ArcelorMittal

Steel Foundation Solutions for Projects

Steel Sheet Piles

The HZM Steel Wall System 2011- Imperial edition

STEEL SHEET PILING
100 YEARS
MADE IN LUXEMBOURG

The 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 lead 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

September 2008

Cover:
Container Terminal JadeWeserPort | Wilhelmshaven | Germany | 2008-2009
Quay wall 1 725 m long | 16.5 m draft
40 000 t of HZM/AZ, HZ/AZ, AZ, AU steel sheet pile sections

The 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

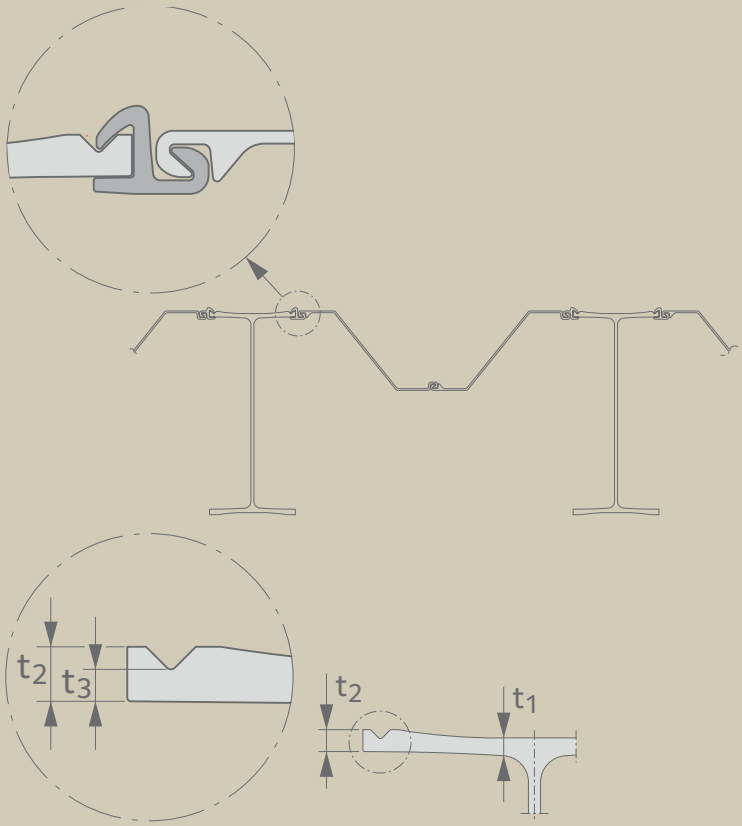
Hot rolled sections RZD/RZU and RH connect infill sheets and HZM king piles in order to guarantee a continuous wall.

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.



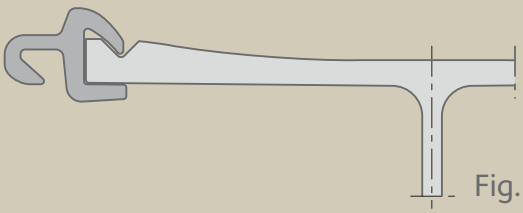


Fig. 1

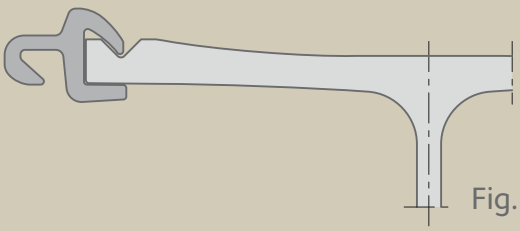


Fig. 2

Fig. 3

Combination HZM ... - 12 / AZ 13-770 (b_{sys} = 81.38 in)

Section	Properties per foot of wall							Per system	
	A in²/ft	I_y in⁴/ft	$W_{el,y}$* in³/ft	$W_{el,y}$** in³/ft	$G_{60\%}$ lb/ft²	$G_{80\%}$ lb/ft²	$G_{100\%}$ lb/ft²	A_{LW} ft²/ft	A_{LS} ft²/ft
HZ 880M A	12.05	1,576.6	**89.6**	102.6	33.69	37.34	**41.00**	8.09	15.95
HZ 880M B	12.77	1,703.0	**97.3**	109.6	36.17	39.82	**43.47**	8.10	15.96
HZ 880M C	13.10	1,788.8	**102.0**	114.6	37.29	40.94	**44.59**	8.10	15.96
HZ 1080M A	13.87	2,958.7	**131.4**	147.4	39.89	43.55	**47.21**	8.08	17.36
HZ 1080M B	14.40	3,189.2	**141.6**	157.9	41.68	45.34	**49.00**	8.08	17.36
HZ 1080M C	15.34	3,466.8	**154.3**	170.4	44.91	48.56	**52.22**	8.08	17.37
HZ 1080M D	16.11	3,737.7	**165.9**	182.7	47.53	51.19	**54.84**	8.09	17.37
HZ 1180M A	16.73	3,941.2	**174.4**	192.0	49.62	53.28	**56.93**	8.09	17.37
HZ 1180M B	17.12	4,119.8	**182.3**	199.8	50.96	54.61	**58.26**	8.09	17.39
HZ 1180M C	17.88	4,382.1	**192.6**	212.0	53.41	57.13	**60.85**	8.14	17.42
HZ 1180M D	18.48	4,588.4	**202.3**	220.5	55.46	59.18	**62.90**	8.16	17.43

Combination HZM ... - 14 / AZ 13-770 (b_{sys} = 81.38 in)

HZ 880M A	12.89	1,814.9	**114.6**	105.6	35.32	39.60	**43.88**	8.10	16.72
HZ 880M B	13.61	1,936.9	**121.6**	112.6	37.78	42.05	**46.33**	8.10	16.73
HZ 880M C	13.94	2,021.8	**126.4**	117.6	38.90	43.17	**47.45**	8.10	16.73
HZ 1080M A	14.72	3,356.4	**162.6**	152.5	41.52	45.81	**50.10**	8.08	18.14
HZ 1080M B	15.24	3,580.8	**172.4**	162.8	43.29	47.58	**51.86**	8.08	18.14
HZ 1080M C	16.19	3,855.3	**184.6**	175.2	46.52	50.80	**55.08**	8.08	18.14
HZ 1080M D	16.96	4,124.1	**196.0**	187.5	49.14	53.42	**57.70**	8.09	18.15
HZ 1180M A	17.57	4,325.8	**204.1**	196.7	51.23	55.51	**59.79**	8.09	18.15
HZ 1180M B	17.93	4,490.4	**211.1**	204.1	52.47	56.75	**61.03**	8.09	18.15
HZ 1180M C	18.93	4,854.0	**225.8**	218.1	55.40	59.91	**64.41**	8.14	18.27
HZ 1180M D	19.47	5,030.8	**233.2**	226.2	57.27	61.77	**66.28**	8.16	18.29

Combination HZM ... - 24 / AZ 13-770 (b_{sys} = 99.92 in)

HZ 880M A	15.88	2,463.4	**146.7**	135.7	48.09	51.06	**54.03**	9.81	17.73
HZ 880M B	17.04	2,661.9	**158.6**	147.3	52.06	55.03	**58.00**	9.83	17.75
HZ 880M C	17.58	2,800.6	**166.4**	155.3	53.89	56.86	**59.83**	9.83	17.75
HZ 1080M A	18.87	4,708.2	**217.4**	204.6	58.24	61.22	**64.20**	9.78	19.13
HZ 1080M B	19.71	5,075.0	**233.7**	221.1	61.12	64.10	**67.08**	9.79	19.14
HZ 1080M C	21.25	5,521.2	**253.9**	241.4	66.35	69.33	**72.30**	9.80	19.15
HZ 1080M D	22.50	5,958.7	**272.8**	261.2	70.60	73.58	**76.56**	9.80	19.15
HZ 1180M A	23.49	6,286.4	**286.3**	276.1	73.99	76.96	**79.94**	9.81	19.15
HZ 1180M B	24.08	6,554.7	**297.7**	288.2	76.01	78.99	**81.96**	9.82	19.18
HZ 1180M C	25.40	7,024.5	**317.5**	306.9	80.40	83.42	**86.45**	9.87	19.23
HZ 1180M D	26.29	7,310.7	**329.7**	319.9	83.42	86.44	**89.46**	9.91	19.26

Combination HZM ... - 26 / AZ 13-770 (b_{sys} = 99.92 in)

HZ 880M A	16.63	2,664.9	**168.4**	155.0	49.61	53.01	**56.58**	9.81	18.44
HZ 880M B	17.79	2,862.0	**180.0**	166.6	53.59	57.06	**60.54**	9.83	18.46
HZ 880M C	18.33	3,000.3	**187.7**	174.6	55.41	58.89	**62.37**	9.83	18.46
HZ 1080M A	19.62	5,046.7	**244.6**	229.5	59.77	63.27	**66.76**	9.78	19.84
HZ 1080M B	20.46	5,412.6	**260.9**	246.2	62.65	66.14	**69.64**	9.79	19.85
HZ 1080M C	22.00	5,857.0	**280.7**	266.4	67.88	71.37	**74.86**	9.80	19.86
HZ 1080M D	23.24	6,293.2	**299.3**	286.3	72.13	75.62	**79.10**	9.80	19.86
HZ 1180M A	24.24	6,620.0	**312.6**	301.1	75.52	79.00	**82.48**	9.81	19.87
HZ 1180M B	24.83	6,887.9	**324.0**	313.3	77.54	81.03	**84.51**	9.82	19.88
HZ 1180M C	26.34	7,438.6	**347.4**	335.5	82.31	85.97	**89.64**	9.87	20.00
HZ 1180M D	27.23	7,723.9	**359.4**	348.4	85.33	88.99	**92.65**	9.91	20.04

Combination HZM ... - 12 / AZ 18-700 (b_{sys} = 75.87 in)

Section	Properties per foot of wall							Per system	
	A in²/ft	I_y in⁴/ft	$W_{el,y}$* in³/ft	$W_{el,y}$** in³/ft	$G_{60\%}$ lb/ft²	$G_{80\%}$ lb/ft²	$G_{100\%}$ lb/ft²	A_{LW} ft²/ft	A_{LS} ft²/ft
HZ 880M A	12.95	1,761.2	**100.1**	114.6	36.19	40.13	**44.07**	8.13	15.99
HZ 880M B	13.73	1,896.7	**108.3**	122.0	38.85	42.78	**46.71**	8.14	15.99
HZ 880M C	14.08	1,988.7	**113.5**	127.4	40.05	43.99	**47.92**	8.13	15.99
HZ 1080M A	14.91	3,244.3	**144.1**	161.6	42.84	46.79	**50.73**	8.11	17.40
HZ 1080M B	15.47	3,491.5	**155.1**	172.9	44.77	48.71	**52.66**	8.12	17.40
HZ 1080M C	16.49	3,789.1	**168.6**	186.2	48.23	52.17	**56.11**	8.12	17.40
HZ 1080M D	17.31	4,079.4	**181.1**	199.4	51.04	54.98	**58.92**	8.12	17.41
HZ 1180M A	17.97	4,297.6	**190.1**	209.3	53.28	57.22	**61.15**	8.12	17.41
HZ 1180M B	18.39	4,489.2	**198.6**	217.7	54.71	58.65	**62.58**	8.13	17.42
HZ 1180M C	19.20	4,770.3	**209.7**	230.8	57.34	61.35	**65.36**	8.17	17.45
HZ 1180M D	19.85	4,991.4	**220.0**	239.8	59.54	63.55	**67.56**	8.19	17.47

Combination HZM ... - 14 / AZ 18-700 (b_{sys} = 75.87 in)

HZ 880M A	13.86	2,016.9	**127.3**	117.3	37.94	42.55	**47.16**	8.13	16.76
HZ 880M B	14.63	2,147.5	**134.9**	124.9	40.57	45.17	**49.78**	8.14	16.77
HZ 880M C	14.98	2,238.6	**140.0**	130.2	41.78	46.38	**50.98**	8.13	16.77
HZ 1080M A	15.82	3,670.9	**177.8**	166.8	44.60	49.22	**53.84**	8.11	18.17
HZ 1080M B	16.38	3,911.7	**188.4**	177.8	46.50	51.11	**55.73**	8.12	18.18
HZ 1080M C	17.39	4,205.8	**201.4**	191.2	49.95	54.57	**59.18**	8.12	18.18
HZ 1080M D	18.21	4,494.0	**213.6**	204.3	52.77	57.38	**61.99**	8.12	18.18
HZ 1180M A	18.87	4,710.2	**222.3**	214.1	55.00	59.61	**64.22**	8.12	18.18
HZ 1180M B	19.26	4,886.6	**229.7**	222.2	56.34	60.95	**65.55**	8.13	18.19
HZ 1180M C	20.33	5,276.4	**245.5**	237.2	59.48	64.33	**69.18**	8.17	18.30
HZ 1180M D	20.91	5,465.7	**253.4**	245.7	61.48	66.33	**71.17**	8.19	18.32

Combination HZM ... - 24 / AZ 18-700 (b_{sys} = 94.41 in)

HZ 880M A	16.83	2,663.5	**158.6**	146.7	50.93	54.10	**57.26**	9.84	17.77
HZ 880M B	18.06	2,873.3	**171.1**	159.0	55.14	58.29	**61.45**	9.86	17.79
HZ 880M C	18.63	3,020.0	**179.4**	167.5	57.07	60.23	**63.38**	9.86	17.78
HZ 1080M A	19.99	5,040.3	**232.8**	219.0	61.69	64.86	**68.04**	9.82	19.16
HZ 1080M B	20.89	5,428.6	**250.0**	236.5	64.74	67.91	**71.08**	9.82	19.17
HZ 1080M C	22.51	5,900.3	**271.3**	258.0	70.27	73.44	**76.60**	9.83	19.18
HZ 1080M D	23.83	6,363.0	**291.3**	279.0	74.77	77.93	**81.01**	9.84	19.18
HZ 1180M A	24.88	6,709.5	**305.5**	294.7	78.35	81.51	**84.67**	9.84	19.19
HZ 1180M B	25.51	6,993.5	**317.6**	307.6	80.49	83.66	**86.82**	9.85	19.22
HZ 1180M C	26.90	7,489.9	**338.5**	327.3	85.12	88.34	**91.56**	9.91	19.26
HZ 1180M D	27.84	7,792.3	**351.4**	340.9	88.32	91.53	**94.74**	9.95	19.29

Combination HZM ... - 26 / AZ 18-700 (b_{sys} = 94.41 in)

HZ 880M A	17.62	2,876.8	**181.8**	167.4	52.55	56.25	**59.96**	9.84	18.48
HZ 880M B	18.85	3,085.0	**193.9**	179.5	56.75	60.45	**64.14**	9.86	18.50
HZ 880M C	19.42	3,231.3	**202.2**	188.0	58.69	62.38	**66.08**	9.86	18.50
HZ 1080M A	20.79	5,398.7	**261.6**	245.5	63.31	67.03	**70.74**	9.82	19.88
HZ 1080M B	21.68	5,786.0	**278.8**	263.1	66.36	70.08	**73.79**	9.82	19.88
HZ 1080M C	23.30	6,255.7	**299.7**	284.5	71.89	75.60	**79.30**	9.83	19.89
HZ 1080M D	24.62	6,717.1	**319.5**	305.5	76.39	80.09	**83.80**	9.84	19.90
HZ 1180M A	25.67	7,062.6	**333.4**	321.2	79.97	83.67	**87.37**	9.84	19.90
HZ 1180M B	26.30	7,346.1	**345.5**	334.1	82.11	85.81	**89.51**	9.85	19.91
HZ 1180M C	27.90	7,928.1	**370.2**	357.6	87.15	91.04	**94.93**	9.91	20.04
HZ 1180M D	28.83	8,229.6	**383.0**	371.2	90.34	94.23	**98.12**	9.95	20.08

Combination HZM ... - 12 / AZ 26-700 (b_{sys} = 75.87 in)

Section	Properties per foot of wall							Per system	
	A in²/ft	I_y in⁴/ft	$W_{el,y}$* in³/ft	$W_{el,y}$** in³/ft	$G_{60\%}$ lb/ft²	$G_{80\%}$ lb/ft²	$G_{100\%}$ lb/ft²	A_{LW} ft²/ft	A_{LS} ft²/ft
HZ 880M A	14.60	1,877.8	**106.7**	122.1	39.56	44.61	**49.67**	8.37	16.23
HZ 880M B	15.37	2,013.1	**114.9**	129.5	42.21	47.26	**52.31**	8.38	16.24
HZ 880M C	15.73	2,105.1	**120.1**	134.9	43.41	48.46	**53.52**	8.38	16.24
HZ 1080M A	16.56	3,361.2	**149.3**	167.4	46.21	51.28	**56.35**	8.36	17.64
HZ 1080M B	17.12	3,608.3	**160.2**	178.7	48.14	53.20	**58.27**	8.36	17.64
HZ 1080M C	18.14	3,905.7	**173.8**	192.0	51.59	56.66	**61.72**	8.36	17.65
HZ 1080M D	18.96	4,196.1	**186.3**	205.2	54.40	59.46	**64.52**	8.37	17.65
HZ 1180M A	19.62	4,414.2	**195.3**	215.0	56.64	61.70	**66.76**	8.37	17.65
HZ 1180M B	20.04	4,605.8	**203.9**	223.4	58.07	63.13	**68.19**	8.37	17.67
HZ 1180M C	20.85	4,886.8	**214.8**	236.5	60.70	65.83	**70.96**	8.42	17.70
HZ 1180M D	21.50	5,107.8	**225.2**	245.4	62.90	68.03	**73.15**	8.44	17.71

Combination HZM ... - 14 / AZ 26-700 (b_{sys} = 75.87 in)

HZ 880M A	15.50	2,133.5	**134.7**	124.1	41.30	47.03	**52.76**	8.37	17.00
HZ 880M B	16.27	2,263.9	**142.2**	131.7	43.93	49.65	**55.38**	8.38	17.01
HZ 880M C	16.63	2,355.1	**147.2**	137.0	45.14	50.86	**56.58**	8.38	17.01
HZ 1080M A	17.47	3,787.7	**183.4**	172.1	47.97	53.71	**59.45**	8.36	18.42
HZ 1080M B	18.03	4,028.5	**194.0**	183.1	49.86	55.61	**61.35**	8.36	18.42
HZ 1080M C	19.04	4,322.5	**207.0**	196.5	53.32	59.05	**64.79**	8.36	18.42
HZ 1080M D	19.86	4,610.6	**219.2**	209.6	56.13	61.86	**67.59**	8.37	18.43
HZ 1180M A	20.52	4,826.7	**227.8**	219.4	58.37	64.09	**69.82**	8.37	18.43
HZ 1180M B	20.91	5,003.2	**235.2**	227.5	59.70	65.43	**71.16**	8.37	18.43
HZ 1180M C	21.97	5,393.0	**250.9**	242.4	62.84	68.81	**74.78**	8.42	18.54
HZ 1180M D	22.56	5,582.2	**258.8**	250.9	64.84	70.81	**76.77**	8.44	18.56

Combination HZM ... - 24 / AZ 26-700 (b_{sys} = 94.41 in)

HZ 880M A	18.15	2,757.2	**164.1**	151.9	53.64	57.70	**61.76**	10.09	18.01
HZ 880M B	19.38	2,966.7	**176.7**	164.1	57.83	61.89	**65.94**	10.11	18.03
HZ 880M C	19.95	3,113.4	**185.0**	172.6	59.77	63.82	**67.88**	10.11	18.03
HZ 1080M A	21.32	5,134.3	**237.1**	223.1	64.40	68.48	**72.55**	10.06	19.41
HZ 1080M B	22.21	5,522.6	**254.3**	240.6	67.45	71.52	**75.60**	10.07	19.41
HZ 1080M C	23.83	5,994.1	**275.6**	262.1	72.97	77.04	**81.11**	10.08	19.42
HZ 1080M D	25.15	6,456.7	**295.6**	283.1	77.47	81.54	**85.60**	10.08	19.43
HZ 1180M A	26.20	6,803.1	**309.8**	298.8	81.05	85.11	**89.17**	10.09	19.43
HZ 1180M B	26.83	7,087.1	**321.9**	311.6	83.19	87.26	**91.32**	10.10	19.46
HZ 1180M C	28.22	7,583.3	**342.7**	331.4	87.82	91.94	**96.05**	10.15	19.51
HZ 1180M D	29.16	7,885.8	**355.6**	345.0	91.01	95.12	**99.23**	10.19	19.54

Combination HZM ... - 26 / AZ 26-700 (b_{sys} = 94.41 in)

HZ 880M A	18.94	2,970.4	**187.7**	172.9	55.25	59.86	**64.46**	10.09	18.72
HZ 880M B	20.17	3,178.5	**199.9**	185.0	59.45	64.04	**68.64**	10.11	18.74
HZ 880M C	20.74	3,324.8	**208.0**	193.4	61.38	65.98	**70.57**	10.11	18.74
HZ 1080M A	22.11	5,492.6	**266.2**	249.8	66.02	70.64	**75.26**	10.06	20.12
HZ 1080M B	23.01	5,879.9	**283.4**	267.4	69.07	73.69	**78.31**	10.07	20.13
HZ 1080M C	24.63	6,349.5	**304.3**	288.8	74.59	79.20	**83.81**	10.08	20.14
HZ 1080M D	25.95	6,810.8	**323.9**	309.8	79.09	83.70	**88.30**	10.08	20.14
HZ 1180M A	27.00	7,156.2	**337.9**	325.5	82.67	87.27	**91.87**	10.09	20.15
HZ 1180M B	27.63	7,439.8	**350.0**	338.4	84.81	89.41	**94.02**	10.10	20.16
HZ 1180M C	29.22	8,021.5	**374.6**	361.8	89.85	94.64	**99.43**	10.15	20.28
HZ 1180M D	30.15	8,323.0	**387.3**	375.4	93.03	97.82	**102.61**	10.19	20.32

Combination HZM ... - 12 / AZ 13-700R									(b_{sys} = 75.87 in)
	Properties per foot of wall							Per system	
Section	A in²/ft	I_y in⁴/ft	$W_{el,y}$* in³/ft	$W_{el,y}$** in³/ft	$G_{60\%}$ lb/ft²	$G_{80\%}$ lb/ft²	$G_{100\%}$ lb/ft²	A_{LW} ft²/ft	A_{LS} ft²/ft
HZ 880M A	12,79	1 669,4	**94,8**	108,6	35,87	39,70	**43,53**	7,65	15,51
HZ 880M B	13,57	1 805,0	**103,0**	116,1	38,53	42,35	**46,18**	7,66	15,52
HZ 880M C	13,92	1 897,0	**108,2**	121,6	39,73	43,56	**47,39**	7,66	15,52
HZ 1080M A	14,75	3 152,3	**140,1**	157,1	42,52	46,36	**50,20**	7,64	16,93
HZ 1080M B	15,32	3 399,6	**151,0**	168,3	44,45	48,28	**52,12**	7,64	16,92
HZ 1080M C	16,33	3 697,2	**164,5**	181,7	47,91	51,74	**55,57**	7,65	16,93
HZ 1080M D	17,16	3 987,6	**177,0**	194,9	50,72	54,55	**58,38**	7,65	16,93
HZ 1180M A	17,81	4 205,8	**186,1**	204,8	52,96	56,79	**60,62**	7,65	16,93
HZ 1180M B	18,23	4 397,4	**194,6**	213,2	54,39	58,22	**62,05**	7,65	16,95
HZ 1180M C	19,05	4 678,5	**205,6**	226,5	57,02	60,92	**64,82**	7,70	16,98
HZ 1180M D	19,69	4 899,7	**216,0**	235,5	59,22	63,12	**67,02**	7,72	16,99

Combination HZM ... - 14 / AZ 13-700R									(b_{sys} = 75.87 in)
HZ 880M A	13,70	1 925,1	**121,6**	112,0	37,62	42,12	**46,62**	7,65	16,28
HZ 880M B	14,47	2 055,8	**129,2**	119,6	40,25	44,75	**49,24**	7,66	16,29
HZ 880M C	14,82	2 146,9	**134,2**	124,9	41,46	45,95	**50,45**	7,66	16,29
HZ 1080M A	15,66	3 579,0	**173,4**	162,7	44,28	48,79	**53,30**	7,64	17,70
HZ 1080M B	16,22	3 819,8	**184,0**	173,6	46,17	50,68	**55,20**	7,64	17,70
HZ 1080M C	17,23	4 113,9	**197,0**	187,0	49,63	54,14	**58,64**	7,65	17,70
HZ 1080M D	18,06	4 402,1	**209,3**	200,1	52,44	56,95	**61,45**	7,65	17,71
HZ 1180M A	18,71	4 618,3	**217,9**	210,0	54,68	59,18	**63,69**	7,65	17,71
HZ 1180M B	19,11	4 794,9	**225,4**	218,0	56,02	60,52	**65,02**	7,65	17,71
HZ 1180M C	20,17	5 184,7	**241,2**	233,0	59,16	63,90	**68,64**	7,70	17,83
HZ 1180M D	20,76	5 374,1	**249,2**	241,5	61,16	65,90	**70,64**	7,72	17,85

Combination HZM ... - 24 / AZ 13-700R									(b_{sys} = 94.41 in)
HZ 880M A	16,70	2 589,8	**154,2**	142,7	50,68	53,75	**56,83**	9,37	17,29
HZ 880M B	17,93	2 799,6	**166,7**	154,9	54,88	57,95	**61,02**	9,39	17,31
HZ 880M C	18,50	2 946,3	**175,0**	163,4	56,81	59,89	**62,96**	9,39	17,31
HZ 1080M A	19,87	4 966,3	**229,3**	215,9	61,43	64,52	**67,61**	9,34	18,69
HZ 1080M B	20,76	5 354,6	**246,5**	233,2	64,48	67,57	**70,65**	9,35	18,70
HZ 1080M C	22,38	5 826,5	**267,9**	254,8	70,01	73,09	**76,17**	9,36	18,71
HZ 1080M D	23,70	6 289,2	**287,8**	275,7	74,51	77,59	**80,67**	9,36	18,71
HZ 1180M A	24,75	6 635,7	**302,2**	291,5	78,09	81,17	**84,24**	9,37	18,71
HZ 1180M B	25,38	6 919,7	**314,2**	304,3	80,24	83,31	**86,39**	9,38	18,74
HZ 1180M C	26,78	7 416,2	**335,2**	324,1	84,87	88,00	**91,13**	9,43	18,79
HZ 1180M D	27,71	7 718,8	**348,1**	337,8	88,06	91,19	**94,32**	9,47	18,82

Combination HZM ... - 26 / AZ 13-700R									(b_{sys} = 94.41 in)
HZ 880M A	17,49	2 803,0	**177,1**	163,1	52,30	55,91	**59,53**	9,37	18,00
HZ 880M B	18,72	3 011,4	**189,3**	175,2	56,49	60,10	**63,71**	9,39	18,02
HZ 880M C	19,29	3 157,7	**197,5**	183,8	58,43	62,04	**65,65**	9,39	18,02
HZ 1080M A	20,66	5 324,7	**258,1**	242,2	63,06	66,68	**70,31**	9,34	19,40
HZ 1080M B	21,56	5 712,0	**275,3**	259,7	66,10	69,73	**73,36**	9,35	19,41
HZ 1080M C	23,18	6 181,9	**296,2**	281,1	71,63	75,25	**78,87**	9,36	19,42
HZ 1080M D	24,50	6 643,3	**315,9**	302,2	76,13	79,75	**83,37**	9,36	19,42
HZ 1180M A	25,55	6 988,8	**330,0**	317,9	79,71	83,32	**86,94**	9,37	19,43
HZ 1180M B	26,18	7 272,4	**342,1**	330,8	81,85	85,47	**89,09**	9,38	19,44
HZ 1180M C	27,77	7 854,4	**366,8**	354,2	86,89	90,70	**94,50**	9,43	19,56
HZ 1180M D	28,71	8 156,1	**379,5**	367,9	90,08	93,89	**97,69**	9,47	19,60

Combination HZM ... - 12 / AZ 18 (b_{sys} = 70.35 in)

Section	Properties per foot of wall							Per system	
	A in²/ft	I_y in⁴/ft	$W_{el,y}$* in³/ft	$W_{el,y}$** in³/ft	$G_{60\%}$ lb/ft²	$G_{80\%}$ lb/ft²	$G_{100\%}$ lb/ft²	A_{LW} ft²/ft	A_{LS} ft²/ft
HZ 880M A	13.82	1,858.8	**105.6**	120.9	38.74	42.89	**47.04**	7.64	15.51
HZ 880M B	14.66	2,004.7	**114.5**	129.0	41.60	45.75	**49.89**	7.65	15.51
HZ 880M C	15.04	2,104.0	**120.0**	134.8	42.90	47.05	**51.19**	7.65	15.51
HZ 1080M A	15.94	3,458.6	**153.6**	172.3	45.92	50.08	**54.24**	7.63	16.92
HZ 1080M B	16.55	3,725.1	**165.4**	184.5	47.99	52.15	**56.31**	7.63	16.92
HZ 1080M C	17.64	4,045.7	**180.0**	198.8	51.72	55.88	**60.03**	7.64	16.92
HZ 1080M D	18.53	4,358.7	**193.5**	213.1	54.75	58.90	**63.06**	7.64	16.92
HZ 1180M A	19.24	4,593.9	**203.2**	223.8	57.17	61.32	**65.47**	7.64	16.93
HZ 1180M B	19.69	4,800.4	**212.4**	232.8	58.71	62.86	**67.01**	7.65	16.94
HZ 1180M C	20.57	5,103.3	**224.3**	247.0	61.54	65.77	**69.99**	7.69	16.97
HZ 1180M D	21.26	5,341.5	**235.5**	256.7	63.91	68.14	**72.36**	7.71	16.99

Combination HZM ... - 14 / AZ 18 (b_{sys} = 70.35 in)

HZ 880M A	14.80	2,134.5	**134.8**	124.2	40.63	45.50	**50.37**	7.64	16.28
HZ 880M B	15.63	2,275.2	**142.9**	132.3	43.46	48.33	**53.19**	7.65	16.29
HZ 880M C	16.01	2,373.5	**148.4**	138.0	44.76	49.63	**54.49**	7.65	16.29
HZ 1080M A	16.92	3,918.7	**189.8**	178.1	47.81	52.70	**57.58**	7.63	17.69
HZ 1080M B	17.52	4,178.3	**201.3**	189.9	49.86	54.74	**59.63**	7.63	17.69
HZ 1080M C	18.61	4,495.2	**215.3**	204.3	53.58	58.46	**63.34**	7.64	17.70
HZ 1080M D	19.50	4,805.7	**228.4**	218.5	56.61	61.49	**66.36**	7.64	17.70
HZ 1180M A	20.21	5,038.7	**237.7**	229.1	59.03	63.90	**68.77**	7.64	17.70
HZ 1180M B	20.63	5,229.0	**245.8**	237.7	60.46	65.34	**70.21**	7.65	17.71
HZ 1180M C	21.78	5,649.0	**262.8**	253.9	63.84	68.98	**74.11**	7.69	17.82
HZ 1180M D	22.41	5,853.0	**271.4**	263.1	66.00	71.13	**76.27**	7.71	17.84

Combination HZM ... - 24 / AZ 18 (b_{sys} = 88.90 in)

HZ 880M A	17.76	2,796.7	**166.5**	154.0	53.86	57.15	**60.43**	9.36	17.28
HZ 880M B	19.06	3,019.1	**179.8**	167.1	58.32	61.60	**64.87**	9.38	17.30
HZ 880M C	19.67	3,174.9	**188.6**	176.1	60.37	63.65	**66.93**	9.38	17.30
HZ 1080M A	21.12	5,321.7	**245.8**	231.3	65.30	68.59	**71.89**	9.33	18.68
HZ 1080M B	22.07	5,734.1	**264.0**	249.8	68.54	71.83	**75.12**	9.34	18.69
HZ 1080M C	23.80	6,234.5	**286.6**	272.6	74.40	77.69	**80.98**	9.35	18.70
HZ 1080M D	25.20	6,725.6	**307.8**	294.9	79.18	82.46	**85.75**	9.36	18.70
HZ 1180M A	26.31	7,093.3	**323.0**	311.6	82.97	86.26	**89.54**	9.36	18.71
HZ 1180M B	26.98	7,394.8	**335.8**	325.1	85.25	88.54	**91.82**	9.37	18.74
HZ 1180M C	28.46	7,921.2	**358.1**	346.1	90.16	93.50	**96.84**	9.43	18.78
HZ 1180M D	29.45	8,242.0	**371.7**	360.7	93.55	96.88	**100.22**	9.47	18.81

Combination HZM ... - 26 / AZ 18 (b_{sys} = 88.90 in)

HZ 880M A	18.60	3,023.1	**191.0**	176.0	55.58	59.44	**63.29**	9.36	18.00
HZ 880M B	19.90	3,243.9	**203.9**	188.8	60.03	63.88	**67.73**	9.38	18.02
HZ 880M C	20.51	3,399.3	**212.7**	197.8	62.09	65.94	**69.79**	9.38	18.01
HZ 1080M A	21.97	5,702.3	**276.3**	259.3	67.02	70.89	**74.76**	9.33	19.39
HZ 1080M B	22.92	6,113.7	**294.6**	278.1	70.26	74.13	**78.00**	9.34	19.40
HZ 1080M C	24.64	6,611.9	**316.9**	300.7	76.12	79.99	**83.85**	9.35	19.41
HZ 1080M D	26.04	7,101.6	**337.8**	323.0	80.90	84.76	**88.62**	9.36	19.41
HZ 1180M A	27.15	7,468.2	**352.6**	339.6	84.69	88.55	**92.40**	9.36	19.42
HZ 1180M B	27.82	7,769.3	**365.4**	353.4	86.97	90.83	**94.68**	9.37	19.43
HZ 1180M C	29.51	8,386.5	**391.6**	378.2	92.31	96.37	**100.43**	9.43	19.56
HZ 1180M D	30.50	8,706.2	**405.2**	392.7	95.70	99.75	**103.80**	9.47	19.60

Combination HZM ... - 12 / AZ 26 (b_{sys} = 70.35 in)

Section	Properties per foot of wall							Per system	
	A	I_y	$W_{el,y}$*	$W_{el,y}$**	$G_{60\%}$	$G_{80\%}$	$G_{100\%}$	A_{LW}	A_{LS}
	in²/ft	in⁴/ft	in³/ft	in³/ft	lb/ft²	lb/ft²	lb/ft²	ft²/ft	ft²/ft
HZ 880M A	15.40	1,968.8	**111.8**	128.1	41.96	47.18	**52.40**	7.88	15.75
HZ 880M B	16.23	2,114.7	**120.7**	136.1	44.81	50.03	**55.24**	7.90	15.75
HZ 880M C	16.61	2,213.9	**126.3**	141.8	46.11	51.33	**56.54**	7.89	15.75
HZ 1080M A	17.52	3,568.8	**158.5**	177.8	49.14	54.37	**59.61**	7.87	17.16
HZ 1080M B	18.12	3,835.4	**170.4**	190.0	51.22	56.45	**61.68**	7.88	17.16
HZ 1080M C	19.22	4,155.9	**184.9**	204.2	54.94	60.17	**65.40**	7.88	17.16
HZ 1080M D	20.10	4,468.8	**198.4**	218.5	57.97	63.19	**68.42**	7.88	17.17
HZ 1180M A	20.81	4,703.9	**208.0**	229.1	60.38	65.60	**70.83**	7.88	17.17
HZ 1180M B	21.26	4,910.4	**217.3**	238.1	61.93	67.15	**72.37**	7.89	17.18
HZ 1180M C	22.14	5,213.2	**229.2**	252.3	64.75	70.05	**75.35**	7.93	17.21
HZ 1180M D	22.84	5,451.4	**240.3**	262.0	67.13	72.42	**77.72**	7.95	17.23

Combination HZM ... - 14 / AZ 26 (b_{sys} = 70.35 in)

HZ 880M A	16.38	2,244.5	**141.7**	130.5	43.84	49.79	**55.73**	7.88	16.52
HZ 880M B	17.20	2,385.0	**149.8**	138.7	46.67	52.61	**58.55**	7.90	16.53
HZ 880M C	17.59	2,483.3	**155.2**	144.4	47.97	53.91	**59.85**	7.89	16.53
HZ 1080M A	18.50	4,028.9	**195.1**	183.1	51.04	57.00	**62.95**	7.87	17.93
HZ 1080M B	19.01	4,288.6	**206.6**	194.9	53.08	59.04	**65.00**	7.88	17.93
HZ 1080M C	20.19	4,605.3	**220.5**	209.3	56.80	62.75	**68.71**	7.88	17.94
HZ 1080M D	21.08	4,915.8	**233.7**	223.5	59.83	65.78	**71.73**	7.88	17.94
HZ 1180M A	21.78	5,148.7	**242.9**	234.1	62.24	68.19	**74.13**	7.88	17.94
HZ 1180M B	22.21	5,339.0	**251.0**	242.7	63.68	69.63	**75.57**	7.89	17.95
HZ 1180M C	23.35	5,759.0	**267.9**	258.8	67.06	73.26	**79.47**	7.93	18.06
HZ 1180M D	23.98	5,962.9	**276.5**	268.0	69.21	75.42	**81.62**	7.95	18.08

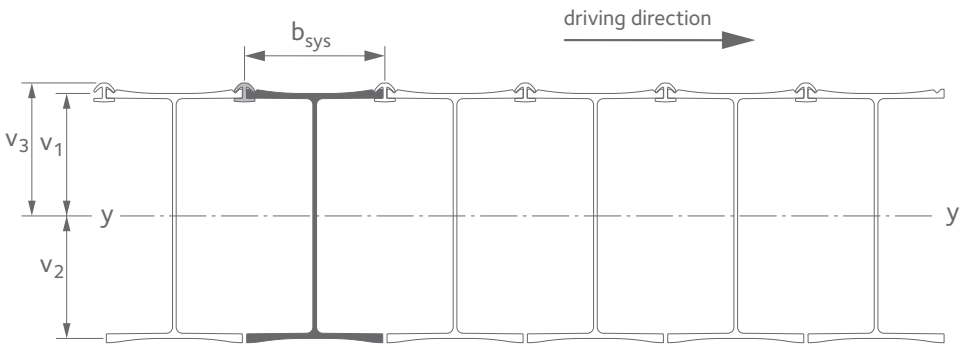
Combination HZM ... - 24 / AZ 26 (b_{sys} = 88.90 in)

HZ 880M A	19.00	2,883.7	**171.7**	158.8	56.41	60.54	**64.67**	9.60	17.52
HZ 880M B	20.31	3,106.0	**185.0**	171.9	60.86	64.98	**69.10**	9.62	17.55
HZ 880M C	20.91	3,261.8	**193.7**	180.9	62.91	67.04	**71.16**	9.62	17.54
HZ 1080M A	22.37	5,409.0	**249.8**	235.1	67.85	72.00	**76.14**	9.58	18.92
HZ 1080M B	23.33	5,821.4	**268.0**	253.6	71.09	75.23	**79.38**	9.58	18.93
HZ 1080M C	25.04	6,321.7	**290.6**	276.4	76.95	81.09	**85.23**	9.59	18.94
HZ 1080M D	26.44	6,812.7	**311.8**	298.7	81.72	85.86	**89.99**	9.60	18.94
HZ 1180M A	27.56	7,180.3	**327.0**	315.4	85.52	89.65	**93.78**	9.60	18.95
HZ 1180M B	28.23	7,481.8	**339.8**	328.9	87.80	91.93	**96.06**	9.61	18.98
HZ 1180M C	29.70	8,008.1	**362.0**	350.0	92.70	96.89	**101.07**	9.67	19.02
HZ 1180M D	30.69	8,328.7	**375.6**	364.5	96.08	100.27	**104.45**	9.71	19.05

Combination HZM ... - 26 / AZ 26 (b_{sys} = 88.90 in)

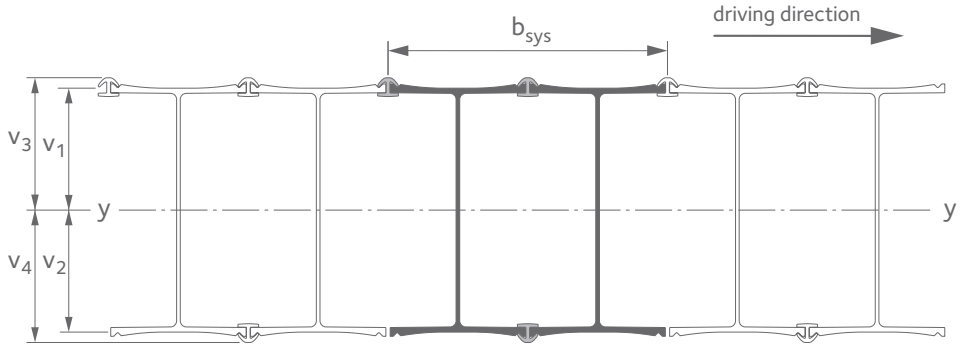
HZ 880M A	19.84	3,110.1	**196.5**	181.0	58.13	62.83	**67.53**	9.60	18.24
HZ 880M B	21.15	3,330.8	**209.4**	193.8	62.57	67.27	**71.96**	9.62	18.26
HZ 880M C	21.75	3,486.2	**218.1**	202.8	64.63	69.32	**74.02**	9.62	18.26
HZ 1080M A	23.22	5,789.6	**280.6**	263.3	69.58	74.30	**79.02**	9.58	19.63
HZ 1080M B	24.17	6,201.0	**298.8**	282.0	72.81	77.53	**82.25**	9.58	19.64
HZ 1080M C	25.89	6,699.2	**321.0**	304.7	78.67	83.38	**88.01**	9.59	19.65
HZ 1080M D	27.29	7,188.7	**341.9**	327.0	83.44	88.15	**92.86**	9.60	19.66
HZ 1180M A	28.40	7,555.2	**356.7**	343.6	87.24	91.94	**96.64**	9.60	19.66
HZ 1180M B	29.07	7,856.4	**369.5**	357.3	89.52	94.22	**98.92**	9.61	19.67
HZ 1180M C	30.75	8,473.4	**395.7**	382.1	94.85	99.76	**104.66**	9.67	19.80
HZ 1180M D	31.74	8,793.0	**409.2**	396.6	98.23	103.13	**108.03**	9.71	19.84

Combination C1 (b_{sys} = 18.70 / 18.50 / 18.70 in)



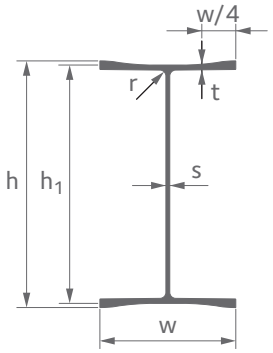
	Dimensions				Properties per foot of wall					Per system	
Section	v_1 in	v_2 in	v_3 in	v_4 in	A in²/ft	G lb/ft²	I_y in⁴/ft	$W_{el,y}$* in³/ft	$W_{el,y}$** in³/ft	A_{LW} ft²/ft	A_{LS} ft²/ft
HZ 880M A	14.96	16.67	16.31	-	31.28	**106.46**	5,939.0	**356.2**	364.1	1.81	9.85
HZ 880M B	15.13	16.66	16.41	-	34.37	**116.98**	6,464.9	**388.1**	394.0	1.82	9.85
HZ 880M C	15.24	16.71	16.44	-	35.81	**121.88**	6,836.8	**409.2**	415.9	1.82	9.85
HZ 1080M A	19.72	21.52	21.08	-	39.49	**134.40**	11,736.7	**545.5**	556.9	1.79	11.26
HZ 1080M B	19.91	21.57	21.14	-	41.82	**142.31**	12,745.5	**591.0**	602.8	1.80	11.26
HZ 1080M C	20.10	21.61	21.22	-	45.86	**156.08**	13,915.7	**644.0**	655.7	1.80	11.26
HZ 1080M D	20.31	21.71	21.27	-	49.17	**167.35**	15,075.7	**694.3**	708.7	1.80	11.26
HZ 1180M A	20.51	21.83	21.31	-	51.79	**176.26**	15,938.9	**730.1**	747.9	1.81	11.27
HZ 1180M B	20.65	21.84	21.38	-	53.51	**182.11**	16,715.1	**765.2**	781.9	1.82	11.29
HZ 1180M C	20.58	22.07	21.34	-	56.58	**192.56**	17,798.2	**806.4**	833.9	1.83	11.34
HZ 1180M D	20.78	22.03	21.46	-	59.12	**201.21**	18,656.7	**846.9**	869.3	1.85	11.37

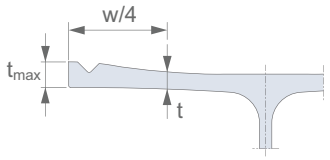
Combination C23 (b_{sys} = 37.40 / 37.00 / 37.40 in)

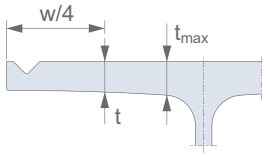


	Dimensions				Properties per foot of wall					Per system	
Section	v_1 in	v_2 in	v_3 in	v_4 in	A in²/ft	G lb/ft²	I_y in⁴/ft	$W_{el,y}$* in³/ft	$W_{el,y}$** in³/ft	A_{LW} ft²/ft	A_{LS} ft²/ft
HZ 880M A	15.31	16.32	16.67	17.67	31.97	**108.81**	6,126.0	**375.4**	346.6	3.53	11.62
HZ 880M B	15.44	16.35	16.72	17.63	35.03	**119.21**	6,641.1	**406.2**	376.7	3.55	11.64
HZ 880M C	15.54	16.41	16.73	17.61	36.47	**124.12**	7,012.4	**427.3**	398.2	3.54	11.64
HZ 1080M A	20.09	21.14	21.45	22.50	40.19	**136.79**	12,054.7	**570.2**	535.9	3.50	13.02
HZ 1080M B	20.24	21.23	21.48	22.47	42.48	**144.57**	13,045.2	**614.5**	580.6	3.51	13.03
HZ 1080M C	20.40	21.30	21.52	22.42	46.52	**158.33**	14,212.4	**667.1**	633.8	3.52	13.04
HZ 1080M D	20.59	21.43	21.55	22.39	49.84	**169.60**	15,370.6	**717.2**	686.4	3.52	13.04
HZ 1180M A	20.77	21.57	21.58	22.37	52.45	**178.50**	16,231.2	**752.6**	725.6	3.52	13.05
HZ 1180M B	20.86	21.63	21.59	22.36	54.05	**183.95**	16,952.4	**783.6**	758.2	3.54	13.08
HZ 1180M C	20.87	21.78	21.64	22.54	57.37	**195.26**	18,147.9	**833.3**	805.2	3.57	13.15
HZ 1180M D	20.97	21.84	21.65	22.52	59.68	**203.09**	18,888.9	**864.9**	838.8	3.61	13.18

HZ-M-King Piles

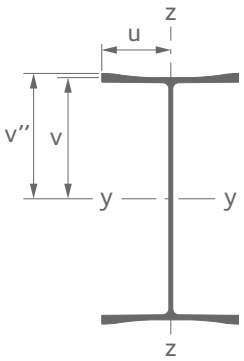






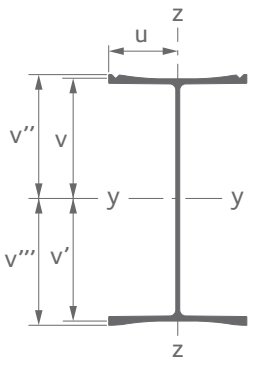
Section	h in	h1 in	w in	tmax in	t in	s in	r in	Suitable connectors	
HZ 880M A	32.73	31.63	18.03	1.14	0.74	0.51	0.79	RZDU 16	RH 16
HZ 880M B	32.73	31.79	18.11	1.14	0.82	0.59	0.79	RZDU 16	RH 16
HZ 880M C	32.73	31.95	18.11	1.14	0.90	0.59	0.79	RZDU 16	RH 16
HZ 1080M A	42.33	41.24	17.87	1.14	0.77	0.63	1.38	RZDU 16	RH 16
HZ 1080M B	42.33	41.47	17.87	1.14	0.89	0.63	1.38	RZDU 16	RH 16
HZ 1080M C	42.33	41.71	17.95	1.14	1.01	0.71	1.38	RZDU 16	RH 16
HZ 1080M D	42.33	42.02	17.99	1.21	1.17	0.75	1.38	RZDU 16	RH 16
HZ 1180M A	42.34	-	18.03	1.36	1.22	0.79	1.38	RZDU 16	RH 16
HZ 1180M B	42.50	-	18.03	1.44	1.30	0.79	1.38	RZDU 16	RH 16
HZ 1180M C	42.65	-	18.07	1.52	1.38	0.83	1.38	RZDU 18	RH 20
HZ 1180M D	42.81	-	18.11	1.60	1.46	0.87	1.38	RZDU 18	RH 20

Solution 100



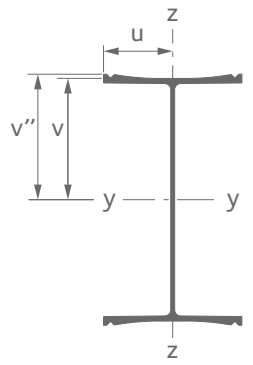
	Dimensions						Properties per solution								
Section	v in	v' in	v'' in	v''' in	u in	u' in	A in²	G lb/ft	Iy in⁴	Iz in⁴	Wel,y* in³	Wel,y** in³	Wel,z in³	ALW ft²/ft	ALS ft²/ft
HZ 880M A	15.82	-	16.36	-	9.02	-	45.82	**155.92**	8,571.4	960.8	**541.9**	-	106.5	1.51	9.73
HZ 880M B	15.89	-	16.36	-	9.06	-	50.87	**173.13**	9,435.8	1,027.5	**593.8**	-	113.5	1.51	9.74
HZ 880M C	15.97	-	16.36	-	9.06	-	53.11	**180.76**	10,012.7	1,065.5	**627.0**	-	117.8	1.51	9.74
HZ 1080M A	20.62	-	21.17	-	8.94	-	58.00	**197.39**	16,943.9	944.9	**821.7**	-	105.9	1.49	11.14
HZ 1080M B	20.74	-	21.17	-	8.94	-	61.63	**209.72**	18,512.5	1,016.5	**892.8**	-	113.8	1.49	11.14
HZ 1080M C	20.85	-	21.17	-	8.98	-	68.14	**231.88**	20,396.5	1,080.2	**977.9**	-	120.2	1.50	11.15
HZ 1080M D	21.01	-	21.17	-	9.00	-	73.41	**249.82**	22,231.8	1,127.7	**1,058.2**	-	125.4	1.50	11.15
HZ 1180M A	21.17	-	21.17	-	9.02	-	77.63	**264.18**	23,617.8	1,152.0	**1,115.8**	-	127.8	1.50	11.15
HZ 1180M B	21.25	-	21.25	-	9.02	-	80.46	**273.83**	24,893.7	1,228.9	**1,171.7**	-	136.4	1.50	11.18
HZ 1180M C	21.33	-	21.33	-	9.04	-	84.98	**289.21**	26,434.9	1,314.9	**1,239.4**	-	145.5	1.51	11.21
HZ 1180M D	21.41	-	21.41	-	9.06	-	89.51	**304.63**	27,991.5	1,401.9	**1,307.7**	-	154.7	1.53	11.24

Solution 102



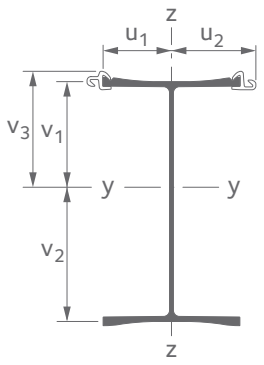
	Dimensions						Properties per solution								
	v	v'	v''	v'''	u	u'	A	G	I_y	I_z	$W_{el,y}$*	$W_{el,y}$**	$W_{el,z}$	A_{LW}	A_{LS}
Section	in	in	in	in	in	in	in²	lb/ft	in⁴	in⁴	in³	in³	in³	ft²/ft	ft²/ft
HZ 880M A	15.99	15.64	16.54	16.19	9.02	-	45.32	**154.24**	8,441.2	928.3	**527.9**	-	102.8	1.57	9.73
HZ 880M B	16.07	15.72	16.54	16.19	9.06	-	50.33	**171.30**	9,293.1	991.8	**578.5**	-	109.5	1.58	9.74
HZ 880M C	16.14	15.81	16.53	16.20	9.06	-	52.58	**178.93**	9,870.2	1,030.0	**611.8**	-	113.8	1.58	9.74
HZ 1080M A	20.79	20.44	21.34	20.99	8.94	-	57.52	**195.75**	16,729.6	913.7	**804.6**	-	102.2	1.55	11.14
HZ 1080M B	20.92	20.55	21.35	20.98	8.94	-	61.09	**207.89**	18,273.4	981.9	**873.6**	-	109.8	1.56	11.14
HZ 1080M C	21.02	20.69	21.33	21.00	8.98	-	67.60	**230.05**	20,157.5	1,045.1	**959.0**	-	116.6	1.56	11.15
HZ 1080M D	21.17	20.86	21.32	21.01	9.00	-	72.87	**247.99**	21,993.0	1,092.7	**1,038.9**	-	121.4	1.56	11.15
HZ 1180M A	21.32	21.02	21.32	21.02	9.02	-	77.09	**262.34**	23,377.3	1,116.4	**1,096.6**	-	123.9	1.57	11.15
HZ 1180M B	21.44	21.06	21.44	21.06	9.02	-	79.75	**271.39**	24,572.3	1,181.5	**1,146.3**	-	131.2	1.58	11.18
HZ 1180M C	21.51	21.15	21.51	21.15	9.04	-	84.26	**286.77**	26,111.3	1,267.3	**1,214.1**	-	140.4	1.58	11.21
HZ 1180M D	21.67	21.14	21.67	21.14	9.06	-	88.42	**300.92**	27,494.2	1,329.8	**1,269.0**	-	146.8	1.60	11.24

Solution 104



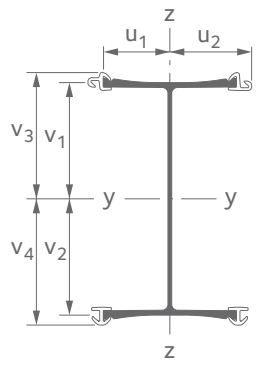
	Dimensions						Properties per solution								
	v	v'	v''	v'''	u	u'	A	G	I_y	I_z	$W_{el,y}$*	$W_{el,y}$**	$W_{el,z}$	A_{LW}	A_{LS}
Section	in	in	in	in	in	in	in²	lb/ft	in⁴	in⁴	in³	in³	in³	ft²/ft	ft²/ft
HZ 880M A	15.82	-	16.36	-	9.02	-	44.83	**152.57**	8,313.6	895.9	**525.7**	-	99.5	1.57	9.79
HZ 880M B	15.89	-	16.36	-	9.06	-	49.80	**169.47**	9,153.8	956.2	**576.1**	-	105.6	1.58	9.80
HZ 880M C	15.97	-	16.36	-	9.06	-	52.04	**177.01**	9,730.8	994.2	**609.3**	-	109.8	1.58	9.80
HZ 1080M A	20.62	-	21.17	-	8.94	-	57.04	**194.10**	16,518.6	882.4	**801.2**	-	98.9	1.55	11.20
HZ 1080M B	20.74	-	21.17	-	8.94	-	60.55	**206.06**	18,038.5	947.3	**869.9**	-	105.9	1.56	11.20
HZ 1080M C	20.85	-	21.17	-	8.98	-	67.06	**228.22**	19,922.3	1,010.3	**955.3**	-	112.6	1.56	11.21
HZ 1080M D	21.01	-	21.17	-	9.00	-	72.33	**246.16**	21,757.8	1,057.6	**1,035.6**	-	117.5	1.56	11.21
HZ 1180M A	21.17	-	21.17	-	9.02	-	76.54	**260.49**	23,139.9	1,080.9	**1,093.2**	-	119.9	1.57	11.21
HZ 1180M B	21.25	-	21.25	-	9.02	-	79.03	**268.94**	24,256.4	1,134.5	**1,141.5**	-	125.7	1.58	11.25
HZ 1180M C	21.33	-	21.33	-	9.04	-	83.55	**284.32**	25,793.0	1,220.0	**1,209.5**	-	134.9	1.58	11.28
HZ 1180M D	21.41	-	21.41	-	9.06	-	87.33	**297.20**	27,009.1	1,257.7	**1,261.7**	-	138.8	1.60	11.29

Solution 12



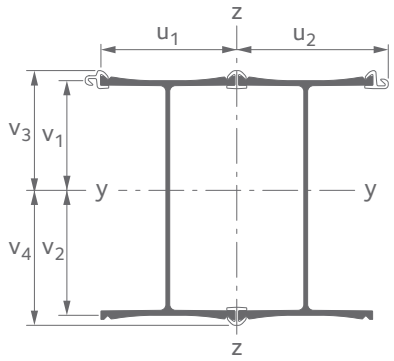
Section	Dimensions						Properties per solution								
	v_1 in	v_2 in	v_3 in	v_4 in	u_1 in	u_2 in	A in^2	G lb/ft	I_y in^4	I_z in^4	$W_{el,y}$* in^3	$W_{el,y}$** in^3	$W_{el,z}$ in^3	A_{LW} ft^2/ft	A_{LS} ft^2/ft
HZ 880M A	14.02	17.61	15.37	-	9.01	11.14	51.70	**175.93**	9,868.7	1,504.9	**560.5**	642.0	135.2	2.04	9.90
HZ 880M B	14.27	17.51	15.55	-	9.05	11.18	56.71	**192.98**	10,738.2	1,573.2	**613.0**	690.8	140.7	2.05	9.91
HZ 880M C	14.41	17.53	15.61	-	9.05	11.18	58.95	**200.61**	11,320.8	1,611.1	**645.6**	725.3	144.0	2.05	9.90
HZ 1080M A	18.72	22.51	20.07	-	8.93	11.06	63.89	**217.43**	19,207.5	1,480.7	**853.1**	956.9	133.9	2.02	11.31
HZ 1080M B	18.96	22.51	20.19	-	8.93	11.06	67.46	**229.58**	20,767.9	1,548.9	**922.4**	1,028.6	140.1	2.03	11.31
HZ 1080M C	19.23	22.48	20.35	-	8.97	11.10	73.97	**251.74**	22,670.7	1,616.9	**1,008.7**	1,114.3	145.8	2.03	11.32
HZ 1080M D	19.50	22.53	20.46	-	8.99	11.12	79.24	**269.67**	24,519.0	1,666.9	**1,088.7**	1,198.8	149.8	2.03	11.32
HZ 1180M A	19.73	22.61	20.53	-	9.01	11.14	83.46	**284.02**	25,912.4	1,693.0	**1,146.3**	1,262.0	151.9	2.04	11.32
HZ 1180M B	19.90	22.60	20.62	-	9.01	11.14	86.12	**293.07**	27,124.2	1,758.1	**1,200.3**	1,315.4	157.7	2.04	11.33
HZ 1180M C	19.90	22.75	20.66	-	9.03	11.16	91.33	**310.81**	28,917.9	1,897.5	**1,271.1**	1,399.6	170.0	2.08	11.36
HZ 1180M D	20.13	22.68	20.81	-	9.05	11.18	95.49	**324.96**	30,333.2	1,962.6	**1,337.3**	1,457.9	175.4	2.10	11.38

Solution 14



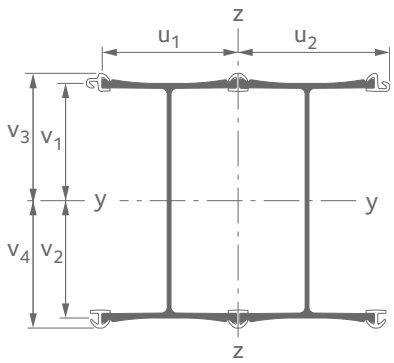
Section	Dimensions						Properties per solution								
	v_1 in	v_2 in	v_3 in	v_4 in	u_1 in	u_2 in	A in^2	G lb/ft	I_y in^4	I_z in^4	$W_{el,y}$* in^3	$W_{el,y}$** in^3	$W_{el,z}$ in^3	A_{LW} ft^2/ft	A_{LS} ft^2/ft
HZ 880M A	15.79	15.84	17.14	17.20	9.01	11.14	57.44	**195.49**	11,485.9	2,013.5	**725.0**	667.9	180.9	2.04	10.67
HZ 880M B	15.87	15.92	17.14	17.19	9.05	11.18	62.41	**212.38**	12,326.0	2,083.2	**774.4**	716.7	186.4	2.05	10.68
HZ 880M C	15.95	16.00	17.14	17.19	9.05	11.18	64.65	**220.02**	12,903.1	2,121.2	**806.7**	750.6	189.8	2.05	10.68
HZ 1080M A	20.59	20.65	21.94	22.00	8.93	11.06	69.65	**237.02**	21,900.5	1,981.6	**1,060.6**	995.3	179.1	2.02	12.08
HZ 1080M B	20.71	20.77	21.94	22.00	8.93	11.06	73.16	**248.98**	23,420.1	2,046.4	**1,128.0**	1,064.6	185.2	2.03	12.09
HZ 1080M C	20.83	20.88	21.94	22.00	8.97	11.10	79.67	**271.14**	25,304.3	2,118.5	**1,211.9**	1,150.3	191.0	2.03	12.09
HZ 1080M D	20.99	21.04	21.94	22.00	8.99	11.12	84.94	**289.07**	27,139.6	2,170.7	**1,290.0**	1,233.6	195.3	2.03	12.09
HZ 1180M A	21.15	21.19	21.95	22.00	9.01	11.14	89.15	**303.41**	28,521.8	2,198.5	**1,345.9**	1,296.8	197.4	2.04	12.10
HZ 1180M B	21.22	21.27	21.95	22.00	9.01	11.14	91.64	**311.86**	29,638.2	2,252.1	**1,393.5**	1,347.4	202.3	2.04	12.10
HZ 1180M C	21.49	21.16	22.25	21.92	9.03	11.16	98.44	**334.99**	32,120.9	2,538.7	**1,494.5**	1,443.5	227.6	2.08	12.21
HZ 1180M D	21.57	21.25	22.25	21.93	9.05	11.18	102.22	**347.87**	33,337.1	2,582.2	**1,546.0**	1,498.4	231.0	2.10	12.23

Solution 24



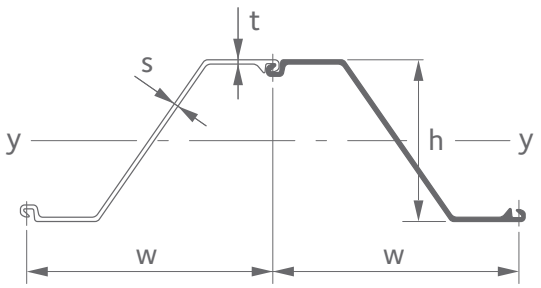
	Dimensions						Properties per solution								
Section	v_1 in	v_2 in	v_3 in	v_4 in	u_1 in	u_2 in	A in^2	G lb/ft	I_y in^4	I_z in^4	$W_{el,y}$* in^3	$W_{el,y}$** in^3	$W_{el,z}$ in^3	A_{LW} ft^2/ft	A_{LS} ft^2/ft
HZ 880M A	14.83	16.80	16.19	18.16	18.30	20.43	102.27	**348.05**	19,700.5	11,783.3	**1,172.9**	1,085.0	576.7	3.75	11.68
HZ 880M B	15.00	16.79	16.27	18.07	18.38	20.51	112.20	**381.85**	21,389.7	12,853.1	**1,273.9**	1,183.9	626.7	3.77	11.70
HZ 880M C	15.11	16.83	16.31	18.03	18.38	20.51	116.69	**397.12**	22,547.0	13,319.7	**1,339.5**	1,250.4	649.6	3.77	11.69
HZ 1080M A	19.58	21.65	20.94	23.01	18.14	20.27	126.68	**431.12**	38,283.1	13,659.9	**1,767.9**	1,663.8	674.0	3.73	13.07
HZ 1080M B	19.75	21.72	20.99	22.95	18.14	20.27	133.71	**455.04**	41,329.7	14,385.9	**1,903.0**	1,800.5	709.7	3.73	13.08
HZ 1080M C	19.96	21.75	21.08	22.87	18.22	20.35	146.73	**499.36**	45,109.3	15,733.3	**2,074.2**	1,972.6	773.2	3.74	13.09
HZ 1080M D	20.18	21.85	21.14	22.81	18.26	20.39	157.27	**535.23**	48,787.8	16,792.3	**2,233.2**	2,139.2	823.5	3.75	13.10
HZ 1180M A	20.38	21.96	21.18	22.77	18.30	20.43	165.70	**563.90**	51,557.9	17,628.8	**2,347.6**	2,264.9	862.9	3.75	13.10
HZ 1180M B	20.48	22.02	21.20	22.74	18.30	20.43	170.66	**580.80**	53,793.9	18,164.3	**2,443.4**	2,365.3	889.1	3.76	13.13
HZ 1180M C	20.53	22.12	21.29	22.88	18.38	20.51	181.98	**619.31**	57,800.8	19,543.1	**2,612.4**	2,525.8	952.9	3.82	13.17
HZ 1180M D	20.64	22.17	21.32	22.85	18.42	20.55	189.55	**645.07**	60,237.4	20,355.4	**2,716.8**	2,635.9	990.7	3.86	13.20

Solution 26



	Dimensions						Properties per solution								
Section	v_1 in	v_2 in	v_3 in	v_4 in	u_1 in	u_2 in	A in^2	G lb/ft	I_y in^4	I_z in^4	$W_{el,y}$* in^3	$W_{el,y}$** in^3	$W_{el,z}$ in^3	A_{LW} ft^2/ft	A_{LS} ft^2/ft
HZ 880M A	15.81	15.82	17.16	17.19	18.31	20.43	108.51	**369.28**	21,379.6	13,940.3	**1,351.1**	1,244.0	682.6	3.75	12.39
HZ 880M B	15.88	15.91	17.16	17.18	18.38	20.50	118.44	**403.08**	23,059.9	15,028.4	**1,449.6**	1,341.9	732.9	3.77	12.41
HZ 880M C	15.96	15.98	17.16	17.18	18.38	20.50	122.93	**418.35**	24,213.8	15,494.9	**1,514.9**	1,409.0	755.8	3.77	12.41
HZ 1080M A	20.60	20.63	21.96	21.99	18.14	20.27	132.92	**452.36**	41,095.0	15,780.3	**1,991.5**	1,868.9	778.4	3.73	13.79
HZ 1080M B	20.72	20.75	21.96	21.99	18.14	20.27	139.95	**476.27**	44,134.6	16,506.6	**2,127.0**	2,007.1	814.4	3.73	13.79
HZ 1080M C	20.84	20.87	21.96	21.99	18.22	20.35	152.97	**520.59**	47,902.7	17,872.2	**2,295.4**	2,178.6	878.4	3.74	13.80
HZ 1080M D	21.00	21.02	21.96	21.99	18.26	20.39	163.51	**556.46**	51,573.5	18,940.1	**2,452.9**	2,345.8	929.1	3.75	13.81
HZ 1180M A	21.16	21.18	21.96	21.99	18.30	20.43	171.94	**585.13**	54,338.1	19,785.8	**2,565.4**	2,471.5	968.8	3.75	13.81
HZ 1180M B	21.24	21.26	21.96	21.99	18.30	20.43	176.90	**602.03**	56,570.9	20,321.3	**2,661.0**	2,573.1	995.0	3.76	13.82
HZ 1180M C	21.41	21.24	22.17	22.00	18.38	20.51	189.81	**645.94**	61,256.8	22,283.7	**2,860.8**	2,762.9	1,086.5	3.82	13.95
HZ 1180M D	21.49	21.32	22.17	22.00	18.42	20.55	197.37	**671.70**	63,689.1	23,107.5	**2,963.9**	2,873.0	1,124.7	3.86	13.99

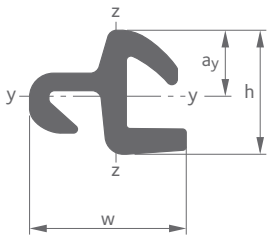
AZ - Intermediary Piles



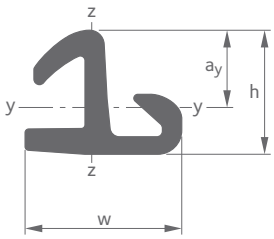
Section	Dimensions h in	w in	t in	s in	Properties Double Piles A in²	G lb/ft	I_y in⁴	$W_{el,y}$ in³	i_y in	A_{LW} ft²/ft
AZ 13-770	13,54	30,32	0,354	0,354	30,04	102,21	827,4	122,0	5,25	6,07
AZ 14-770-10/10	13,58	30,32	0,394	0,394	32,74	111,41	896,9	132,1	5,24	6,07
AZ 18-700	16,54	27,56	0,354	0,354	30,21	102,81	1 271,4	153,8	6,50	6,10
AZ 20-700	16,57	27,56	0,394	0,394	32,98	112,22	1 377,6	166,3	6,46	6,10
AZ 26-700	18,11	27,56	0,480	0,480	40,63	138,22	2 008,7	221,8	7,03	6,33
AZ 13-700R	12,40	27,56	0,375	0,375	29,22	99,45	690,7	111,4	4,86	5,61
AZ 13-700R-10/10	12,44	27,56	0,394	0,394	30,47	103,68	718,6	115,6	4,85	5,61
AZ 18	14,96	24,80	0,375	0,375	29,39	99,99	1 035,0	138,5	5,93	5,61
AZ 18-10/10	15,00	24,80	0,394	0,394	30,71	104,49	1 076,1	143,7	5,92	5,61
AZ 26	16,81	24,80	0,512	0,480	38,63	131,44	1 680,3	200,2	6,59	5,84

Connectors

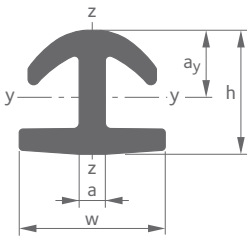
RZD



RZU



RH



Section	h in	w in	a in	a_y in	A in²	G lb/ft	I_y in⁴	I_z in⁴	$W_{el,y}$ in³	$W_{el,z}$ in³	A_{LW} ft²/ft	A_{LS} ft²/ft
RZD 16	2.43	3.19	-	1.24	3.21	**10.89**	1.4	2.3	**1.1**	1.3	0.39	0.20
RZU 16	2.43	3.19	-	1.51	3.16	**10.82**	1.6	2.3	**1.1**	1.3	0.26	0.33
RH 16	2.43	2.69	0.48	1.28	3.12	**10.75**	2.0	1.3	**1.5**	1.0	0.33	0.30
RZD 18	2.65	3.35	-	1.41	3.57	**12.16**	1.9	2.6	**1.3**	1.5	0.39	0.23
RZU 18	2.65	3.35	-	1.66	3.50	**12.03**	2.2	2.6	**1.3**	1.5	0.30	0.33
RH 20	2.65	3.12	0.56	1.44	3.91	**13.44**	2.9	2.1	**2.0**	1.3	0.36	0.33

Delivery conditions

Tolerances (rounded values from SI conversion)

Standard EN 10248	HZM	AZ, AZ-R	ASTM A6	HZM / AZ
Mass[1]	± 5 %		Mass [1]	± 2.5 %
Length (L)	± 7.87 in		Length	-0.0 in / + 5.0 in
Thickness (t, s)	t,s > 0.492 in: + 0.10 in / -0.06 in	t,s > 0.335 in : ± 6 %		
Height	h ≥ 19.69 in: ± 0.28 in	h ≥ 11.81 in: ± 0.28 in		
Width single pile (w)	± 2 % w			
Width double piles	± 3 % w			
Straightness (q)	≤ 0.2 % L			
Ends out of square	± 2 % w			

[1] from the mass of the total delivery

Maximum rolling length[1] (rounded values from SI conversion)

HZM	108.3 ft
AZ	101.7 ft
AZ-R	78.7 ft
RZD / RZU / RH	78.7 ft

[1] Longer sections may be supplied. Please contact us.

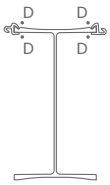
Steel Grades

Standard EN 10248	Min. yield strength R_{eH}		Min. tensile strength R_m	Min. elongation $L_o = 5.65\sqrt{S_o}$	ASTM	Min. yield strength R_{eH}	
	MPa	ksi [1]	MPa	%		ksi	MPa
S 240 GP	**240**	34.8	340	26			
S 270 GP	**270**	39.2	410	24	**A 328**	**39**	270
S 320 GP	**320**	46.4	440	23			
S 355 GP	**355**	51.5	480	22	**A 572 Gr. 50**	**50**	345
S 390 GP	**390**	56.6	490	20	**A 572 Gr. 55**	**55**	380
S 430 GP	**430**	62.4	510	19	**A 572 Gr. 60**	**60**	415
ArcelorMittal mill specification							
S 460 AP	**460**	66.7	550	17	**A 572 Gr. 65**	**65**	450

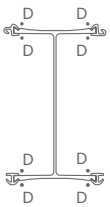
All the components of the HZM Steel Wall System are available in **ASTM A 690** steel grade. **ASTM A 690** with higher yield strength on request. Please contact us for availability of S 460 AP.
[1] converted from SI units

Standard Welding Configuration

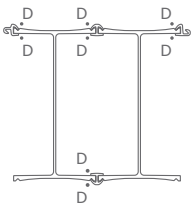
Sol 12



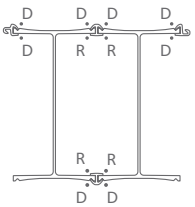
Sol 14



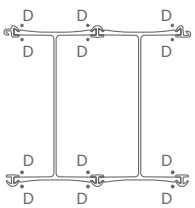
Sol 24 - Form 'a'



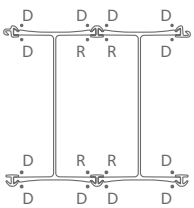
Sol 24 - Form 'b'



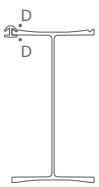
Sol 26 - Form 'a'



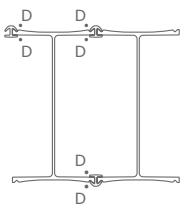
Sol 26 - Form 'b'



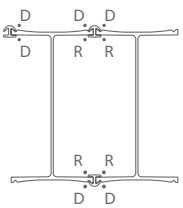
Sol C1



Sol C23 - Form 'a'



Sol C23 - Form 'b'



D dicontinuous weld, a = 6 mm (0.236"), 10% of length (100mm/m, 3.94" per 3.28 ft) over the whole pile length + 500 mm (19.68") continuous weld at top and toe
R continuous weld, a = 6 mm (0.236"), length 500 mm (19.68") at top and toe only

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) [in] or [ft]
h_i	height (depth) of the section [in]
i_y	radius of gyration about the y-y axis [in] $i_y = \sqrt{I_y / A}$
r	inner radius of the HZM profile, between web and flange [in]
s	thickness of the web [in]
t	thickness of the flange at a distance w/4 from the edge [in]
t_{max}	maximum thickness of the flange [in]
u_i , v_i	distance from neutral axis to extreme fiber of the HZM flange / connector RH/RZ [in]
w	nominal width of the element [in]
A	cross sectional steel area [in^2], [in^2/ft]
A_{Ls}	coating area on the soil side (back), excluding the inside of the interlocks, per element or system width, per unit length [ft^2/ft]
A_{Lw}	coating area on the water side (front), excluding the inside of the interlocks, per element or system width, per unit length [ft^2/ft]
G	mass of the element / wall per unit length [lb/ft], [lb/ft^2]
$G_{60\%}$	mass of the combination with length of the infill sheets AZ = 60% of length of the HZM king piles [lb/ft^2]
$G_{80\%}$	mass of the combination with length of the infill sheets AZ = 80% of length of the HZM king piles [lb/ft^2]
$G_{100\%}$	mass of the combination with length of the infill sheets AZ = 100% of length of the HZM king piles [lb/ft^2]
I_y	moment of inertia about the main neutral axis y-y [in^4], [in^4/ft]
I_z	moment of inertia about the neutral axis z-z (weak axis) [in^4]
$W_{el,y}$ *	equivalent elastic section modulus of the combination related to the extreme fiber of the flange of the HZM [in^3/ft]
$W_{el,y}$ **	equivalent elastic section modulus of the combination related to the extreme fiber of the connector RZU/RZD/RH [in^3/ft]
$W_{el,z}$	elastic section modulus of the element related to neutral axis z-z (weak axis) [in^3]

Table of Combinations according to Section Modulus

$W_{el,y}$* in³/ft	$G_{100\%}$ lb/ft²	Section	Combination
89,6	41,00	HZ 880M A	12/AZ 13-770
94,8	43,53	HZ 880M A	12/AZ 13-700R
97,3	43,47	HZ 880M B	12/AZ 13-770
100,1	44,07	HZ 880M A	12/AZ 18-700
102,0	44,59	HZ 880M C	12/AZ 13-770
103,0	46,18	HZ 880M B	12/AZ 13-700R
105,6	47,04	HZ 880M A	12/AZ 18
106,7	49,67	HZ 880M A	12/AZ 26-700
108,2	47,39	HZ 880M C	12/AZ 13-700R
108,3	46,71	HZ 880M B	12/AZ 18-700
111,8	52,40	HZ 880M A	12/AZ 26
113,5	47,92	HZ 880M C	12/AZ 18-700
114,5	49,89	HZ 880M B	12/AZ 18
114,6	43,88	HZ 880M A	14/AZ 13-770
114,9	52,31	HZ 880M B	12/AZ 26-700
120,0	51,19	HZ 880M C	12/AZ 18
120,1	53,52	HZ 880M C	12/AZ 26-700
120,7	55,24	HZ 880M B	12/AZ 26
121,6	46,62	HZ 880M A	14/AZ 13-700R
121,6	46,33	HZ 880M B	14/AZ 13-770
126,3	56,54	HZ 880M C	12/AZ 26
126,4	47,45	HZ 880M C	14/AZ 13-770
127,3	47,16	HZ 880M A	14/AZ 18-700
129,2	49,24	HZ 880M B	14/AZ 13-700R
131,4	47,21	HZ 1080M A	12/AZ 13-770
134,2	50,45	HZ 880M C	14/AZ 13-700R
134,7	52,76	HZ 880M A	14/AZ 26-700
134,8	50,37	HZ 880M A	14/AZ 18
134,9	49,78	HZ 880M B	14/AZ 18-700
140,0	50,98	HZ 880M C	14/AZ 18-700
140,1	50,20	HZ 1080M A	12/AZ 13-700R
141,6	49,00	HZ 1080M B	12/AZ 13-770
141,7	55,73	HZ 880M A	14/AZ 26
142,2	55,38	HZ 880M B	14/AZ 26-700
142,9	53,19	HZ 880M B	14/AZ 18
144,1	50,73	HZ 1080M A	12/AZ 18-700
146,7	54,03	HZ 880M A	24/AZ 13-770
147,2	56,58	HZ 880M C	14/AZ 26-700
148,4	54,49	HZ 880M C	14/AZ 18
149,3	56,35	HZ 1080M A	12/AZ 26-700
149,8	58,55	HZ 880M B	14/AZ 26
151,0	52,12	HZ 1080M B	12/AZ 13-700R
153,6	54,24	HZ 1080M A	12/AZ 18
154,2	56,83	HZ 880M A	24/AZ 13-700R
154,3	52,22	HZ 1080M C	12/AZ 13-770
155,1	52,66	HZ 1080M B	12/AZ 18-700
155,2	59,85	HZ 880M C	14/AZ 26
158,5	59,61	HZ 1080M A	12/AZ 26
158,6	58,00	HZ 880M B	24/AZ 13-770
158,6	57,26	HZ 880M A	24/AZ 18-700
160,2	58,27	HZ 1080M B	12/AZ 26-700
162,6	50,10	HZ 1080M A	14/AZ 13-770
164,1	61,76	HZ 880M A	24/AZ 26-700
164,5	55,57	HZ 1080M C	12/AZ 13-700R
165,4	56,31	HZ 1080M B	12/AZ 18
165,9	54,84	HZ 1080M D	12/AZ 13-770
166,4	59,83	HZ 880M C	24/AZ 13-770
166,5	60,43	HZ 880M A	24/AZ 18
166,7	61,02	HZ 880M B	24/AZ 13-700R
168,3	56,58	HZ 880M A	26/AZ 13-770
168,6	56,11	HZ 1080M C	12/AZ 18-700
170,4	61,68	HZ 1080M B	12/AZ 26
171,1	61,45	HZ 880M B	24/AZ 18-700
171,7	64,67	HZ 880M A	24/AZ 26
172,4	51,86	HZ 1080M B	14/AZ 13-770
173,4	53,30	HZ 1080M A	14/AZ 13-700R
173,8	61,72	HZ 1080M C	12/AZ 26-700
174,4	56,93	HZ 1180M A	12/AZ 13-770
175,0	62,96	HZ 880M C	24/AZ 13-700R
176,7	65,94	HZ 880M B	24/AZ 26-700
177,0	58,38	HZ 1080M D	12/AZ 13-700R
177,1	59,53	HZ 880M A	26/AZ 13-700R
177,8	53,84	HZ 1080M A	14/AZ 18-700
179,4	63,38	HZ 880M C	24/AZ 18-700
179,8	64,87	HZ 880M B	24/AZ 18
180,0	60,54	HZ 880M B	26/AZ 13-770
180,0	60,03	HZ 1080M C	12/AZ 18
181,1	58,92	HZ 1080M D	12/AZ 18-700
181,7	59,96	HZ 880M A	26/AZ 18-700
182,3	58,26	HZ 1180M B	12/AZ 13-770
183,4	59,45	HZ 1080M A	14/AZ 26-700
184,0	55,20	HZ 1080M B	14/AZ 13-700R
184,6	55,08	HZ 1080M C	14/AZ 13-770
184,9	65,40	HZ 1080M C	12/AZ 26
185,0	67,88	HZ 880M C	24/AZ 26-700
185,0	69,10	HZ 880M B	24/AZ 26
186,1	60,62	HZ 1180M A	12/AZ 13-700R
186,3	64,52	HZ 1080M D	12/AZ 26-700
187,7	62,37	HZ 880M C	26/AZ 13-770
187,7	64,46	HZ 880M A	26/AZ 26-700
188,4	55,73	HZ 1080M B	14/AZ 18-700
188,6	66,93	HZ 880M C	24/AZ 18
189,3	63,71	HZ 880M B	26/AZ 13-700R
189,8	57,58	HZ 1080M A	14/AZ 18
190,1	61,15	HZ 1180M A	12/AZ 18-700
191,0	63,29	HZ 880M A	26/AZ 18
192,6	60,85	HZ 1180M C	12/AZ 13-770
193,5	63,06	HZ 1080M D	12/AZ 18
193,7	71,16	HZ 880M C	24/AZ 26
193,9	64,14	HZ 880M B	26/AZ 18-700
194,0	61,35	HZ 1080M B	14/AZ 26-700
194,6	62,05	HZ 1180M B	12/AZ 13-700R
195,1	62,95	HZ 1080M A	14/AZ 26
195,3	66,76	HZ 1180M A	12/AZ 26-700
196,0	57,70	HZ 1080M D	14/AZ 13-770
196,5	67,53	HZ 880M A	26/AZ 26
197,0	58,64	HZ 1080M C	14/AZ 13-700R
197,5	65,65	HZ 880M C	26/AZ 13-700R
198,4	68,42	HZ 1080M D	12/AZ 26
198,6	62,58	HZ 1180M B	12/AZ 18-700
199,9	68,64	HZ 880M B	26/AZ 26-700
201,3	59,63	HZ 1080M B	14/AZ 18
201,4	59,18	HZ 1080M C	14/AZ 18-700
202,2	66,08	HZ 880M C	26/AZ 18-700
202,3	62,90	HZ 1180M D	12/AZ 13-770
203,2	65,47	HZ 1180M A	12/AZ 18
203,9	68,19	HZ 1180M B	12/AZ 26-700
203,9	67,73	HZ 880M B	26/AZ 18
204,1	59,79	HZ 1180M A	14/AZ 13-770
205,6	64,82	HZ 1180M C	12/AZ 13-700R
206,6	65,00	HZ 1080M B	14/AZ 26
207,0	64,79	HZ 1080M C	14/AZ 26-700
208,0	70,57	HZ 880M C	26/AZ 26-700
208,0	70,83	HZ 1180M A	12/AZ 26
209,3	61,45	HZ 1080M D	14/AZ 13-700R
209,4	71,96	HZ 880M B	26/AZ 26
209,7	65,36	HZ 1180M C	12/AZ 18-700
211,1	61,03	HZ 1180M B	14/AZ 13-770
212,4	67,01	HZ 1180M B	12/AZ 18
212,7	69,79	HZ 880M C	26/AZ 18
213,6	61,99	HZ 1080M D	14/AZ 18-700
214,8	70,96	HZ 1180M C	12/AZ 26-700

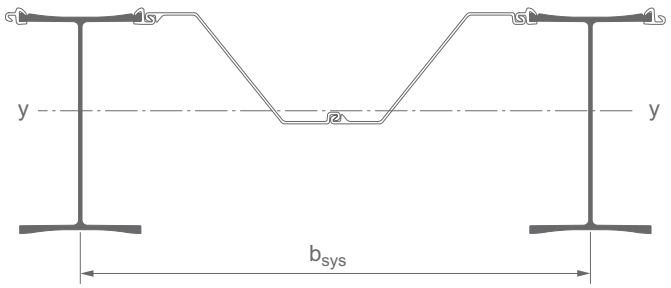
Table of Combinations according to Section Modulus

$W_{el,y}$* in³/ft	$G_{100\%}$ lb/ft²	Section	Combination
215,3	63,34	HZ 1080M C	14/AZ 18
216,0	67,02	HZ 1180M D	12/AZ 13-700R
217,3	72,37	HZ 1180M B	12/AZ 26
217,4	64,20	HZ 1080M A	24/AZ 13-770
217,9	63,69	HZ 1180M A	14/AZ 13-700R
218,1	74,02	HZ 880M C	26/AZ 26
219,2	67,59	HZ 1080M D	14/AZ 26-700
220,0	67,56	HZ 1180M D	12/AZ 18-700
220,5	68,71	HZ 1080M C	14/AZ 26
222,3	64,22	HZ 1180M A	14/AZ 18-700
224,3	69,99	HZ 1180M C	12/AZ 18
225,2	73,15	HZ 1180M D	12/AZ 26-700
225,4	65,02	HZ 1180M B	14/AZ 13-700R
225,8	64,41	HZ 1180M C	14/AZ 13-770
227,8	69,82	HZ 1180M A	14/AZ 26-700
228,4	66,36	HZ 1080M D	14/AZ 18
229,2	75,35	HZ 1180M C	12/AZ 26
229,3	67,61	HZ 1080M A	24/AZ 13-700R
229,7	65,55	HZ 1180M B	14/AZ 18-700
232,8	68,04	HZ 1080M A	24/AZ 18-700
233,2	66,28	HZ 1180M D	14/AZ 13-770
233,7	67,08	HZ 1080M B	24/AZ 13-770
233,7	71,73	HZ 1080M D	14/AZ 26
235,2	71,16	HZ 1180M B	14/AZ 26-700
235,5	72,36	HZ 1180M D	12/AZ 18
237,1	72,55	HZ 1080M A	24/AZ 26-700
237,7	68,77	HZ 1180M A	14/AZ 18
240,3	77,72	HZ 1180M D	12/AZ 26
241,2	68,64	HZ 1180M C	14/AZ 13-700R
242,9	74,13	HZ 1180M A	14/AZ 26
244,6	66,76	HZ 1080M A	26/AZ 13-770
245,5	69,18	HZ 1180M C	14/AZ 18-700
245,8	70,21	HZ 1180M B	14/AZ 18
245,8	71,89	HZ 1080M A	24/AZ 18
246,5	70,65	HZ 1080M B	24/AZ 13-700R
249,2	70,64	HZ 1180M D	14/AZ 13-700R
249,8	76,14	HZ 1080M A	24/AZ 26
250,0	71,08	HZ 1080M B	24/AZ 18-700
250,9	74,78	HZ 1180M C	14/AZ 26-700
251,0	75,57	HZ 1180M B	14/AZ 26
253,4	71,17	HZ 1180M D	14/AZ 18-700
253,9	72,30	HZ 1080M C	24/AZ 13-770
254,3	75,60	HZ 1080M B	24/AZ 26-700
258,1	70,31	HZ 1080M A	26/AZ 13-700R
258,8	76,77	HZ 1180M D	14/AZ 26-700
260,9	69,64	HZ 1080M B	26/AZ 13-770
261,6	70,74	HZ 1080M A	26/AZ 18-700
262,8	74,11	HZ 1180M C	14/AZ 18
264,0	75,12	HZ 1080M B	24/AZ 18
266,2	75,26	HZ 1080M A	26/AZ 26-700
267,9	76,17	HZ 1080M C	24/AZ 13-700R
267,9	79,47	HZ 1180M C	14/AZ 26
268,0	79,38	HZ 1080M B	24/AZ 26
271,3	76,60	HZ 1080M C	24/AZ 18-700
271,4	76,27	HZ 1180M D	14/AZ 18
272,8	76,56	HZ 1080M D	24/AZ 13-770
275,3	73,36	HZ 1080M B	26/AZ 13-700R
275,6	81,11	HZ 1080M C	24/AZ 26-700
276,3	74,76	HZ 1080M A	26/AZ 18
276,5	81,62	HZ 1180M D	14/AZ 26
278,8	73,79	HZ 1080M B	26/AZ 18-700
280,6	79,02	HZ 1080M A	26/AZ 26
280,7	74,86	HZ 1080M C	26/AZ 13-770
283,4	78,31	HZ 1080M B	26/AZ 26-700
286,3	79,94	HZ 1180M A	24/AZ 13-770
286,6	80,98	HZ 1080M C	24/AZ 18
287,8	80,67	HZ 1080M D	24/AZ 13-700R
290,6	85,23	HZ 1080M C	24/AZ 26
291,3	81,10	HZ 1080M D	24/AZ 18-700
294,6	78,00	HZ 1080M B	26/AZ 18
295,6	85,60	HZ 1080M D	24/AZ 26-700
296,2	78,87	HZ 1080M C	26/AZ 13-700R
297,7	81,96	HZ 1180M B	24/AZ 13-770
298,8	82,25	HZ 1080M B	26/AZ 26
299,3	79,10	HZ 1080M D	26/AZ 13-770
299,7	79,30	HZ 1080M C	26/AZ 18-700
302,2	84,24	HZ 1180M A	24/AZ 13-700R
304,3	83,81	HZ 1080M C	26/AZ 26-700
305,5	84,67	HZ 1180M A	24/AZ 18-700
307,8	85,75	HZ 1080M D	24/AZ 18
309,8	89,17	HZ 1180M A	24/AZ 26-700
311,8	89,99	HZ 1080M D	24/AZ 26
312,6	82,48	HZ 1180M A	26/AZ 13-770
314,2	86,39	HZ 1180M B	24/AZ 13-700R
315,9	83,37	HZ 1080M D	26/AZ 13-700R
316,9	83,85	HZ 1080M C	26/AZ 18
317,5	86,45	HZ 1180M C	24/AZ 13-770
317,6	86,82	HZ 1180M B	24/AZ 18-700
319,5	83,80	HZ 1080M D	26/AZ 18-700
321,0	88,10	HZ 1080M C	26/AZ 26
321,9	91,32	HZ 1180M B	24/AZ 26-700
323,0	89,54	HZ 1180M A	24/AZ 18
323,9	88,30	HZ 1080M D	26/AZ 26-700
324,0	84,51	HZ 1180M B	26/AZ 13-770
327,0	93,78	HZ 1180M A	24/AZ 26
329,7	89,46	HZ 1180M D	24/AZ 13-770
330,0	86,94	HZ 1180M A	26/AZ 13-700R
333,4	87,37	HZ 1180M A	26/AZ 18-700
335,2	91,13	HZ 1180M C	24/AZ 13-700R
335,8	91,82	HZ 1180M B	24/AZ 18
337,8	88,62	HZ 1080M D	26/AZ 18
337,9	91,87	HZ 1180M A	26/AZ 26-700
338,5	91,56	HZ 1180M C	24/AZ 18-700
339,8	96,06	HZ 1180M B	24/AZ 26
341,9	92,86	HZ 1080M D	26/AZ 26
342,1	89,09	HZ 1180M B	26/AZ 13-700R
342,7	96,05	HZ 1180M C	24/AZ 26-700
345,5	89,51	HZ 1180M B	26/AZ 18-700
347,4	89,64	HZ 1180M C	26/AZ 13-770
348,1	94,32	HZ 1180M D	24/AZ 13-700R
350,0	94,02	HZ 1180M B	26/AZ 26-700
351,4	94,74	HZ 1180M D	24/AZ 18-700
352,6	92,40	HZ 1180M A	26/AZ 18
355,6	99,23	HZ 1180M D	24/AZ 26-700
356,7	96,64	HZ 1180M A	26/AZ 26
358,1	96,84	HZ 1180M C	24/AZ 18
359,4	92,65	HZ 1180M D	26/AZ 13-770
362,0	101,07	HZ 1180M C	24/AZ 26
365,4	94,68	HZ 1180M B	26/AZ 18
366,8	94,50	HZ 1180M C	26/AZ 13-700R
369,5	98,92	HZ 1180M B	26/AZ 26
370,2	94,93	HZ 1180M C	26/AZ 18-700
371,7	100,22	HZ 1180M D	24/AZ 18
374,6	99,43	HZ 1180M C	26/AZ 26-700
375,6	104,45	HZ 1180M D	24/AZ 26
379,5	97,69	HZ 1180M D	26/AZ 13-700R
383,0	98,12	HZ 1180M D	26/AZ 18-700
387,3	102,61	HZ 1180M D	26/AZ 26-700
391,6	100,43	HZ 1180M C	26/AZ 18
395,7	104,66	HZ 1180M C	26/AZ 26
405,2	103,80	HZ 1180M D	26/AZ 18
409,2	108,03	HZ 1180M D	26/AZ 26

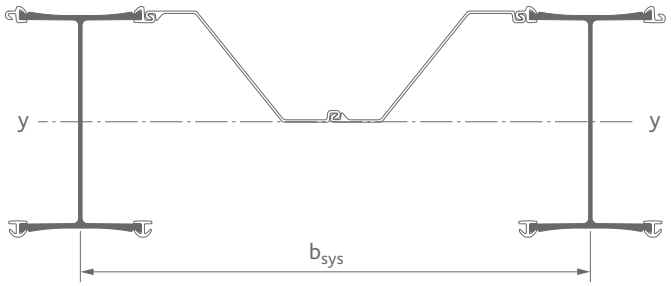
Disclaimer

Edition March 2011.

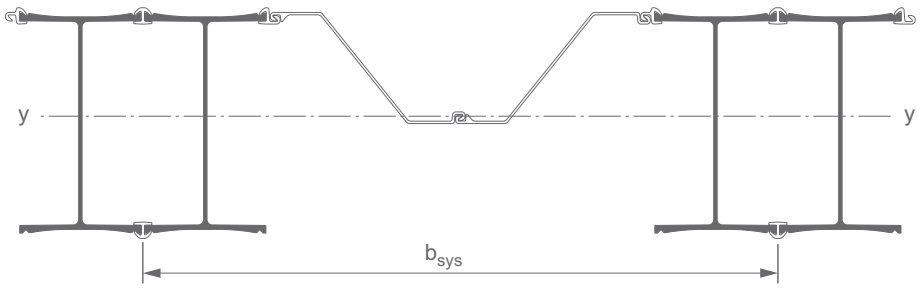
Combination 12



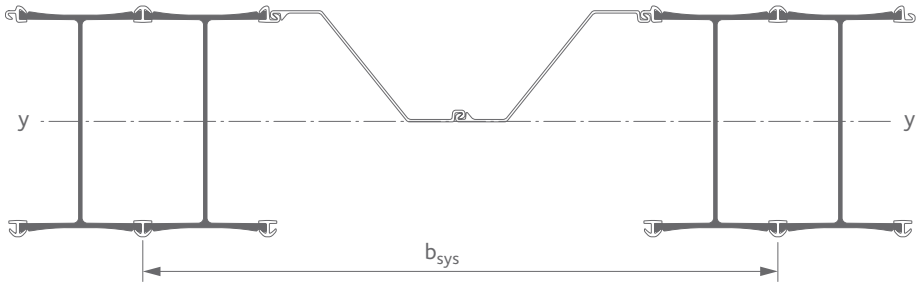
Combination 14



Combination 24



Combination 26



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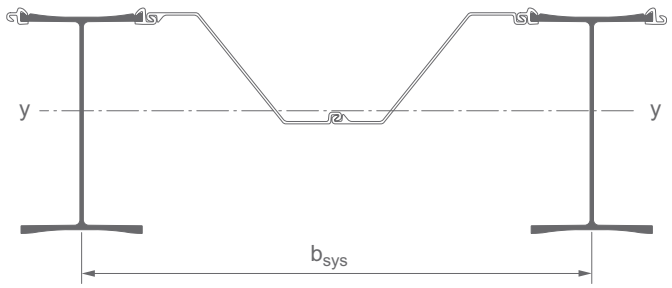

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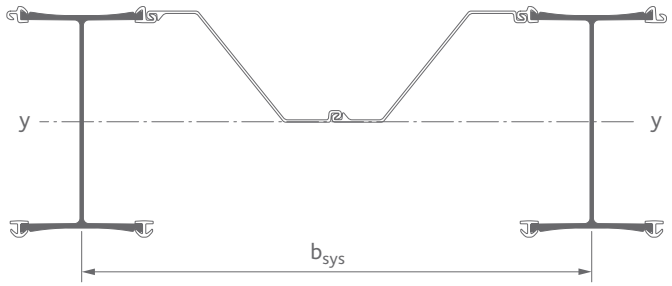

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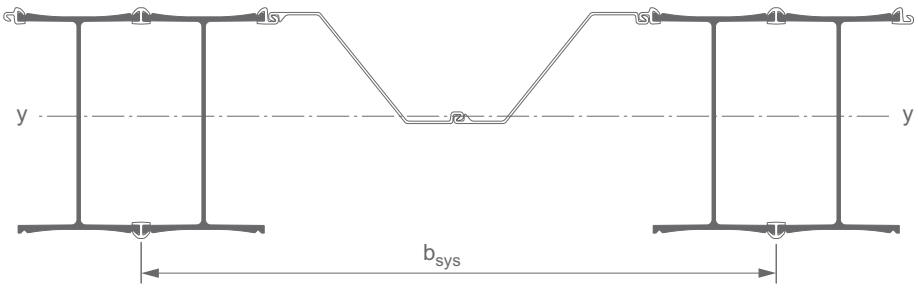

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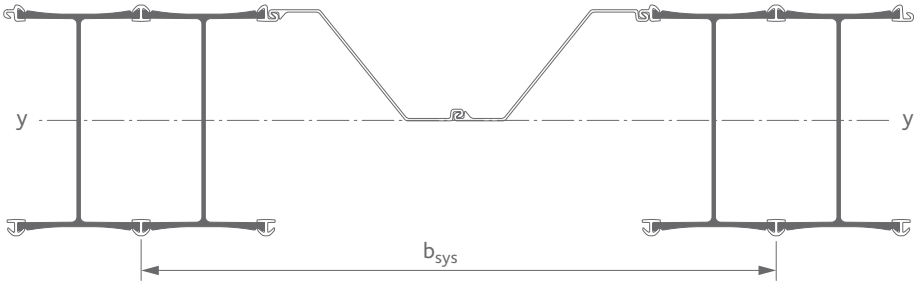

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