM ... - 24 / AZ 26-700

($b_{sys} = 2.398 \text{ m}$)

HZ 880M A	384.1	376 510	8 825	8 165	262	282	302	3.074	5.489
HZ 880M B	410.1	405 120	9 500	8 825	282	302	322	3.081	5.495
HZ 880M C	422.2	425 160	9 945	9 280	292	312	331	3.080	5.495
HZ 1080M A	451.3	701 120	12 745	11 995	314	334	354	3.066	5.915
HZ 1080M B	470.2	754 140	13 670	12 935	329	349	369	3.068	5.918
HZ 1080M C	504.5	818 530	14 815	14 090	356	376	396	3.072	5.921
HZ 1080M D	532.4	881 700	15 890	15 220	378	398	418	3.073	5.922
HZ 1180M A	554.6	929 010	16 655	16 065	396	416	435	3.074	5.923
HZ 1180M B	568.0	967 790	17 305	16 755	406	426	446	3.077	5.932
HZ 1180M C	597.4	1 035 550	18 425	17 815	429	449	469	3.094	5.945
HZ 1180M D	617.2	1 076 850	19 120	18 550	444	464	485	3.107	5.955

Combination HZM ... - 26 / AZ 26-700

($b_{sys} = 2.398 \text{ m}$)

HZ 880M A	400.9	405 620	10 090	9 295	270	292	315	3.074	5.706
HZ 880M B	426.9	434 040	10 745	9 945	290	313	335	3.081	5.713
HZ 880M C	438.9	454 020	11 185	10 400	300	322	345	3.080	5.712
HZ 1080M A	468.1	750 050	14 310	13 430	322	345	367	3.066	6.132
HZ 1080M B	487.0	802 940	15 235	14 375	337	360	382	3.068	6.135
HZ 1080M C	521.3	867 060	16 360	15 525	364	387	409	3.072	6.138
HZ 1080M D	549.2	930 050	17 415	16 655	386	409	431	3.073	6.139
HZ 1180M A	571.4	977 220	18 165	17 500	404	426	449	3.074	6.140
HZ 1180M B	584.7	1 015 950	18 815	18 195	414	437	459	3.077	6.144
HZ 1180M C	618.4	1 095 390	20 140	19 450	439	462	485	3.094	6.181
HZ 1180M D	638.2	1 136 560	20 825	20 185	454	478	501	3.107	6.194

Combination HZM ... - 12 / AZ 13

($b_{sys} = 1.867 \text{ m}$)

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 880M A	276.7	234 030	5 235	5 995	179	198	217	2.269	4.666
HZ 880M B	293.7	253 130	5 690	6 410	193	212	231	2.272	4.667
HZ 880M C	301.5	266 100	5 975	6 710	199	218	237	2.272	4.667
HZ 1080M A	319.5	443 070	7 750	8 690	213	232	251	2.265	5.096
HZ 1080M B	331.9	477 910	8 355	9 320	223	242	261	2.266	5.096
HZ 1080M C	354.0	519 840	9 105	10 060	240	259	278	2.268	5.097
HZ 1080M D	372.1	560 770	9 800	10 795	254	273	292	2.268	5.098
HZ 1180M A	386.4	591 520	10 300	11 340	266	284	303	2.269	5.099
HZ 1180M B	395.6	618 520	10 775	11 810	273	292	311	2.271	5.103
HZ 1180M C	413.4	658 140	11 390	12 540	286	305	325	2.283	5.112
HZ 1180M D	427.5	689 290	11 965	13 040	297	316	336	2.289	5.117

Combination HZM ... - 14 / AZ 13

($b_{sys} = 1.867 \text{ m}$)

HZ 880M A	296.6	270 070	6 710	6 185	188	211	233	2.269	4.901
HZ 880M B	313.4	288 480	7 135	6 605	202	224	246	2.272	4.904
HZ 880M C	321.1	301 320	7 415	6 900	208	230	252	2.272	4.904
HZ 1080M A	339.4	503 200	9 595	9 005	222	244	266	2.265	5.331
HZ 1080M B	351.6	537 140	10 185	9 610	231	254	276	2.266	5.332
HZ 1080M C	373.7	578 590	10 910	10 355	249	271	293	2.268	5.334
HZ 1080M D	391.8	619 200	11 590	11 080	263	285	308	2.268	5.334
HZ 1180M A	406.1	649 660	12 070	11 630	274	297	319	2.269	5.335
HZ 1180M B	414.7	674 540	12 485	12 075	281	303	326	2.271	5.337
HZ 1180M C	437.9	729 470	13 360	12 905	297	320	344	2.283	5.370
HZ 1180M D	450.7	756 150	13 805	13 380	307	330	354	2.289	5.377

Combination HZM ... - 24 / AZ 13

($b_{sys} = 2.338 \text{ m}$)

HZ 880M A	360.4	361 710	8 475	7 845	253	268	283	2.793	5.207
HZ 880M B	387.1	391 090	9 170	8 520	274	289	304	2.799	5.213
HZ 880M C	399.4	411 640	9 625	8 985	283	299	314	2.798	5.213
HZ 1080M A	429.1	694 630	12 630	11 885	307	322	337	2.784	5.633
HZ 1080M B	448.6	749 010	13 580	12 845	322	337	352	2.787	5.636
HZ 1080M C	483.8	815 070	14 755	14 035	350	365	380	2.790	5.639
HZ 1080M D	512.4	879 860	15 855	15 190	372	387	402	2.791	5.640
HZ 1180M A	535.2	928 380	16 645	16 055	390	405	420	2.792	5.641
HZ 1180M B	548.9	968 150	17 310	16 760	401	416	431	2.795	5.650
HZ 1180M C	579.1	1 037 650	18 465	17 850	424	439	455	2.812	5.663
HZ 1180M D	599.4	1 080 000	19 175	18 605	440	455	471	2.825	5.673

Combination HZM ... - 26 / AZ 13

($b_{sys} = 2.338 \text{ m}$)

HZ 880M A	377.6	391 580	9 740	8 970	261	279	296	2.793	5.424
HZ 880M B	404.2	420 740	10 415	9 640	282	300	317	2.799	5.431
HZ 880M C	416.6	441 240	10 870	10 110	292	309	327	2.798	5.430
HZ 1080M A	446.4	744 820	14 210	13 335	315	333	350	2.784	5.850
HZ 1080M B	465.8	799 070	15 160	14 305	330	348	366	2.787	5.853
HZ 1080M C	501.0	864 840	16 315	15 485	358	375	393	2.790	5.856
HZ 1080M D	529.6	929 450	17 405	16 645	380	398	416	2.791	5.857
HZ 1180M A	552.4	977 830	18 175	17 510	398	416	434	2.792	5.858
HZ 1180M B	566.1	1 017 550	18 845	18 220	409	427	444	2.795	5.862
HZ 1180M C	600.7	1 099 020	20 205	19 515	434	453	472	2.812	5.900
HZ 1180M D	621.0	1 141 240	20 910	20 265	450	469	487	2.825	5.912

Combination HZM ... - 12 / AZ 18

($b_{sys} = 1.787 \text{ m}$)

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 880M A	292.6	253 830	5 675	6 500	189	209	230	2.330	4.726
HZ 880M B	310.3	273 760	6 155	6 935	203	223	244	2.333	4.728
HZ 880M C	318.4	287 310	6 450	7 245	209	230	250	2.333	4.728
HZ 1080M A	337.3	472 290	8 260	9 265	224	245	265	2.326	5.157
HZ 1080M B	350.2	508 690	8 895	9 920	234	255	275	2.327	5.157
HZ 1080M C	373.4	552 470	9 680	10 690	253	273	293	2.328	5.158
HZ 1080M D	392.2	595 210	10 405	11 455	267	288	308	2.329	5.159
HZ 1180M A	407.2	627 320	10 925	12 030	279	299	320	2.330	5.159
HZ 1180M B	416.8	655 530	11 420	12 515	287	307	327	2.331	5.163
HZ 1180M C	435.3	696 890	12 060	13 280	300	321	342	2.344	5.172
HZ 1180M D	450.1	729 410	12 660	13 800	312	333	353	2.350	5.177

Combination HZM ... - 14 / AZ 18

($b_{sys} = 1.787 \text{ m}$)

HZ 880M A	313.3	291 480	7 245	6 675	198	222	246	2.330	4.962
HZ 880M B	330.9	310 690	7 685	7 115	212	236	260	2.333	4.965
HZ 880M C	338.9	324 110	7 980	7 420	219	242	266	2.333	4.964
HZ 1080M A	358.1	535 120	10 205	9 575	233	257	281	2.326	5.392
HZ 1080M B	370.9	570 570	10 820	10 210	243	267	291	2.327	5.393
HZ 1080M C	394.0	613 840	11 575	10 985	262	285	309	2.328	5.395
HZ 1080M D	412.8	656 250	12 280	11 745	276	300	324	2.329	5.395
HZ 1180M A	427.7	688 060	12 780	12 315	288	312	336	2.330	5.396
HZ 1180M B	436.7	714 050	13 215	12 780	295	319	343	2.331	5.398
HZ 1180M C	461.0	771 410	14 130	13 650	312	337	362	2.344	5.431
HZ 1180M D	474.3	799 260	14 590	14 145	322	347	372	2.350	5.437

Combination HZM ... - 24 / AZ 18

($b_{sys} = 2.258 \text{ m}$)

HZ 880M A	375.9	381 900	8 950	8 280	263	279	295	2.853	5.268
HZ 880M B	403.5	412 270	9 665	8 985	285	301	317	2.860	5.274
HZ 880M C	416.3	433 550	10 140	9 465	295	311	327	2.859	5.274
HZ 1080M A	447.1	726 710	13 215	12 435	319	335	351	2.845	5.694
HZ 1080M B	467.2	783 020	14 195	13 430	335	351	367	2.847	5.696
HZ 1080M C	503.7	851 360	15 410	14 655	363	379	395	2.850	5.700
HZ 1080M D	533.3	918 420	16 550	15 855	387	403	419	2.851	5.701
HZ 1180M A	556.9	968 630	17 365	16 750	405	421	437	2.853	5.702
HZ 1180M B	571.1	1 009 800	18 055	17 480	416	432	448	2.856	5.711
HZ 1180M C	602.3	1 081 690	19 250	18 610	440	457	473	2.873	5.724
HZ 1180M D	623.3	1 125 490	19 985	19 390	457	473	489	2.885	5.734

Combination HZM ... - 26 / AZ 18

($b_{sys} = 2.258 \text{ m}$)

HZ 880M A	393.7	412 820	10 270	9 460	271	290	309	2.853	5.485
HZ 880M B	421.3	442 980	10 965	10 150	293	312	331	2.860	5.491
HZ 880M C	434.0	464 200	11 435	10 635	303	322	341	2.859	5.491
HZ 1080M A	465.0	778 680	14 855	13 940	327	346	365	2.845	5.911
HZ 1080M B	485.1	834 860	15 840	14 950	343	362	381	2.847	5.914
HZ 1080M C	521.5	902 900	17 035	16 165	372	391	409	2.850	5.917
HZ 1080M D	551.2	969 770	18 160	17 365	395	414	433	2.851	5.918
HZ 1180M A	574.7	1 019 830	18 955	18 260	414	432	451	2.853	5.919
HZ 1180M B	588.9	1 060 950	19 645	19 000	425	443	462	2.856	5.923
HZ 1180M C	624.6	1 145 230	21 055	20 335	451	471	490	2.873	5.960
HZ 1180M D	645.6	1 188 890	21 785	21 115	467	487	507	2.885	5.973

Combination HZM ... - 12 / AZ 26

($b_{sys} = 1.787 \text{ m}$)

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 880M A	325.9	268 850	6010	6885	205	230	256	2.403	4.800
HZ 880M B	343.6	288 770	6490	7315	219	244	270	2.406	4.802
HZ 880M C	351.7	302 320	6790	7625	225	251	276	2.406	4.801
HZ 1080M A	370.7	487 340	8520	9560	240	265	291	2.399	5.230
HZ 1080M B	383.6	523 750	9160	10215	250	276	301	2.400	5.230
HZ 1080M C	406.7	567 510	9940	10980	268	294	319	2.402	5.232
HZ 1080M D	425.5	610 240	10665	11 745	283	309	334	2.402	5.232
HZ 1180M A	440.5	642 340	11 185	12 315	295	320	346	2.403	5.233
HZ 1180M B	450.1	670 550	11 685	12 800	302	328	353	2.405	5.237
HZ 1180M C	468.7	711 900	12 320	13 565	316	342	368	2.418	5.246
HZ 1180M D	483.4	744 420	12 920	14 085	328	354	379	2.424	5.251

Combination HZM ... - 14 / AZ 26

($b_{sys} = 1.787 \text{ m}$)

HZ 880M A	346.6	306 500	7 620	7015	214	243	272	2.403	5.035
HZ 880M B	364.1	325 690	8 055	7455	228	257	286	2.406	5.038
HZ 880M C	372.2	339 110	8 345	7765	234	263	292	2.406	5.038
HZ 1080M A	391.6	550 170	10 490	9845	249	278	307	2.399	5.465
HZ 1080M B	404.3	585 630	11 105	10 480	259	288	317	2.400	5.467
HZ 1080M C	427.3	628 880	11 855	11 255	277	306	335	2.402	5.468
HZ 1080M D	446.1	671 280	12 565	12 015	292	321	350	2.402	5.469
HZ 1180M A	461.1	703 080	13 060	12 585	304	333	362	2.403	5.469
HZ 1180M B	470.0	729 070	13 495	13 050	311	340	369	2.405	5.471
HZ 1180M C	494.3	786 430	14 405	13 915	327	358	388	2.418	5.505
HZ 1180M D	507.6	814 270	14 865	14 410	338	368	399	2.424	5.511

Combination HZM ... - 24 / AZ 26

($b_{sys} = 2.258 \text{ m}$)

HZ 880M A	402.2	393 780	9 230	8540	275	296	316	2.927	5.342
HZ 880M B	429.8	424 140	9945	9240	297	317	337	2.933	5.348
HZ 880M C	442.6	445 420	10 415	9725	307	327	347	2.932	5.347
HZ 1080M A	473.6	738 630	13 430	12 640	331	352	372	2.919	5.768
HZ 1080M B	493.7	794 950	14 410	13 635	347	367	388	2.921	5.770
HZ 1080M C	530.1	863 270	15 625	14 860	376	396	416	2.924	5.773
HZ 1080M D	559.7	930 320	16 765	16 060	399	419	439	2.925	5.774
HZ 1180M A	583.3	980 510	17 580	16 955	418	438	458	2.926	5.776
HZ 1180M B	597.5	1 021 690	18 270	17 685	429	449	469	2.930	5.785
HZ 1180M C	628.6	1 093 550	19 460	18 815	453	473	493	2.947	5.798
HZ 1180M D	649.6	1 137 340	20 195	19 595	469	490	510	2.959	5.807

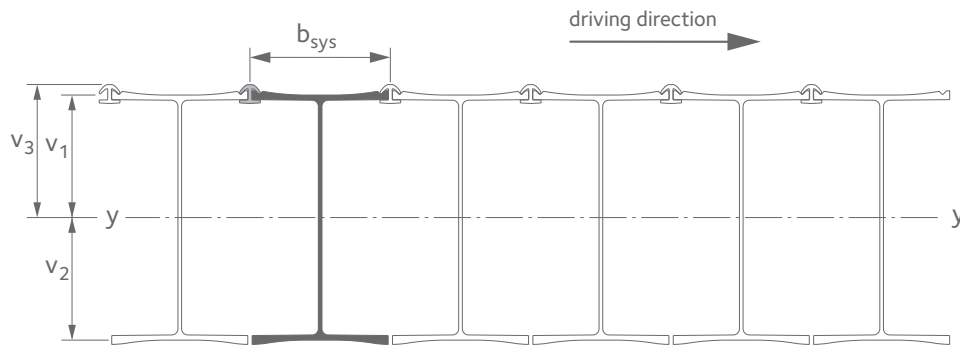
Combination HZM ... - 26 / AZ 26

($b_{sys} = 2.258 \text{ m}$)

HZ 880M A	420.0	424 700	10 565	9730	284	307	330	2.927	5.559
HZ 880M B	447.6	454 840	11 260	10 420	306	328	351	2.933	5.565
HZ 880M C	460.4	476 060	11 725	10 905	316	338	361	2.932	5.564
HZ 1080M A	491.5	790 610	15 085	14 155	340	363	386	2.919	5.985
HZ 1080M B	511.6	846 790	16 065	15 160	356	379	402	2.921	5.987
HZ 1080M C	547.9	914 810	17 260	16 380	384	407	430	2.924	5.990
HZ 1080M D	577.6	981 660	18 380	17 580	407	430	453	2.925	5.991
HZ 1180M A	601.1	1 031 710	19 175	18 475	426	449	472	2.926	5.993
HZ 1180M B	615.3	1 072 840	19 865	19 210	437	460	483	2.930	5.996
HZ 1180M C	650.9	1 157 090	21 275	20 545	463	487	511	2.947	6.034
HZ 1180M D	671.9	1 200 740	22 000	21 325	480	504	527	2.959	6.046

Combination C 1

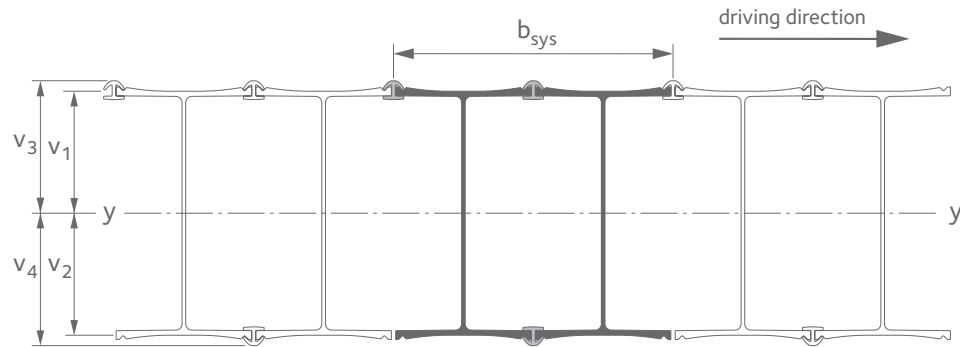
($b_{sys} = 0.475 / 0.470 / 0.475 \text{ m}$)



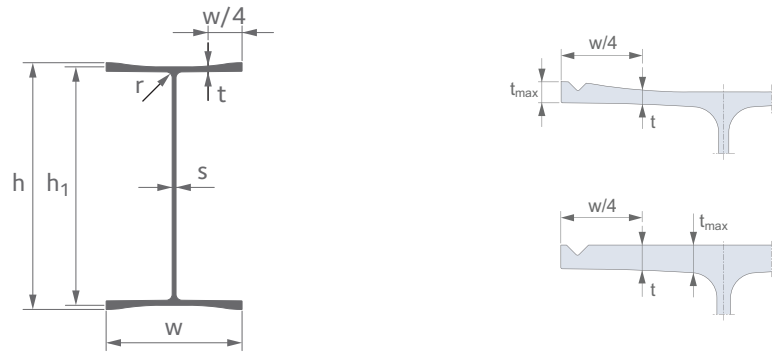
Section	Dimensions				Properties per meter of wall					Per system	
	v_1 mm	v_2 mm	v_3 mm	v_4 mm	A cm ² /m	G kg/m ²	I_y cm ⁴ /m	W_{ely}^* cm ³ /m	W_{ely}^{**} cm ³ /m	A_{LW} m ² /m	A_{LS} m ² /m
HZ 880M A	379.9	423.5	414.3	-	662.1	519.8	811 010	19 150	19 575	0.551	3.001
HZ 880M B	384.3	423.1	416.7	-	727.6	571.1	882 820	20 865	21 185	0.554	3.003
HZ 880M C	387.1	424.3	417.5	-	758.1	595.1	933 600	22 000	22 360	0.554	3.002
HZ 1080M A	500.9	546.5	535.3	-	835.9	656.2	1 602 720	29 330	29 940	0.547	3.431
HZ 1080M B	505.6	547.8	537.1	-	885.1	694.8	1 740 470	31 775	32 410	0.548	3.431
HZ 1080M C	510.6	548.8	539.0	-	970.7	762.0	1 900 270	34 625	35 255	0.549	3.433
HZ 1080M D	515.9	551.5	540.3	-	1 040.9	817.1	2 058 680	37 330	38 100	0.550	3.433
HZ 1180M A	520.9	554.5	541.3	-	1 096.3	860.6	2 176 560	39 250	40 210	0.551	3.434
HZ 1180M B	524.5	554.9	543.0	-	1 132.6	889.1	2 282 550	41 140	42 040	0.553	3.440
HZ 1180M C	522.8	560.6	542.1	-	1 197.6	940.1	2 430 450	43 355	44 835	0.558	3.457
HZ 1180M D	527.9	559.5	545.2	-	1 251.5	982.4	2 547 690	45 530	46 735	0.564	3.464

Combination C 23

($b_{sys} = 0.950 / 0.940 / 0.950 \text{ m}$)

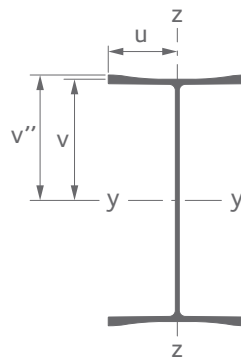


Section	Dimensions				Properties per meter of wall					Per system	
	v_1 mm	v_2 mm	v_3 mm	v_4 mm	A cm ² /m	G kg/m ²	I_y cm ⁴ /m	W_{ely}^* cm ³ /m	W_{ely}^{**} cm ³ /m	A_{LW} m ² /m	A_{LS} m ² /m
HZ 880M A	389.0	414.4	423.4	448.9	676.7	531.2	836 540	20 185	18 635	1.074	3.542
HZ 880M B	392.1	415.3	424.6	447.7	741.5	582.0	906 880	21 840	20 255	1.081	3.549
HZ 880M C	394.6	416.8	425.1	447.3	772.0	606.0	957 590	22 975	21 410	1.080	3.548
HZ 1080M A	510.4	537.0	544.8	571.4	850.8	667.9	1 646 140	30 655	28 810	1.066	3.969
HZ 1080M B	514.1	539.3	545.5	570.7	899.2	705.9	1 781 400	33 035	31 215	1.068	3.971
HZ 1080M C	518.3	541.1	546.7	569.6	984.8	773.0	1 940 790	35 865	34 075	1.072	3.974
HZ 1080M D	523.1	544.3	547.5	568.8	1 054.9	828.1	2 098 950	38 560	36 905	1.073	3.975
HZ 1180M A	527.6	547.8	548.0	568.2	1 110.2	871.5	2 216 470	40 460	39 010	1.074	3.977
HZ 1180M B	529.9	549.5	548.3	567.9	1 144.1	898.1	2 314 950	42 130	40 765	1.078	3.988
HZ 1180M C	530.2	553.2	549.5	572.5	1 214.4	953.3	2 478 200	44 800	43 290	1.087	4.009
HZ 1180M D	532.7	554.7	550.0	572.0	1 263.2	991.6	2 579 400	46 500	45 095	1.099	4.018



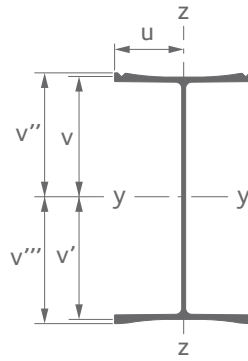
Section	h mm	h ₁ mm	w mm	t _{max} mm	t mm	s mm	r mm	Suitable connectors	
HZ 880M A	831.3	803.4	458	29.0	18.9	13.0	20	RZDU 16	RH 16
HZ 880M B	831.3	807.4	460	29.0	20.9	15.0	20	RZDU 16	RH 16
HZ 880M C	831.3	811.4	460	29.0	22.9	15.0	20	RZDU 16	RH 16
HZ 1080M A	1075.3	1047.4	454	29.0	19.6	16.0	35	RZDU 16	RH 16
HZ 1080M B	1075.3	1053.4	454	29.0	22.6	16.0	35	RZDU 16	RH 16
HZ 1080M C	1075.3	1059.4	456	29.0	25.7	18.0	35	RZDU 16	RH 16
HZ 1080M D	1075.3	1067.4	457	30.7	29.7	19.0	35	RZDU 16	RH 16
HZ 1180M A	1075.4	-	458	34.7	31.0	20.0	35	RZDU 16	RH 16
HZ 1180M B	1079.4	-	458	36.7	33.0	20.0	35	RZDU 16	RH 16
HZ 1180M C	1083.4	-	459	38.7	35.0	21.0	35	RZDU 18	RH 20
HZ 1180M D	1087.4	-	460	40.7	37.0	22.0	35	RZDU 18	RH 20

Solution 100



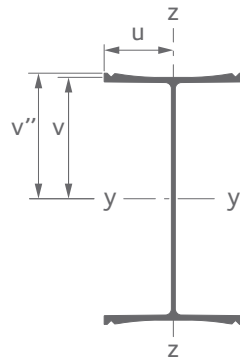
Section	Dimensions						Properties per solution								
	v mm	v' mm	v'' mm	v''' mm	u mm	u' mm	A cm ²	G kg/m	I _y cm ⁴	I _z cm ⁴	W _{ely} * cm ³	W _{ely} ** cm ³	W _{elz} cm ³	A _{tw} m ² /m	A _{ts} m ² /m
HZ 880M A	401.7	-	415.7	-	229.0	-	295.6	232.0	356 770	39 990	8880	-	1 745	0.459	2.966
HZ 880M B	403.7	-	415.7	-	230.0	-	328.2	257.6	392 750	42 770	9730	-	1 860	0.461	2.967
HZ 880M C	405.7	-	415.7	-	230.0	-	342.7	269.0	416 760	44 350	10275	-	1 930	0.461	2.967
HZ 1080M A	523.7	-	537.7	-	227.0	-	374.2	293.8	705 260	39 330	13465	-	1 735	0.455	3.396
HZ 1080M B	526.7	-	537.7	-	227.0	-	397.6	312.1	770 550	42 310	14630	-	1 865	0.455	3.396
HZ 1080M C	529.7	-	537.7	-	228.0	-	439.6	345.1	848 970	44 960	16025	-	1 970	0.457	3.397
HZ 1080M D	533.7	-	537.7	-	228.5	-	473.6	371.8	925 360	46 940	17340	-	2 055	0.457	3.398
HZ 1180M A	537.7	-	537.7	-	229.0	-	500.8	393.1	983 050	47 950	18285	-	2 095	0.458	3.399
HZ 1180M B	539.7	-	539.7	-	229.0	-	519.1	407.5	1 036 160	51 150	19200	-	2 235	0.458	3.407
HZ 1180M C	541.7	-	541.7	-	229.5	-	548.3	430.4	1 100 310	54 730	20310	-	2 385	0.459	3.416
HZ 1180M D	543.7	-	543.7	-	230.0	-	577.5	453.3	1 165 100	58 350	21430	-	2 535	0.460	3.425

Solution 102



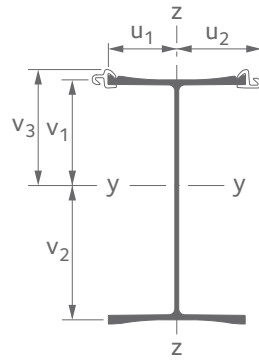
Section	Dimensions						Properties per solution								
	v	v'	v''	v'''	u	u'	A	G	I _y	I _z	W _{ely} *	W _{ely} **	W _{el,z}	A _{LW}	A _{LS}
	mm	mm	mm	mm	mm	mm	cm ²	kg/m	cm ⁴	cm ⁴	cm ³	cm ³	cm ³	m ² /m	m ² /m
HZ 880M A	406.2	397.2	420.1	411.2	229.0	-	292.4	229.5	351 350	38 640	8 650	-	1 685	0.478	2.966
HZ 880M B	408.1	399.3	420.0	411.3	230.0	-	324.7	254.9	386 810	41 280	9 480	-	1 795	0.481	2.967
HZ 880M C	409.9	401.5	419.9	411.4	230.0	-	339.2	266.3	410 830	42 870	10 025	-	1 865	0.480	2.967
HZ 1080M A	528.2	519.2	542.1	533.2	227.0	-	371.1	291.3	696 340	38 030	13 185	-	1 675	0.473	3.396
HZ 1080M B	531.4	522.0	542.3	533.0	227.0	-	394.1	309.4	760 600	40 870	14 315	-	1 800	0.475	3.396
HZ 1080M C	533.9	525.5	541.9	533.4	228.0	-	436.1	342.4	839 020	43 500	15 715	-	1 910	0.476	3.397
HZ 1080M D	537.6	529.8	541.6	533.7	228.5	-	470.1	369.0	915 420	45 480	17 025	-	1 990	0.477	3.398
HZ 1180M A	541.4	534.0	541.4	534.0	229.0	-	497.3	390.4	973 040	46 470	17 970	-	2 030	0.477	3.399
HZ 1180M B	544.5	534.9	544.5	534.9	229.0	-	514.5	403.9	1 022 780	49 180	18 785	-	2 150	0.481	3.407
HZ 1180M C	546.3	537.1	546.3	537.1	229.5	-	543.6	426.8	1 086 840	52 750	19 895	-	2 300	0.482	3.416
HZ 1180M D	550.4	537.0	550.4	537.0	230.0	-	570.5	447.8	1 144 400	55 350	20 795	-	2 405	0.487	3.419

Solution 104



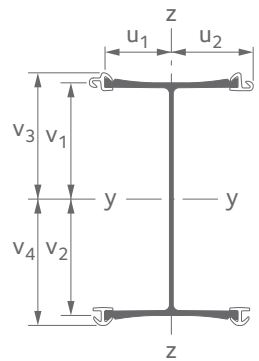
Section	Dimensions						Properties per solution								
	v	v'	v''	u	u'		A	G	I _y	I _z	W _{ely} *	W _{ely} **	W _{el,z}	A _{LW}	A _{LS}
	mm	mm	mm	mm	mm	mm	cm ²	kg/m	cm ⁴	cm ⁴	cm ³	cm ³	cm ³	m ² /m	m ² /m
HZ 880M A	401.7	-	415.7	-	229.0	-	289.2	227.0	346 040	37 290	8 615	-	1 630	0.478	2.984
HZ 880M B	403.7	-	415.7	-	230.0	-	321.3	252.2	381 010	39 800	9 440	-	1 730	0.481	2.987
HZ 880M C	405.7	-	415.7	-	230.0	-	335.7	263.6	405 030	41 380	9 985	-	1 800	0.480	2.987
HZ 1080M A	523.7	-	537.7	-	227.0	-	368.0	288.9	687 560	36 730	13 130	-	1 620	0.473	3.414
HZ 1080M B	526.7	-	537.7	-	227.0	-	390.6	306.7	750 820	39 430	14 255	-	1 735	0.475	3.415
HZ 1080M C	529.7	-	537.7	-	228.0	-	432.7	339.6	829 230	42 050	15 655	-	1 845	0.476	3.417
HZ 1080M D	533.7	-	537.7	-	228.5	-	466.7	366.3	905 630	44 020	16 970	-	1 925	0.477	3.417
HZ 1180M A	537.7	-	537.7	-	229.0	-	493.8	387.7	963 160	44 990	17 915	-	1 965	0.477	3.418
HZ 1180M B	539.7	-	539.7	-	229.0	-	509.8	400.2	1 009 630	47 220	18 705	-	2 060	0.481	3.430
HZ 1180M C	541.7	-	541.7	-	229.5	-	539.0	423.1	1 073 590	50 780	19 820	-	2 210	0.482	3.439
HZ 1180M D	543.7	-	543.7	-	230.0	-	563.4	442.3	1 124 210	52 350	20 675	-	2 275	0.487	3.440

Solution 12



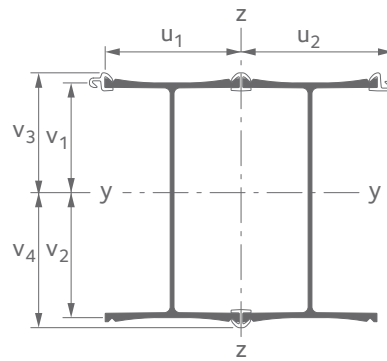
Section	Dimensions						Properties per solution								
	v_1 mm	v_2 mm	v_3 mm	v_4 mm	u_1 mm	u_2 mm	A cm ²	G kg/m	I_y cm ⁴	I_z cm ⁴	W_{ely}^* cm ³	W_{ely}^{**} cm ³	$W_{el,z}$ cm ³	A_{TW} m ² /m	A_{LS} m ² /m
HZ 880M A	356.2	447.2	390.5	-	228.9	282.9	333.5	261.8	410 770	62 640	9 185	10 520	2 215	0.621	3.017
HZ 880M B	362.5	444.9	394.9	-	229.9	283.9	365.8	287.2	446 960	65 480	10 045	11 320	2 305	0.624	3.019
HZ 880M C	366.1	445.3	396.4	-	229.9	283.9	380.3	298.5	471 210	67 060	10 580	11 885	2 360	0.624	3.019
HZ 1080M A	475.6	571.8	509.9	-	226.9	280.9	412.2	323.6	799 480	61 630	13 980	15 680	2 195	0.617	3.448
HZ 1080M B	481.5	571.9	512.9	-	226.9	280.9	435.2	341.6	864 430	64 470	15 115	16 855	2 295	0.618	3.447
HZ 1080M C	488.5	570.9	516.8	-	227.9	281.9	477.2	374.6	943 630	67 300	16 530	18 260	2 390	0.619	3.449
HZ 1080M D	495.3	572.1	519.6	-	228.4	282.4	511.2	401.3	1 020 560	69 380	17 840	19 645	2 455	0.620	3.450
HZ 1180M A	501.2	574.2	521.5	-	228.9	282.9	538.4	422.7	1 078 560	70 470	18 785	20 680	2 490	0.621	3.450
HZ 1180M B	505.5	573.9	523.8	-	228.9	282.9	555.6	436.1	1 129 000	73 180	19 670	21 555	2 585	0.622	3.454
HZ 1180M C	505.5	577.9	524.8	-	229.4	283.4	589.2	462.5	1 203 660	78 980	20 830	22 935	2 785	0.635	3.463
HZ 1180M D	511.2	576.2	528.5	-	229.9	283.9	616.1	483.6	1 262 570	81 690	21 915	23 890	2 875	0.641	3.468

Solution 14



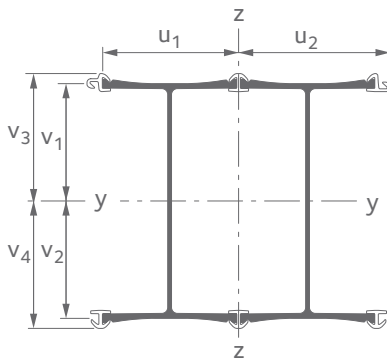
Section	Dimensions						Properties per solution								
	v_1 mm	v_2 mm	v_3 mm	v_4 mm	u_1 mm	u_2 mm	A cm ²	G kg/m	I_y cm ⁴	I_z cm ⁴	W_{ely}^* cm ³	W_{ely}^{**} cm ³	$W_{el,z}$ cm ³	A_{TW} m ² /m	A_{LS} m ² /m
HZ 880M A	401.1	402.4	435.4	436.8	228.9	282.9	370.6	290.9	478 080	83 810	11 880	10 945	2 965	0.621	3.253
HZ 880M B	403.1	404.3	435.4	436.8	229.9	283.9	402.6	316.1	513 050	86 710	12 690	11 745	3 055	0.624	3.256
HZ 880M C	405.1	406.3	435.5	436.7	229.9	283.9	417.1	327.4	537 070	88 290	13 220	12 300	3 110	0.624	3.255
HZ 1080M A	522.9	524.5	557.2	558.9	226.9	280.9	449.3	352.7	911 570	82 480	17 380	16 310	2 935	0.617	3.683
HZ 1080M B	526.0	527.4	557.3	558.9	226.9	280.9	472.0	370.5	974 820	85 180	18 485	17 445	3 035	0.618	3.684
HZ 1080M C	529.0	530.4	557.3	558.8	227.9	281.9	514.0	403.5	1 053 250	88 180	19 860	18 850	3 130	0.619	3.685
HZ 1080M D	533.1	534.3	557.4	558.8	228.4	282.4	548.0	430.2	1 129 640	90 350	21 140	20 215	3 200	0.620	3.686
HZ 1180M A	537.1	538.3	557.4	558.7	228.9	282.9	575.2	451.5	1 187 170	91 510	22 055	21 250	3 235	0.621	3.687
HZ 1180M B	539.1	540.3	557.4	558.7	228.9	282.8	591.2	464.1	1 233 640	93 740	22 835	22 080	3 315	0.622	3.688
HZ 1180M C	545.9	537.5	565.2	556.8	229.4	283.4	635.1	498.5	1 336 980	105 670	24 490	23 655	3 730	0.635	3.722
HZ 1180M D	547.8	539.6	565.1	556.9	229.9	283.9	659.5	517.7	1 387 600	107 480	25 335	24 555	3 785	0.641	3.728

Solution 24

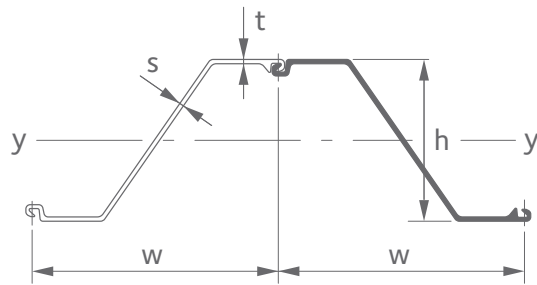


Section	Dimensions						Properties per solution								
	v_1 mm	v_2 mm	v_3 mm	v_4 mm	u_1 mm	u_2 mm	A cm ²	G kg/m	I_y cm ⁴	I_z cm ⁴	W_{ely}^* cm ³	W_{ely}^{**} cm ³	$W_{el,z}$ cm ³	A_{TW} m ² /m	A_{LS} m ² /m
HZ 880M A	376.7	426.7	411.2	461.2	464.8	518.9	659.8	518.0	820000	490460	19220	17780	9450	1.144	3.559
HZ 880M B	380.9	426.5	413.4	458.9	466.9	520.9	723.9	568.3	890310	534990	20875	19400	10270	1.150	3.565
HZ 880M C	383.8	427.6	414.3	458.1	466.9	520.9	752.8	591.0	938480	554410	21950	20490	10645	1.150	3.565
HZ 1080M A	497.4	550.0	531.8	584.4	460.9	514.9	817.3	641.6	1593470	568570	28970	27265	11045	1.136	3.985
HZ 1080M B	501.8	551.6	533.2	583.1	460.9	514.9	862.6	677.2	1720280	598790	31185	29505	11630	1.138	3.987
HZ 1080M C	507.0	552.4	535.4	580.8	462.9	516.9	946.7	743.1	1877600	654870	33990	32325	12670	1.141	3.990
HZ 1080M D	512.5	554.9	536.9	579.3	463.9	517.9	1014.7	796.5	2030710	698950	36595	35055	13495	1.142	3.991
HZ 1180M A	517.6	557.8	538.0	578.2	464.9	518.9	1069.0	839.2	2146010	733770	38470	37115	14140	1.144	3.993
HZ 1180M B	520.2	559.2	538.6	577.7	464.9	518.9	1101.0	864.3	2239080	756060	40040	38760	14570	1.147	4.002
HZ 1180M C	521.4	562.0	540.7	581.3	466.9	520.9	1174.1	921.6	2405860	813450	42810	41390	15615	1.164	4.015
HZ 1180M D	524.2	563.2	541.5	580.5	467.9	521.9	1222.9	960.0	2507280	847260	44520	43195	16235	1.176	4.025

Solution 26

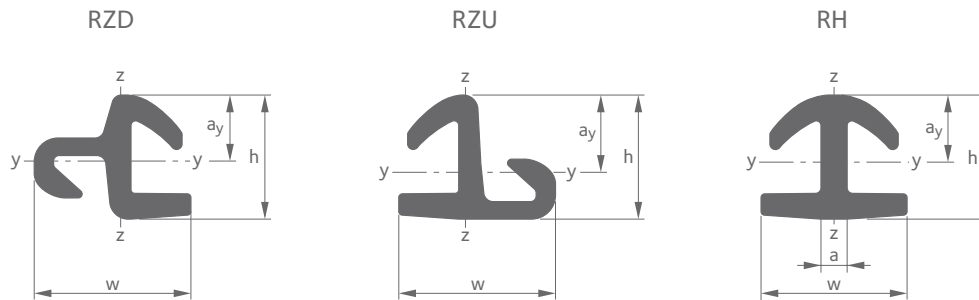


Section	Dimensions						Properties per solution								
	v_1 mm	v_2 mm	v_3 mm	v_4 mm	u_1 mm	u_2 mm	A cm ²	G kg/m	I_y cm ⁴	I_z cm ⁴	W_{ely}^* cm ³	W_{ely}^{**} cm ³	$W_{el,z}$ cm ³	A_{TW} m ² /m	A_{LS} m ² /m
HZ 880M A	401.4	402.0	435.8	436.5	464.9	518.9	700.1	549.6	889890	580240	22135	20385	11180	1.144	3.776
HZ 880M B	403.4	404.0	435.8	436.5	466.9	520.9	764.1	599.9	959830	625530	23755	21990	12010	1.150	3.782
HZ 880M C	405.4	406.0	435.9	436.5	466.9	520.9	793.1	622.6	1007860	644950	24825	23090	12380	1.150	3.782
HZ 1080M A	523.3	524.1	557.7	558.5	460.9	514.9	857.6	673.2	1710510	656830	32635	30625	12755	1.136	4.202
HZ 1080M B	526.3	527.1	557.7	558.5	460.9	514.9	902.9	708.8	1837030	687060	34855	32890	13345	1.138	4.204
HZ 1080M C	529.4	530.1	557.8	558.5	462.9	516.9	986.9	774.7	1993870	743900	37615	35700	14395	1.141	4.208
HZ 1080M D	533.4	534.0	557.8	558.5	463.9	517.9	1054.9	828.1	2146660	788350	40195	38440	15225	1.142	4.209
HZ 1180M A	537.4	538.0	557.8	558.4	464.9	518.9	1109.3	870.8	2261730	823550	42040	40500	15875	1.144	4.210
HZ 1180M B	539.4	540.0	557.8	558.4	464.9	518.8	1141.3	895.9	2354670	845840	43605	42165	16305	1.147	4.213
HZ 1180M C	543.9	539.5	563.2	558.8	466.9	520.9	1224.5	961.3	2549710	927520	46880	45275	17805	1.164	4.251
HZ 1180M D	545.8	541.6	563.1	558.9	467.9	521.9	1273.4	999.6	2650950	961810	48570	47080	18430	1.176	4.264



Section	Dimensions				Properties Double Piles					
	h	w	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	670	9.5	9.5	183.4	144.0	26 400	1 740	11.99	1.65
AZ 13-10/10	304	670	10.0	10.0	191.6	150.4	27 440	1 810	11.97	1.65
AZ 18	380	630	9.5	9.5	189.6	148.8	43 080	2 270	15.07	1.71
AZ 18-10/10	381	630	10.0	10.0	198.1	155.5	44 790	2 355	15.04	1.71
AZ 26	427	630	13.0	12.2	249.2	195.6	69 940	3 280	16.75	1.78
AZ 13-770	344	770	9.0	9.0	193.8	152.1	34 440	2 000	13.33	1.85
AZ 14-770-10/10	345	770	10.0	10.0	211.2	165.8	37 330	2 165	13.30	1.85
AZ 18-700	420	700	9.0	9.0	194.9	153.0	52 920	2 520	16.47	1.86
AZ 20-700	421	700	10.0	10.0	212.8	167.0	57 340	2 725	16.42	1.86
AZ 26-700	460	700	12.2	12.2	262.1	205.7	83 610	3 635	17.86	1.93

Connectors



Section	Dimensions				Properties							
	h	w	a	a _y	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	61.8	80.5	-	31.5	20.7	16.2	57	94	18	22	0.12	0.06
RZU 16	61.8	80.5	-	38.3	20.4	16.1	68	94	18	22	0.08	0.10
RH 16	61.8	68.2	12.2	32.5	20.1	16.0	83	54	25	16	0.10	0.09
RZD 18	67.3	85.0	-	35.9	23.0	18.1	78	110	22	25	0.12	0.07
RZU 18	67.3	85.0	-	42.1	22.6	17.9	92	110	22	25	0.09	0.10
RH 20	67.3	79.2	14.2	36.5	25.2	20.0	122	88	33	22	0.11	0.10

Delivery conditions

Tolerances

Standard EN 10248	HZM	AZ
Weight ⁽¹⁾		± 5 %
Length		± 200 mm
Thickness	t,s > 12.5 mm: + 2.5 mm / -1.5 mm	t,s > 8.5 mm : ± 6 %
Height	h ≥ 500 mm: ± 7.0 mm	h ≥ 300 mm: ± 7.0 mm
Width single pile ⁽²⁾		± 2 % w
Width double piles ⁽²⁾		± 3 % w
Straightness ⁽³⁾		≤ 0.2 % L
Ends out of square ⁽²⁾		± 2 % w

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

Maximum rolling length ⁽¹⁾

HZM	33.0 m
AZ	31.0 m
RZD / RZU / RH	24.0 m

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

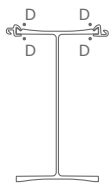
Steel Grades

Standard EN 10248	Min. yield strength R _{eH}	Min. tensile strength R _m	Min. elongation L ₀ = 5.65 √S ₀
	MPa	MPa	%
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
ArcelorMittal mill specification			
S 460 AP	460	550	17

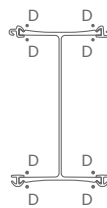
All the components of the HZM Steel Wall System are available in **ASTM A 690** steel grade. **ASTM A 690** with higher yield strength on request.

Standard Welding Configuration

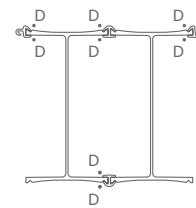
Sol 12



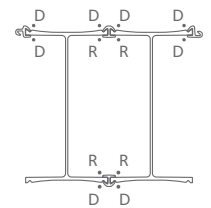
Sol 14



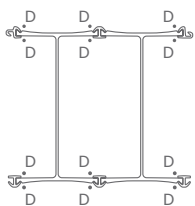
Sol 24 - Form 'a'



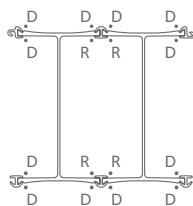
Sol 24 - Form 'b'



Sol 26 - Form 'a'



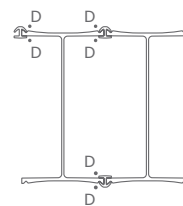
Sol 26 - Form 'b'



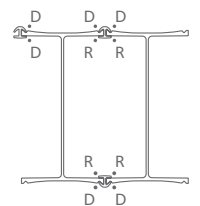
Sol C1



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

In **Form 'a'** the HZM king piles can be driven separately if necessary (for instance, in hard driving conditions).

Form 'b' is the standard delivery form: the HZM king piles are welded together and can only be driven in one piece as a 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.

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 'w' 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 HZM / 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 HZM king piles (Sol. 24 and Sol. 26) have the same length as the HZM king piles.

Conventions and symbols

b_{sys}	nominal width of the combination (system) [m]
h_i	height (depth) of the section [m]
i_y	radius of gyration about the y-y axis [m]. $i_y = \sqrt{I_y / A}$
r	inner radius of the HZM profile, between web and flange [m]
s	thickness of the web [m]
t	thickness of the flange at a distance $w/4$ from the edge [m]
t_{max}	maximum thickness of the flange [m]
u_i, v_i	distance from neutral axis to extreme fiber of the HZM flange / connector RH/RZ [m]
w	nominal width of the element [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 HZM king piles [kg/m ²]
$G_{80\%}$	mass of the combination with length of the infill sheets AZ = 80% of length of the HZM king piles [kg/m ²]
$G_{100\%}$	mass of the combination with length of the infill sheets AZ = 100% of length of the HZM 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]
$W_{el,y}^*$	equivalent elastic section modulus of the combination related to the extreme fiber of the flange of the HZM [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]

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
4815	200	HZ 880M A	12/AZ 13-770	8345	292	HZ 880M C	14/AZ 26	10130	272	HZ 1080M B	14/AZ 18-700
5230	212	HZ 880M B	12/AZ 13-770	8355	261	HZ 1080M B	12/AZ 13	10140	327	HZ 880M C	24/AZ 18
5235	217	HZ 880M A	12/AZ 13	8475	283	HZ 880M A	24/AZ 13	10185	276	HZ 1080M B	14/AZ 13
5380	215	HZ 880M A	12/AZ 18-700	8520	291	HZ 1080M A	12/AZ 26	10205	281	HZ 1080M A	14/AZ 18
5485	218	HZ 880M C	12/AZ 13-770	8525	280	HZ 880M A	24/AZ 18-700	10220	299	HZ 1180M A	12/AZ 18-700
5675	230	HZ 880M A	12/AZ 18	8525	283	HZ 880M B	24/AZ 13-770	10270	309	HZ 880M A	26/AZ 18
5690	231	HZ 880M B	12/AZ 13	8615	285	HZ 1080M B	12/AZ 26-700	10300	303	HZ 1180M A	26/AZ 13
5735	243	HZ 880M A	12/AZ 26-700	8740	245	HZ 1080M A	14/AZ 13-770	10355	297	HZ 1180M C	12/AZ 13-770
5820	228	HZ 880M B	12/AZ 18-700	8825	302	HZ 880M A	24/AZ 26-700	10405	308	HZ 1080M D	12/AZ 18
5975	237	HZ 880M C	12/AZ 13	8895	275	HZ 1080M B	12/AZ 18	10415	317	HZ 880M B	26/AZ 13
6010	256	HZ 880M A	12/AZ 26	8920	268	HZ 1080M D	12/AZ 13-770	10415	347	HZ 880M C	24/AZ 26
6100	234	HZ 880M C	12/AZ 18-700	8945	292	HZ 880M C	24/AZ 13-770	10425	313	HZ 880M B	26/AZ 18-700
6155	244	HZ 880M B	12/AZ 18	8950	295	HZ 880M A	24/AZ 18	10430	300	HZ 1080M B	14/AZ 26-700
6160	214	HZ 880M A	14/AZ 13-770	9050	276	HZ 880M A	26/AZ 13-770	10490	307	HZ 1080M A	14/AZ 26
6180	255	HZ 880M B	12/AZ 26-700	9065	274	HZ 1080M C	12/AZ 18-700	10500	326	HZ 1180M A	12/AZ 26-700
6450	250	HZ 880M C	12/AZ 18	9105	278	HZ 1080M C	12/AZ 13	10540	282	HZ 1080M D	14/AZ 13-770
6455	261	HZ 880M C	12/AZ 26-700	9160	301	HZ 1080M B	12/AZ 26	10565	330	HZ 880M A	26/AZ 26
6490	270	HZ 880M B	12/AZ 26	9170	304	HZ 880M B	24/AZ 13	10665	334	HZ 1080M D	12/AZ 26
6540	226	HZ 880M B	14/AZ 13-770	9200	300	HZ 880M B	24/AZ 18-700	10680	306	HZ 1180M B	12/AZ 18-700
6710	233	HZ 880M A	14/AZ 13	9230	316	HZ 880M A	24/AZ 26	10745	335	HZ 880M B	26/AZ 26-700
6790	276	HZ 880M C	12/AZ 26	9270	253	HZ 1080M B	14/AZ 13-770	10775	311	HZ 1180M B	12/AZ 13
6795	232	HZ 880M C	14/AZ 13-770	9345	301	HZ 1080M C	12/AZ 26-700	10820	291	HZ 1080M B	14/AZ 18
6845	230	HZ 880M A	14/AZ 18-700	9375	278	HZ 1180M A	12/AZ 13-770	10830	289	HZ 1080M C	14/AZ 18-700
7065	230	HZ 1080M A	12/AZ 13-770	9500	322	HZ 880M B	24/AZ 26-700	10870	323	HZ 880M C	26/AZ 18-700
7135	246	HZ 880M B	14/AZ 13	9560	263	HZ 1080M A	14/AZ 18-700	10870	327	HZ 880M C	26/AZ 13
7240	258	HZ 880M A	14/AZ 26-700	9595	266	HZ 1080M A	14/AZ 13	10875	307	HZ 1180M D	12/AZ 13-770
7245	246	HZ 880M A	14/AZ 18	9625	314	HZ 880M C	24/AZ 13	10910	293	HZ 1080M C	14/AZ 13
7255	243	HZ 880M B	14/AZ 18-700	9645	309	HZ 880M C	24/AZ 18-700	10925	320	HZ 1180M A	12/AZ 18
7415	252	HZ 880M C	14/AZ 13	9665	317	HZ 880M B	24/AZ 18	10960	333	HZ 1180M B	12/AZ 26-700
7525	249	HZ 880M C	14/AZ 18-700	9675	296	HZ 880M B	26/AZ 13-770	10965	331	HZ 880M B	26/AZ 18
7615	239	HZ 1080M B	12/AZ 13-770	9680	293	HZ 1080M C	12/AZ 18	10975	292	HZ 1180M A	14/AZ 13-770
7620	272	HZ 880M A	14/AZ 26	9735	288	HZ 1080M D	12/AZ 18-700	11105	317	HZ 1080M B	14/AZ 26
7645	270	HZ 880M B	14/AZ 26-700	9740	296	HZ 880M A	26/AZ 13	11130	316	HZ 1080M C	14/AZ 26-700
7685	260	HZ 880M B	14/AZ 18	9770	293	HZ 880M A	26/AZ 18-700	11185	345	HZ 880M C	26/AZ 26-700
7745	248	HZ 1080M A	12/AZ 18-700	9800	284	HZ 1180M B	12/AZ 13-770	11185	346	HZ 1180M A	12/AZ 26
7750	251	HZ 1080M A	12/AZ 13	9800	292	HZ 1080M D	12/AZ 13	11260	351	HZ 880M B	26/AZ 26
7885	264	HZ 880M A	24/AZ 13-770	9860	290	HZ 1080M A	14/AZ 26-700	11275	319	HZ 1180M C	12/AZ 18-700
7915	276	HZ 880M C	14/AZ 26-700	9925	269	HZ 1080M C	14/AZ 13-770	11350	298	HZ 1180M B	14/AZ 13-770
7980	266	HZ 880M C	14/AZ 18	9940	319	HZ 1080M C	12/AZ 26	11390	325	HZ 1180M C	12/AZ 13
8025	275	HZ 1080M A	12/AZ 26-700	9945	331	HZ 880M C	24/AZ 26-700	11420	327	HZ 1180M B	12/AZ 18
8055	286	HZ 880M B	14/AZ 26	9945	337	HZ 880M B	24/AZ 26	11435	341	HZ 880M C	26/AZ 18
8260	265	HZ 1080M A	12/AZ 18	10015	315	HZ 1080M D	12/AZ 26-700	11485	303	HZ 1080M D	14/AZ 18-700
8295	255	HZ 1080M C	12/AZ 13-770	10090	305	HZ 880M C	26/AZ 13-770	11550	346	HZ 1180M C	12/AZ 26-700
8340	257	HZ 1080M B	12/AZ 18-700	10090	315	HZ 880M A	26/AZ 26-700	11575	309	HZ 1080M C	14/AZ 18

Table of Combinations according to Section Modulus

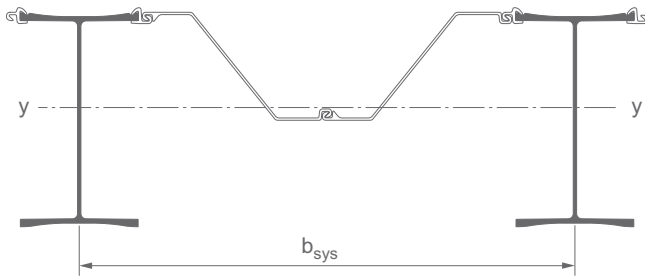
W_{ely}^* cm ³ /m	$G_{100\%}$ kg/m ²	Section	Combination	W_{ely}^* cm ³ /m	$G_{100\%}$ kg/m ²	Section	Combination	W_{ely}^* cm ³ /m	$G_{100\%}$ kg/m ²	Section	Combination
11590	308	HZ 1080M D	14/AZ 13	14025	340	HZ 1080M B	26/AZ 13-770	17305	446	HZ 1180M B	24/AZ 26-700
11685	353	HZ 1180M B	12/AZ 26	14065	345	HZ 1080M A	26/AZ 18-700	17310	431	HZ 1180M B	24/AZ 13
11690	313	HZ 1080M A	24/AZ 13-770	14130	362	HZ 1180M C	14/AZ 18	17365	437	HZ 1180M A	24/AZ 18
11725	361	HZ 880M C	26/AZ 26	14195	367	HZ 1080M B	24/AZ 18	17405	416	HZ 1080M D	26/AZ 13
11785	330	HZ 1080M D	14/AZ 26-700	14210	350	HZ 1080M A	26/AZ 13	17415	431	HZ 1080M D	26/AZ 26-700
11830	330	HZ 1180M D	12/AZ 18-700	14310	367	HZ 1080M A	26/AZ 26-700	17420	413	HZ 1180M B	26/AZ 13-770
11855	335	HZ 1080M C	14/AZ 26	14405	388	HZ 1180M C	14/AZ 26	17580	458	HZ 1180M A	24/AZ 26
11950	314	HZ 1180M A	14/AZ 18-700	14410	388	HZ 1080M B	24/AZ 26	17725	437	HZ 1180M D	24/AZ 13-770
11965	336	HZ 1180M D	12/AZ 13	14585	374	HZ 1080M C	24/AZ 18-700	17925	427	HZ 1180M A	26/AZ 18-700
12060	342	HZ 1180M C	12/AZ 18	14590	372	HZ 1180M D	14/AZ 18	18055	448	HZ 1180M B	24/AZ 18
12070	319	HZ 1180M A	14/AZ 13	14665	374	HZ 1080M D	24/AZ 13-770	18160	433	HZ 1080M D	26/AZ 18
12105	357	HZ 1180M D	12/AZ 26-700	14755	380	HZ 1080M C	24/AZ 13	18165	449	HZ 1180M A	26/AZ 26-700
12140	314	HZ 1180M C	14/AZ 13-770	14815	396	HZ 1080M C	24/AZ 26-700	18175	434	HZ 1180M A	26/AZ 13
12245	341	HZ 1180M A	14/AZ 26-700	14855	365	HZ 1080M A	26/AZ 18	18200	447	HZ 1180M C	24/AZ 18-700
12280	324	HZ 1080M D	14/AZ 18	14865	399	HZ 1180M D	14/AZ 26	18270	469	HZ 1180M B	24/AZ 26
12320	368	HZ 1180M C	12/AZ 26	14990	360	HZ 1080M B	26/AZ 18-700	18380	453	HZ 1080M D	26/AZ 26
12350	320	HZ 1180M B	14/AZ 18-700	15085	386	HZ 1080M A	26/AZ 26	18425	469	HZ 1180M C	24/AZ 26-700
12485	326	HZ 1180M B	14/AZ 13	15090	365	HZ 1080M C	26/AZ 13-770	18465	455	HZ 1180M C	24/AZ 13
12515	332	HZ 1080M A	24/AZ 18-700	15160	366	HZ 1080M B	26/AZ 13	18575	437	HZ 1180M B	26/AZ 18-700
12540	324	HZ 1180M D	14/AZ 13-770	15235	382	HZ 1080M B	26/AZ 26-700	18675	438	HZ 1180M C	26/AZ 13-770
12565	328	HZ 1080M B	24/AZ 13-770	15390	390	HZ 1180M A	24/AZ 13-770	18815	459	HZ 1180M B	26/AZ 26-700
12565	350	HZ 1080M D	14/AZ 26	15410	395	HZ 1080M C	24/AZ 18	18845	444	HZ 1180M B	26/AZ 13
12630	337	HZ 1080M A	24/AZ 13	15625	416	HZ 1080M C	24/AZ 26	18895	463	HZ 1180M D	24/AZ 18-700
12645	347	HZ 1180M B	14/AZ 26-700	15660	396	HZ 1080M D	24/AZ 18-700	18955	451	HZ 1180M A	26/AZ 18
12660	353	HZ 1180M D	12/AZ 18	15840	381	HZ 1080M B	26/AZ 18	19120	485	HZ 1180M D	24/AZ 26-700
12745	354	HZ 1080M A	24/AZ 26-700	15855	402	HZ 1080M D	24/AZ 13	19175	471	HZ 1180M D	24/AZ 13
12780	336	HZ 1180M A	14/AZ 18	15890	418	HZ 1080M D	24/AZ 26-700	19175	472	HZ 1180M A	26/AZ 26
12920	379	HZ 1180M D	12/AZ 26	16005	400	HZ 1180M B	24/AZ 13-770	19250	473	HZ 1180M C	24/AZ 18
13060	362	HZ 1180M A	14/AZ 26	16065	402	HZ 1080M B	26/AZ 26	19325	452	HZ 1180M D	26/AZ 13-770
13150	326	HZ 1080M A	26/AZ 13-770	16090	386	HZ 1080M D	26/AZ 13-770	19460	493	HZ 1180M C	24/AZ 26
13200	338	HZ 1180M C	14/AZ 18-700	16115	387	HZ 1080M C	26/AZ 18-700	19645	462	HZ 1180M B	26/AZ 18
13215	343	HZ 1180M B	14/AZ 18	16315	393	HZ 1080M C	26/AZ 13	19865	483	HZ 1180M B	26/AZ 26
13215	351	HZ 1080M A	24/AZ 18	16360	409	HZ 1080M C	26/AZ 26-700	19905	464	HZ 1180M C	26/AZ 18-700
13360	344	HZ 1180M C	14/AZ 13	16425	413	HZ 1180M A	24/AZ 18-700	19985	489	HZ 1180M D	24/AZ 18
13430	372	HZ 1080M A	24/AZ 26	16550	419	HZ 1080M D	24/AZ 18	20140	485	HZ 1180M C	26/AZ 26-700
13440	347	HZ 1080M B	24/AZ 18-700	16645	420	HZ 1180M A	24/AZ 13	20195	510	HZ 1180M D	24/AZ 26
13490	365	HZ 1180M C	14/AZ 26-700	16655	435	HZ 1180M A	24/AZ 26-700	20205	472	HZ 1180M C	26/AZ 13
13495	369	HZ 1180M B	14/AZ 26	16765	439	HZ 1080M D	24/AZ 26	20590	479	HZ 1180M D	26/AZ 18-700
13580	352	HZ 1080M B	24/AZ 13	16805	403	HZ 1180M A	26/AZ 13-770	20825	501	HZ 1180M D	26/AZ 26-700
13625	348	HZ 1180M D	14/AZ 18-700	17035	409	HZ 1080M C	26/AZ 18	20910	487	HZ 1180M D	26/AZ 13
13650	353	HZ 1080M C	24/AZ 13-770	17070	422	HZ 1180M C	24/AZ 13-770	21055	490	HZ 1180M C	26/AZ 18
13670	369	HZ 1080M B	24/AZ 26-700	17075	424	HZ 1180M B	24/AZ 18-700	21275	511	HZ 1180M C	26/AZ 26
13805	354	HZ 1180M D	14/AZ 13	17175	409	HZ 1080M D	26/AZ 18-700	21785	507	HZ 1180M D	26/AZ 18
13915	375	HZ 1180M D	14/AZ 26-700	17260	430	HZ 1080M C	26/AZ 26	22000	527	HZ 1180M D	26/AZ 26

Disclaimer

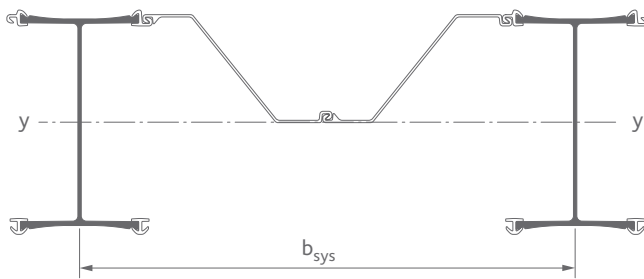
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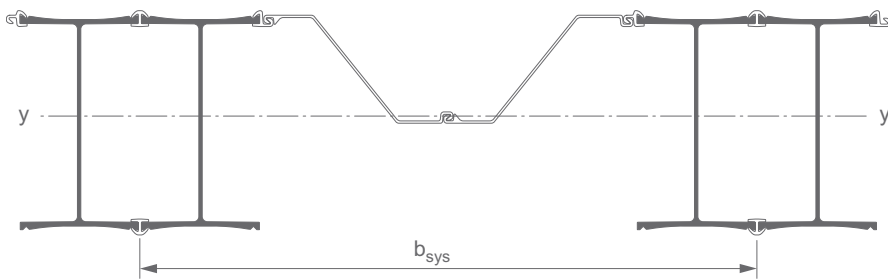
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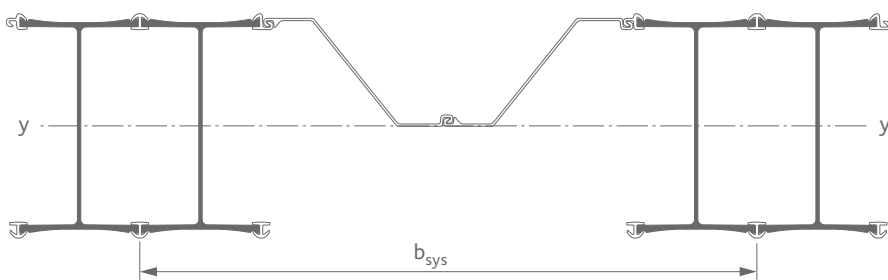
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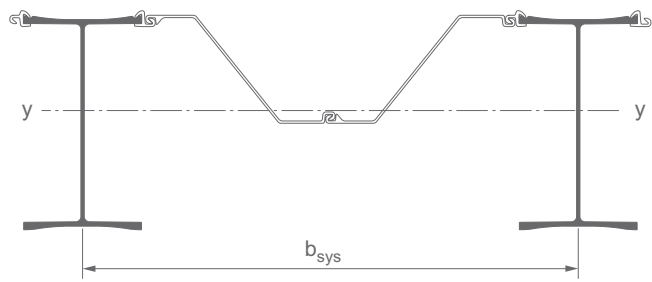
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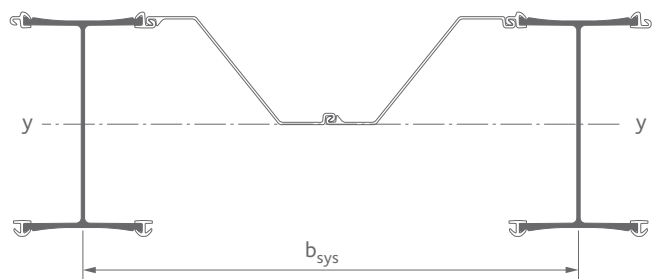
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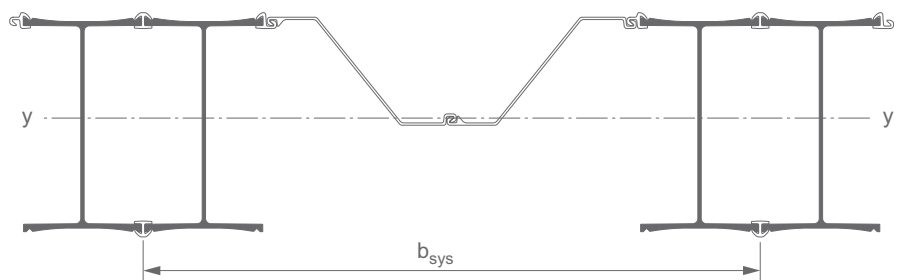
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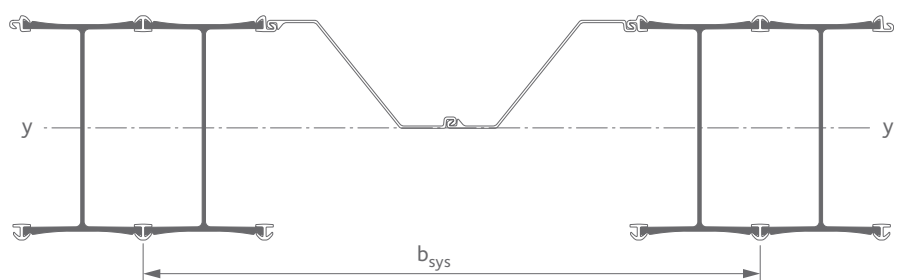
Combination 14



Combination 24



Combination 26



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