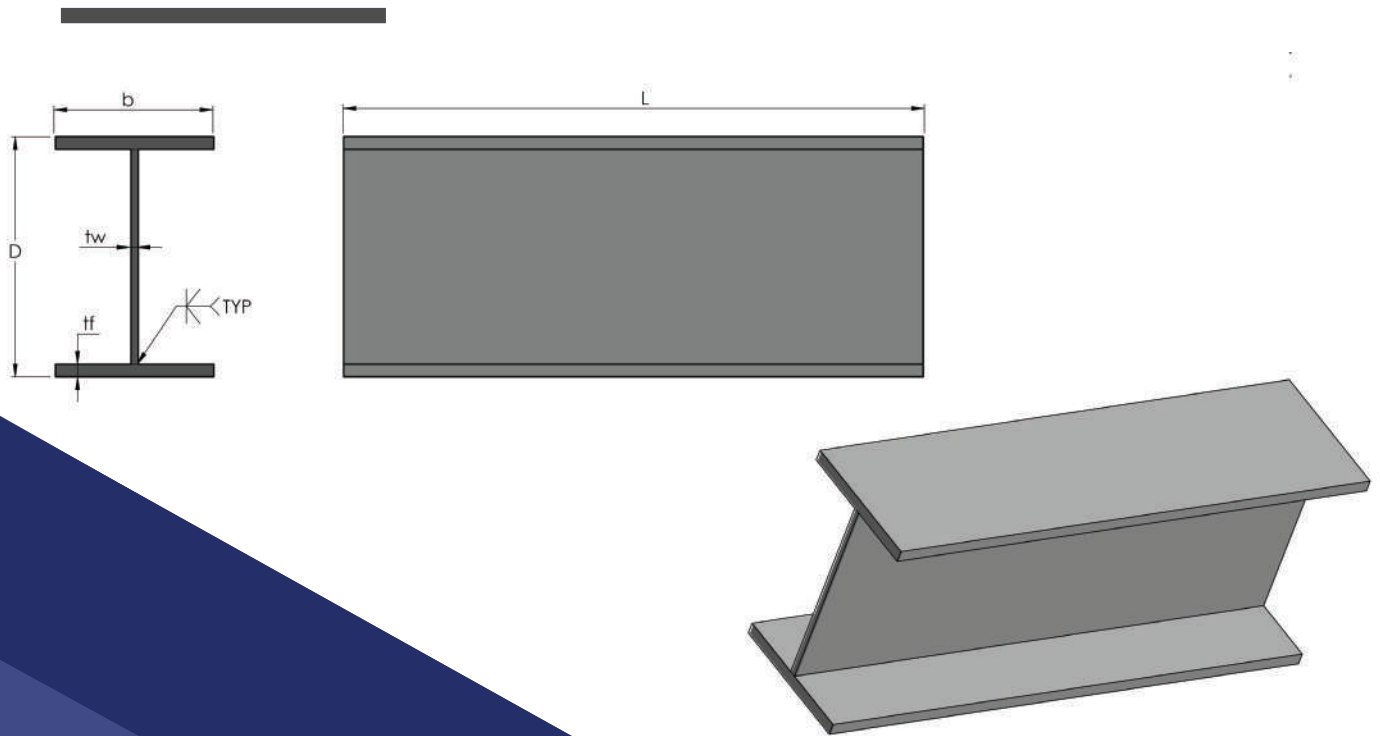


Welded H Piles & Welded Beam Piles

Our Sustainability & Green Products





Hp Welded Wide Flange Bearing Piles

HP bearing Piles are special H Beam sections with the same web and flange thickness. These piles are particularly attractive deep foundation elements for numerous types of structures; bridges, industrial facilities, housing and stadiums.

Key advantages of HP Piles:

- » Guaranteed pile integrity after installation;
- » Easy to store handle and install;
- » No length limitations. Any pile size can be achieved through trimming and splicing;
- » Load bearing capacity can be determined during installation;
- » Easy connection to the superstructure;
- » Excellent bending capacity to resist horizontal pressure;
- » Immediate bearing resistance after installation;
- » Excellent durability, corrosion on completely embedded steel elements, like HP bearing piles, has been proven to be neglectable;
- » HP piles can withstand high tensile forces.

HP welded Wide Flange Bearing

Section		Dimensions						Area	Construction Dimen- sions for detailing		Surface	
	G kg/m	h mm	b mm	t mm	t mm	r mm	A cm²	h mm	d mm	A m²/m	A m²/t	
HP 200 x 43 HP 200 x 53	42.5 53.5	200.0 204.0	205.0 207.0	9.0 11.3	9.0 11.3	10.0 10.0	54.1 68.4	182.0 181.4	162.0 161.4	1.185 1.196	27.88 22.36	
HP 220 x 57	57.2	210.0	224.5	11.0	11.0	18.0	72.9	188.0	152.0	1.265	22.12	
HP 260 x 75 HP 260 x 87	75.0 87.3	249.0 253.0	265.0 267.0	12.0 14.0	12.0 14.0	24.0 24.0	95.5 111	225.0 225.0	177.0 177.0	1.493 1.505	19.90 17.24	
HP 305 x 79	78.9	299.3	306.4	11.0	11.1	15.2	101	277.1	246.7	1.776	22.52	
HP 305 x 88	88.0	301.7	307.8	12.4	12.3	15.2	112	277.1	246.7	1.784	20.28	
HP 305 x 95	94.9	303.7	308.7	13.3	13.3	15.2	121	277.1	246.7	1.790	18.85	
HP 305 x 110	110	307.9	310.7	15.3	15.4	15.2	140	277.1	246.7	1.802	16.39	
HP 305 x 126	126	312.3	312.9	17.5	17.6	15.2	161	277.1	246.7	1.815	14.40	
HP 305 x 149	149	318.5	316.0	20.6	20.7	15.2	190	277.1	246.7	1.834	12.30	
HP 305 x 180	180	326.7	319.7	24.8	24.8	15.2	229	277.1	246.7	1.857	10.31	
HP 305 x 186	186	328.3	320.9	25.5	25.6	15.2	237	277.1	246.7	1.863	10.02	
HP 305 x 223	223	337.9	325.7	30.3	30.4	15.2	284	277.1	246.7	1.892	8.49	
HP 320 x 88	88.5	303.0	304.0	12.0	12.0	27.0	113	279.0	225.0	1.752	19.80	
HP 320 x 103	103	307.0	306.0	14.0	14.0	27.0	131	279.0	225.0	1.764	17.15	
HP 320 x 117	117	311.0	308.0	16.0	16.0	27.0	150	279.0	225.0	1.776	15.13	
HP 320 x 147	147	319.0	312.0	20.0	20.0	27.0	187	279.0	225.0	1.800	12.27	
HP 320 x 184	184	329.0	317.0	25.0	25.0	27.0	235	279.0	225.0	1.830	9.94	
HP 360 x 109	109	346.4	371.0	12.8	12.9	15.2	139	320.6	290.2	2.125	19.51	
HP 360 x 133	133	352.0	373.8	15.6	15.7	15.2	169	320.6	290.2	2.142	16.11	
HP 360 x 152	152	356.4	376.0	17.8	17.9	15.2	194	320.6	290.2	2.155	14.18	
HP 360 x 174	174	361.4	378.5	20.3	20.4	15.2	222	320.6	290.2	2.170	12.48	
HP 360 x 180	180	362.9	378.8	21.1	21.1	15.2	230	320.6	290.2	2.173	12.06	
HP 400 x 122	122	348.0	390.0	14.0	14.0	15.0	156	320.0	290.0	2.202	17.99	
HP 400 x 140	140	352.0	392.0	16.0	16.0	15.0	179	320.0	290.0	2.214	15.80	
HP 400 x 158	158	356.0	394.0	18.0	18.0	15.0	201	320.0	290.0	2.226	14.08	
HP 400 x 176	176	360.0	396.0	20.0	20.0	15.0	224	320.0	290.0	2.238	12.71	
HP 400 x 194	194	364.0	398.0	22.0	22.0	15.0	248	320.0	290.0	2.250	11.58	
HP 400 x 213	213	368.0	400.0	24.0	24.0	15.0	271	320.0	290.0	2.262	10.64	
HP 400 x 231	231	372.0	402.0	26.0	26.0	15.0	294	320.0	290.0	2.274	9.85	

Welded beam manufacturing is in accordance with AS/NZS 3679.2 Latest edition
 Fabrication is in accordance with AS 4100 and AS/NZS 5131 latest edition
 Hot rolled plates are according to AS/NZS 3678 latest edition requirements

HP Welded Wide Flange Bearing

HP Welded Wide Flange Bearing piles																						
Section		Section properties											Class 1993-1-1: 2005							EN 10025-2: 2004 EN 10025-4: 2004 EN 10225: 2009		
							weak axis z-z						Pure bending y-y			Pure compression						
	G	I	W	W	Avz	A	I	W	W	I	I	I x										
	kg/m	cm ⁴	cm ³	cm ³	cm	cm ²	cm ⁴	cm ³	cm ³	cm	cm ⁴	cm ⁶										
HP 200 x 43	42.5	3888	388.8	434.5	8.47	19.85	1294	126.2	193.4	4.89	17.7	117.9	2	3	4	2	3	4				
HP 200 x 53	53.5	4977	488.0	551.3	8.55	24.89	1673	161.7	248.6	4.96	34.2	155.1	1	2	3	1	2	3				
HP 220 x 57	57.2	5729	545.6	613.7	8.87	28.63	2079	185.2	285.5	5.34	44.2	205.4	1	2	3	1	2	3				
HP 260 x 75	75.0	10650	855.1	958.5	10.56	39.14	3733	281.7	435.1	6.25	79.3	522.6	1	3	3	1	3	3				
HP 260 x 87	87.3	12590	994.9	1124	10.64	45.12	4455	333.7	516.2	6.33	115.7	634.2	1	1	3	1	1	3				
HP 305 x 79	78.9	16440	1099	1218	12.79	37.06	5326	347.7	531.2	7.28	51.4	1105	3	4	4	3	4	4				
HP 305 x 88	88.0	18420	1221	1360	12.82	41.61	5984	388.9	595.2	7.31	70.1	1252	3	3	4	3	3	4				
HP 305 x 95	94.9	20040	1320	1474	12.87	44.65	6529	423.0	648.0	7.35	86.7	s	2	3	3	2	3	3				
HP 305 x 110	110	23560	1531	1720	12.97	51.42	7709	496.2	761.7	7.42	131.4	1647	1	3	3	1	3	3				
HP 305 x 126	126	27410	1755	1986	13.06	58.91	9002	575.4	885.2	7.49	194.3	1951	1	2	3	1	2	3				
HP 305 x 149	149	33070	2076	2370	13.20	69.62	10910	690.5	1066	7.58	314.2	2414	1	1	1	1	1	1				
HP 305 x 180	180	40970	2508	2897	13.37	84.39	13550	847.4	1313	7.69	541.7	3077	1	1	1	1	1	1				
HP 305 x 186	186	42610	2596	3003	13.41	86.95	14140	881.5	1366	7.73	593.7	3230	1	1	1	1	1	1				
HP 305 x 223	223	52700	3119	3653	13.62	104.4	17580	1079	1680	7.87	998.4	4138	1	1	1	1	1	1				
HP 320 x 88	HP 320 x 89	HP 320 x 90	HP 320 x 91	1379	12.90	47.66	5634	370.6	572.1	7.07	99.0	1190	2	3	3	2	3	3				
HP 320 x 103	103	22050	1437	1611	12.97	54.84	6704	438.2	677.3	7.15	142.3	1435	1	3	3	1	3	3				
HP 320 x 117	117	25480	1638	1849	13.06	62.10	7815	507.5	785.5	7.23	198.5	1695	1	2	3	1	2	3				
HP 320 x 147	147	32670	2048	2338	13.22	76.86	10160	651.3	1011	7.37	357.1	2263	1	1	1	1	1	1				
HP 320 x 184	184	42340	2574	2979	13.44	95.76	13330	841.2	1311	7.54	662.0	3067	1	1	1	1	1	1				
HP 360 x 109	109	30630	1769	1956	14.86	48.59	10990	592.3	902.9	8.90	90.7	3053	3	4	4	3	4	4				
HP 360 x 133	133	37980	2158	2406	14.98	59.22	13680	731.9	1119	8.99	160.7	3864	3	3	4	3	3	4				
HP 360 x 152	152	43970	2468	2767	15.07	67.68	15880	844.5	1293	9.05	236.4	4543	2	3	3	2	3	3				
HP 360 x 174	174	51010	2823	3186	15.18	77.41	18460	975.6	1497	9.13	348.5	5360	1	2	3	1	2	3				
HP 360 x 180	180	53040	2923	3306	15.20	80.52	19140	1011	1552	9.13	387.2	5583	1	2	3	1	2	3				
HP 400 x 122	122	34770	1998	2212	14.93	52.89	13850	710.3	1082	9.42	118.7	3860	3	4	4	3	4	4				
HP 400 x 140	140	40270	2288	2547	15.02	60.49	16080	820.2	1252	9.49	175.3	4534	3	3	4	3	3	4				
HP 400 x 158	158	45940	2581	2888	15.10	68.17	18370	932.4	1425	9.55	248.0	5241	2	3	3	2	3	3				
HP 400 x 176	176	51770	2876	3235	15.19	75.93	20720	1047	1603	9.61	338.9	5982	1	3	3	1	3	3				
HP 400 x 194	194	57760	3174	3588	15.28	83.77	23150	1163	1784	9.67	450.2	6759	1	2	3	1	2	3				
HP 400 x 213	213	63920	3474	3947	15.37	91.69	25640	1282	1969	9.73	584.2	7574	1	1	3	1	1	3				
HP 400 x 231	231	70260	3777	4312	15.45	99.69	28200	1403	2158	9.79	743.1	8425	1	1	2	1	1	2				

Wpl : for plastic design, the shape must belong to class 1 or 2 in reference to the required rotation capacity.

UBP Welded Wide Flange Bearing Piles

UBP Welded
Wide flange bearing piles

Section		Dimensions				Area		Construction Dimensions for detailing		Surface		
	G kg/m	h mm	b mm	t mm	t mm	r mm	A cm²		h mm	d mm	A _s m²/m	A _s m²/t
UBP 203 x 203 x 45	44.9	200.2	205.9	9.50	9.50	10	57.2		181.2	161.2	1.187	26.43
UBP 203 x 203 x 54	53.9	204.0	207.7	11.30	11.40	10	68.7		181.2	161.2	1.199	22.22
UBP 254 x 254 x 63	63.0	247.1	256.6	10.60	10.70	13	80.2		225.7	199.7	1.478	23.46
UBP 254 x 254 x 71	71.0	249.7	258.0	12.00	12.00	13	90.4		225.7	199.7	1.486	20.94
UBP 254 x 254 x 85	85.1	254.3	260.4	14.40	14.30	13	108.4		225.7	199.7	1.500	17.63
UBP 305 x 305 x 79	78.9	299.3	306.4	11.00	11.10	15	100.5		277.1	247.1	1.776	22.52
UBP 305 x 305 x 88	88.0	301.7	307.8	12.40	12.30	15	112.1		277.1	247.1	1.784	20.28
UBP 305 x 305 x 95	94.9	303.7	308.7	13.30	13.30	15	120.9		277.1	247.1	1.790	18.85
UBP 305 x 305 x 110	110	307.9	310.7	15.30	15.40	15	140.1		277.1	247.1	1.802	16.39
UBP 305 x 305 x 126	126	312.3	312.9	17.50	17.60	15	160.6		277.1	247.1	1.815	14.40
UBP 305 x 305 x 149	149	318.5	316.0	20.60	20.70	15	189.9		277.1	247.1	1.834	12.30
UBP 305 x 305 x 186	186	328.3	320.9	25.50	25.60	15	236.9		277.1	247.1	1.863	10.02
UBP 305 x 305 x 223	223	337.9	325.7	30.30	30.40	15	284.0		277.1	247.1	1.892	8.487
UBP 356 x 368 x 109	109	346.4	371.0	12.80	12.90	15	138.7		320.6	290.6	2.125	19.51
UBP 356 x 368 x 133	133	352.0	373.8	15.60	15.70	15	169.4		320.6	290.6	2.142	16.11
UBP 356 x 368 x 152	152	356.4	376.0	17.80	17.90	15	193.7		320.6	290.6	2.155	14.18
UBP 356 x 368 x 174	174	361.4	378.5	20.30	20.40	15	221.5		320.6	290.6	2.170	12.48

Dimensions according to AS 4100 and AS/NZS 3679.2: 2017 Rolling margins according to AS/NZS 3679.2: 1993
Surface condition according to AS 4100 and AS/NZS 3679.2: 2004, class C, subclass 1 Delivery according to
ASTM A6/A6M upon request;

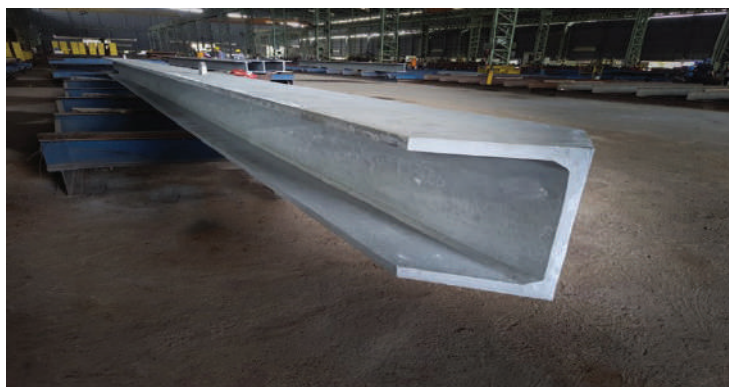
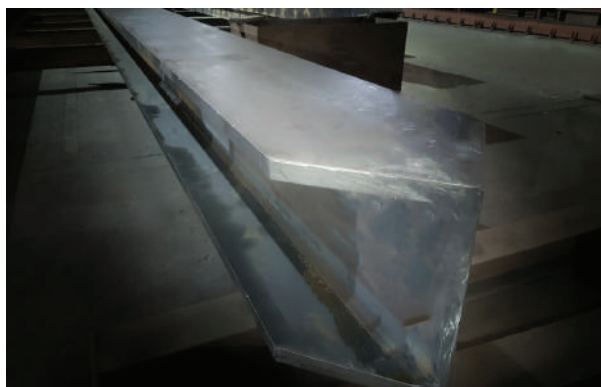
* Minimum tonnage and delivery conditions upon agreement.

UBP Welded Wide Flange Bearing Piles

UBP Welded Wide flange bearing Piles

Section	Section properties											Class EN 1993-1-1: 2005										EN 10025-2: 2004	EN 10025-4: 2004	EN 10225: 2009
	strong axis y-y					weak axis z-z					Pure bending y-y					Pure compression								
	G	I	W _{el,z}	W	i _y	A _{vz}	I _z	W _{el,z}	W _{pl,z}	I _z	I _t	I x10 ³	S ₂₃₅	S ₃₅₅	S ₄₆₀	S ₂₃₅	S ₃₅₅	S ₄₆₀						
	kg/m	l, cm ⁴	cm ³	cm ³	cm	cm ²	cm ⁴	cm ³	cm	cm ⁴	cm ⁴	cm ⁶												
UBP 203 x 203 x 45	44.9	4100	409.6	458.9	8.46	20.95	1384	134.4	206.1	4.92	20.80	125.7	2	3	3	2	3	3						
UBP 203 x 203 x 54	53.9	5027	492.8	556.7	8.55	24.98	1705	164.2	252.4	4.98	34.97	157.9	1	2	3	1	2	3						
UBP 254 x 254 x 63	63.0	8860	717.2	799.3	10.51	29.16	3016	235.1	359.7	6.13	37.20	421.0	3	3	4	3	3	4						
UBP 254 x 254 x 71	71.0	10070	806.7	904.0	10.56	32.96	3439	266.6	408.7	6.17	52.27	485.2	2	3	3	2	3	3						
UBP 254 x 254 v x 85	85.1	12280	966.1	1092	10.65	39.58	4215	323.8	497.9	6.24	87.82	606.0	1	2	3	1	2	3						
UBP 305 x 305 x 79	78.9	16440	1099	1218	12.79	37.06	5326	347.7	531.2	7.28	51.37	1105	3	4	4	3	4	4						
UBP 305 x 305 x 88	88.0	18420	1221	1360	12.82	41.61	5984	388.9	595.2	7.31	70.05	1252	3	3	4	3	3	4						
UBP 305 x 305 x 95	94.9	20040	1320	1474	12.87	44.65	6529	423.0	648.0	7.35	86.69	1375	2	3	3	2	3	3						
UBP 305 x 305 x 110	110	23560	1531	1720	12.97	51.42	7709	496.2	761.7	7.42	131.4	1647	1	3	3	1	3	3						
UBP 305 x 305 x 126	126	27410	1755	1986	13.06	58.91	9002	575.4	885.2	7.49	194.3	1951	1	2	3	1	2	3						
UBP 305 x 305 x 149	149	33070	2076	2370	13.20	69.62	10910	690.5	1066	7.58	314.2	2414	1	1	1	1	1	1						
UBP 305 x 305 x 186	186	42610	2596	3003	13.41	86.95	14140	881.5	1366	7.73	593.7	3230	1	1	1	1	1	1						
UBP 305 x 305 x 223	223	52700	3119	3653	13.62	104.4	17580	1079	1680	7.87	998.4	4138	1	1	1	1	1	1						
UBP 356 x 368 x 109	109	30630	1769	1956	14.86	48.59	10990	592.3	902.9	8.90	90.73	3053	3	4	4	3	4	4						
UBP 356 x 368 x 133	133	37980	2158	2406	14.98	59.22	13680	731.9	1119	8.99	160.7	3864	3	3	4	3	3	4						
UBP 356 x 368 x 152	152	43970	2468	2767	15.07	67.68	15880	844.5	1293	9.05	236.4	4543	2	3	3	2	3	3						
UBP 356 x 368 x 174	174	51010	2823	3186	15.18	77.41	18460	975.6	1497	9.13	348.5	5360	1	2	3	1	2	3						

Wpl : for plastic design, the shape must belong to class 1 or 2 in reference to the required rotation capacity.



HP Australian Welded wide Flange Bearing

HP Australian welded Wide Flange Bearing Piles

Section	Dimensions Dimensions Abmessungen						Area	Construction Dimensions for detailing		Surface	
	G kg/m	h mm	b mm	t _f mm	t _w mm	r mm	A cm ²	h mm	d mm	A _f m ² /m	A _w m ² /t
HP 200 x 43	43	200	205	9.0	9.0	10	54.1	182.0	162.0	1.185	27.88
HP 200 x 53	53	204	207	11.3	11.3	10	68.4	181.1	161.1	1.196	22.36
HP 250 x 62	62	246	256	10.5	10.7	13	80.0	225.0	199.0	1.473	23.50
HP 250 x 85	85	254	260	14.4	14.4	13	108.0	225.0	199.0	1.497	17.53
HP 310 x 79	79	299	306	11.0	11.0	15	100.0	277.1	247.1	1.774	22.67
HP 310 x 93	93	303	308	13.1	13.1	15	119.0	277.1	247.1	1.786	19.14
HP 310 x 110	110	308	310	15.4	15.5	15	141.0	277.1	247.1	1.799	16.29
HP 310 x 125	125	312	312	17.4	17.4	15	159.0	277.1	247.1	1.811	14.54
HP 310 x 132	132	314	313	18.3	18.3	15	167.3	277.1	247.1	1.818	13.84
HP 360 x 108	108	346	370	12.8	12.8	15	138.0	320.0	290.0	2.121	19.62
HP 360 x 132	132	351	373	15.6	15.6	15	168.0	320.0	290.0	2.137	16.19
HP 360 x 152	152	356	376	17.9	17.9	15	194.0	320.0	290.0	2.154	14.16
HP 360 x 174	174	361	378	20.4	20.4	15	222.0	320.0	290.0	2.167	12.47

General requirements of materials and Delivery are in accordance with ASTM A6/A6M latest edition.

+ Minimum order: 40 t per section and grade or upon agreement.

* Minimum tonnage and delivery conditions upon agreement.

section		Section properties											Class 1993-1-1: 2005						A572/A709/A992 A913		
		strong axis y-y					weak axis z-z					Pure bend- ing y-y			Pure com- pression						
		G lbs/ft	I _y cm ⁴	W _{ely} cm ³	W _{ply} cm ³	I _y cm	A _{vz} cm ²	I _z cm ⁴	W _{elz} cm ³	W _{ply} cm ³	i _z cm	I _t cm ⁴	I x10 ⁻³ cm ⁶	S ₂₃₅	S ₃₅₅	S ₄₆₀	S ₂₃₅	S ₃₅₅			S ₄₆₀
HP 8 x 29	29	3888	388.8	434.5	8.47	19.85	1294	126.2	193.4	4.89	17.7	118	2	3	3	2	3	3	✓		
HP 8 x 36	36	4977	488.0	551.3	8.55	24.89	1673	161.7	248.6	4.96	34.2	155	1	2	3	1	2	3	✓		
HP 10 x 42	42	8753	711.6	792.8	10.47	28.94	2995	234.0	358.0	6.13	37.0	414	3	3	4	3	3	4	✓	✓	
HP 10 x 57	57	12300	968.9	1096	10.64	39.70	4225	325.0	499.9	6.23	89.3	605	1	2	3	1	2	3	✓	✓	
HP 12 x 53	53	16270	1088	1207	12.77	36.91	5258	343.6	525.1	7.26	50.3	1089	3	4	4		3	4	4	✓	
HP 12 x 63	63	19630	1296	1447	12.85	43.84	6387	414.7	635.1	7.33	82.5	1340	3	3	4		3	3	4	✓	
HP 12 x 74	74	23660	1536	1727	12.97	51.63	7707	497.2	763.3	7.40	133.1	1646	1	3	3		1	3	3	✓	✓
HP 12 x 84	84	27030	1733	1960	13.05	58.41	8823	565.6	870.2	7.46	188.2	1911	1	2	3		1	2	3	✓	✓
HP 12 x 89	89	28680	1827	2072	13.10	61.53	9370	598.7	922.1	7.48	218.5	2044	1	1	3		1	1	3	✓	✓
HP 14 x 73	73	30290	1751	1937	14.83	48.42	10810	584.5	891.2	8.86	89.0	2999	3	4	4		3	4	4	✓	
HP 14 x 89	89	37480	2135	2381	14.93	58.93	13510	724.2	1107	8.96	158	3795	3	3	4		3	3	4	✓	✓
HP 14 x 102	102	43880	2465	2765	15.04	67.82	15880	844.5	1293	9.05	237	4532	2	3	3		2	3	3	✓	✓
HP 14 x 117	117	50840	2816	3180	15.15	77.53	18390	973.0	1493	9.11	349	5326	1	2	3		1	2	3	✓	✓

Wpl: for plastic design, the shape must belong to class 1 or 2 according to the required rotation capacity.

Steel Grades

Previous standards													
EN 10025-2: 2004	EN 10025: 1990 + A1: 1993	EN 10025: 1990	NF A 35-501	DIN 17100	BS 4360	UNE 36 080 NBN A21-101	UNI 7070	SS 14	NS 12 101	ONORM M1316	ASTM	CSA G 40-21	JIS G 3101 JIS G 3106
S235JR S235J0 S235J2*	S235JR S235JRG1 S235JRG2 S235J0 S235J2G3 S235J2G4	Fe360B Fe360BFU Fe360BFN Fe360C Fe360D1 Fe360D2	E24-2 E24-3 E24-4	St37-2 Ust37-2 RSt37-2 St37-3U St37-3N	40B 40C 40D	AE235B AE235B-FU AE235B-FN AE235C AE235D	Fe360B Fe360C Fe360D	13 11-00 13 12-00	NS 12 120 NS 12 122 NS 12 123 NS 12 124 NS 12 124	USt 360 B RSt 360 B St 360 C St 360 CE St 360 D			
S275JR S275J0 S275J2*	S275JR S275J0 S275J2G3 S275J2G4	Fe430B Fe430C Fe430D1 Fe430D2	E28-2 E28-3 E28-4	St44-2 St44-3U St44-3N	43B 43C 43D	AE255B AE255C AE255D	Fe430B Fe430C Fe430D	14 12-00 14 14-00 14 14-01	NS 12 142 NS 12 143 NS 12 143	St 430 B St 430 C St 430 CE St 430 D	A 36	260 W 300 W	SS 400 SM 400 A/B/C SS 400
S355JR	S355JR	Fe510B	E36-2		50B	AE355B	Fe510B				A 572 Gr.50 A 992 Gr.50	350 W	SS 490
S355J0 S355J2 S355K2	S355J0 S355J2G3 S355J2G4 S355K2G3 S355K2G4	Fe510C Fe510D1 Fe510D2 Fe510DD1 Fe510DD2	E36-3 E36-4	St52-3U St52-3N	50C 50D 50DD	AE355C AE355D AE355-DD	Fe510C Fe510D	21 32-01 21 34-01	NS 12 153 NS 12 153	St 510 C St 510 D			
S450J0	55C												
E295* E335* E360*	E295 E335 E360	Fe490-2 Fe590-2 Fe690-2	A50-2 A60-2 A70-2	St50-2 St60-2 St70-2		A490-2 A590-2 A690-2	Fe490 Fe590 Fe690	15 50-00/-01 16 50-00/-01 16 55-00/-01		St 490 St 590 St 690			

Special steel qualities

Steel grades according to other standards or particular specifications (chemical composition, mechanical properties, impact tests at lower test temperatures and higher energy values) can be agreed upon.

Delivery conditions upon request.

High Strength Steels with high notch toughness

Previous standards									
EN 10025-4: 2004	EN 10113-3: 1993	NF A 35-504 NF A 36-201	DIN 17102	BS 4360	UNI 7382	SS 14	ASTM	CSA G 40-21	JIS G 3101
S355M S355ML	S355M S355ML	E355	St E 355 TSt E 355	50 D 50 EE	Fe E 355 KG Fe E 355 KT	21 34-01 21 35-01	A 913 Gr.50		
								400 W	SM 490 YA SM 490 YB
S460M	S460M	E460R	St E 460	55 C	Fe E 355 KG		A 913 Gr.65		SM 570

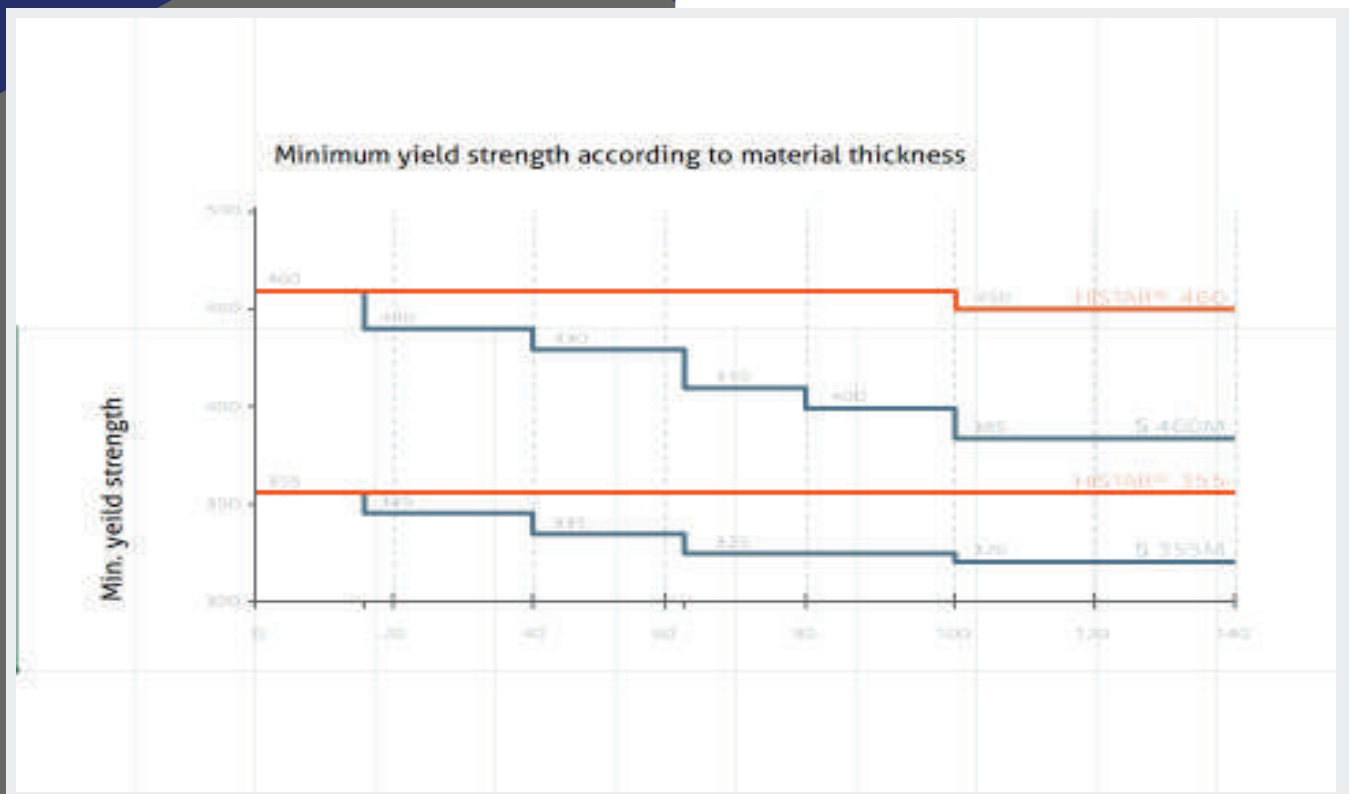
EnviroBeam™ trademark steels

ENVIROBEAM steels are structural steels combining high yield strength (up to 460 MPa) with excellent toughness at low temperature and outstanding weldability (typical carbon equivalent $\leq 0.41\%$). Substantial cost and weight savings can be achieved using ENVIROBEAM steels.

Mechanical Properties:

Steel grade Min.elongation Min.tensile strength Min. yield strength
Charpy V notch impact test longitudinal

	R_{eH} MPa	R_m Mpa	$L_0 = 5.65\sqrt{S_0}$ %	Temperature °C	Min. absorbed J
HISTAR 355	355	470 - 630	22	-20	40
HISTAR 460	460	540 - 720	17	-20	40



ENVIROBEAM grades are available for the shapes mentioned. Other sections in ENVIROBEAM grades upon request. The minimum yield strength for the structural steel grades according to Euronorm AS 4100 and AS/NZS 3679.2 is shown above in comparison to ENVIROBEAM grades.

Machining of EnviroBeam™ Steel

All ENVIROBEAM grades can be machined under the same conditions as standard steel grades of the same range of tensile steel strength.

Due to their low carbon equivalent all ENVIROBEAM grades offer an excellent weldability for all manual and automatic processes. No preheating is required for the normal range of heat inputs (about 10 to 60 kJ/cm).

Also for flame-cutting a preheating is not required in order to avoid cracking. If deformations have occurred during driving or handling, all ENVIROBEAM grades can be flamestraightened up to a temperature of 650°C without altering the mechanical properties of the steel.



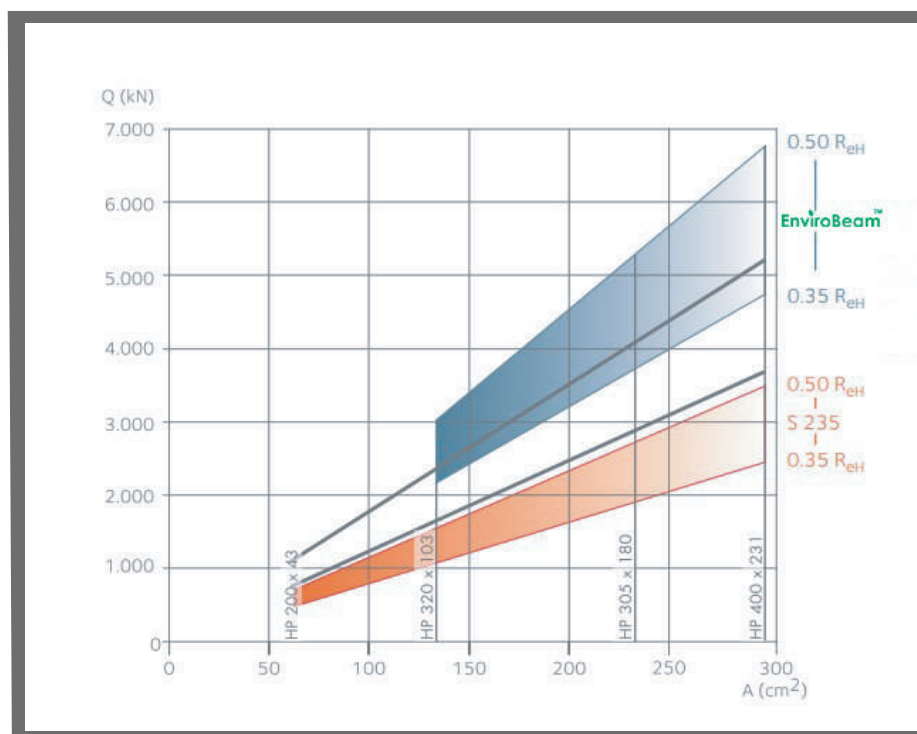
Economical use as steel foundations

The ENVIROBEAM steel grades allow an improved use of the HP bearing pile capabilities:

- » high dynamic stresses may occur during hard driving conditions without creating plastic deformations in the material;
- » the higher allowable steel stresses reduce the required section and the total steel volume needed;
- » provided sufficient soil strength, the bearing capacity of a given steel pile section may increase proportionally to the ratio of the yield points of the steel grades, thus reducing the required number of piles. This further results in substantial savings on pile driving costs as well as reduced pile cap dimensions;
- » the HISTAR bearing piles provide increased resistance against transverse loads from horizontal forces transmitted by the superstructure or lateral soil pressures.

Service loads for HP bearing piles

Axial service loads for the HP bearing piles based on an allowable design steel stresses between 35% and 50% of the yield strength f_y for the steel grades ENVIROBEAM 460, S 355 and S 235:

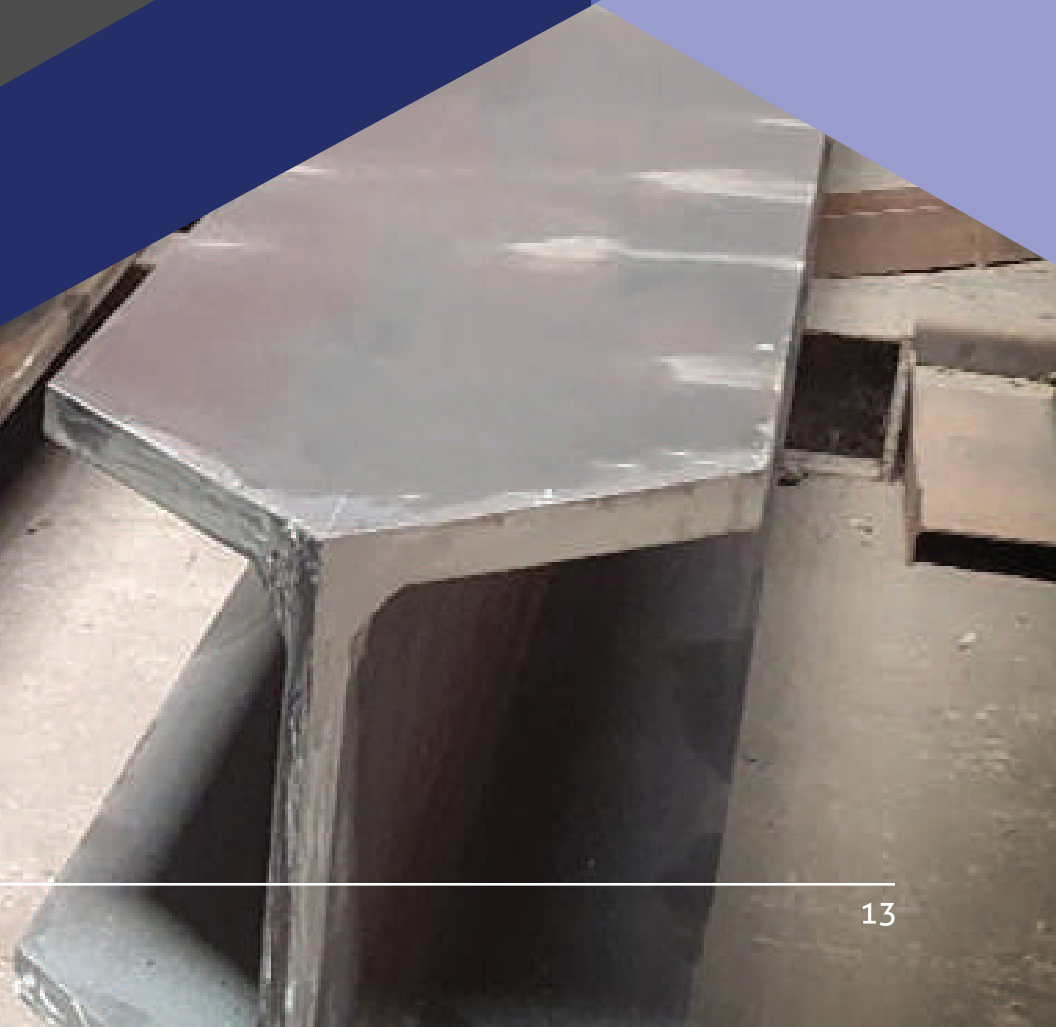


Important notes

The service loads Q , given on the previous figure as function of the steel area A , are shown as an example and are based only on the structural capacity of the steel sections.

When used as bearing piles or as deep foundation elements, it is imperative that the responsible engineer considers all system's interactions (pile soil-rock / bearing capacity) to achieve load and stress levels compatible with all design considerations.

The combination of a geotechnical site investigation, based on soil tests, with additional testing and inspection of the piles justify the use of high steel stress levels when site conditions allow for. The combination of a geotechnical site investigation, based on soil tests, with additional testing and inspection of the piles justify the use of high steel stress levels when site conditions allow for. Based on a geotechnical site investigation in combination with additional testing and inspection of the piles, high steel stress levels may be considered when the site conditions are favorable.



Technical deliver conditions

Rolling tolerances Rolling tolerances on dimensions, shape, weight and length according to AS/NZS 10034. Tolerances following standard	Minimum tonnage If not indicated differently in the section table, the minimum tonnage for any order is 5 tonnes per section, per quality, per length and per destination.
Dimensions Dimensions according to AS/NZS 10365: 2017	Term of delivery Please contact our local representative.
Maximum rolling length Minimum length: 9.0 m	

Designations according to AS/NZS 10365 and ASTM

AS/NZ 10365: 2017		ASTM A 6/A 6M [®]	
HP Profilé HP Section HP Profil	UBP Profilé UBP Section UBP Profil	Metric units	Imperial Units
HP 200 x 43 HP 200 x 53	UBP 203 x 203 x 45 UBP 203 x 203 x 54	HP 200 x 43 HP 200 x 53	HP 8 x 29 HP 8 x 36
HP 220 x 57	-	-	-
- HP 260 x 75 HP 260 x 87	UBP 254 x 254 x 63 UBP 254 x 254 x 71 UBP 254 x 254 x 85	- HP 250 x 63 HP 250 x 85	- HP 10 x 42 HP 10 x 57
HP 305 x 79 HP 305 x 88 HP 305 x 95 HP 305 x 110 HP 305 x 126 - HP 305 x 149 HP 305 x 180 HP 305 x 186 HP 305 x 223	UBP 305 x 305 x 79 UBP 305 x 305 x 88 UBP 305 x 305 x 95 UBP 305 x 305 x 110 UBP 305 x 305 x 126 - UBP 305 x 305 x 149 UBP 305 x 305 x 180 UBP 305 x 305 x 186 UBP 305 x 305 x 223	HP 310 x 79 - HP 310 x 93 HP 310 x 110 HP 310 x 125 HP 310 x 132 - - - -	HP 12 x 53 - HP 12 x 63 HP 12 x 74 HP 12 x 84 HP 12 x 89 - - - -
HP 320 x 88 HP 320 x 103 HP 320 x 117 HP 320 x 147 HP 320 x 184	- - - - -	- - - - -	- - - - -

HP 360 x 84	-	-	-
HP 360 x 109	UBP 356 x 368 x 109	HP 360 x 108	HP 14 x 73
HP 360 x 133	UBP 356 x 368 x 133	HP 360 x 132	HP 14 x 89
HP 360 x 152	UBP 356 x 368 x 152	HP 360 x 152	HP 14 x 102
HP 360 x 174	UBP 356 x 368 x 174	HP 360 x 174	HP 14 x 117
HP 360 x 180	UBP 356 x 368 x 180	-	-
HP 400 x 122	-	HP 410 x 131	HP 16 x 88
HP 400 x 140	-	HP 410 x 150	HP 16 x 101
HP 400 x 158	-	-	-
HP 400 x 176	-	HP 410 x 180	HP 16 x 121
HP 400 x 194	-	-	-
HP 400 x 213	-	HP 410 x 210	HP 16 x 141
HP 400 x 231	-	HP 410 x 241	HP 16 x 162

Notations & Formulas

According to EN 1933-1-1

A area of section

$$A = 2 \cdot t_f \cdot b + (h - 2 \cdot t_f) \cdot t_w + (4 - \pi) \cdot r^2$$

A_L coating area per unit length

$$A_L = [4 \cdot (b - 2 \cdot r) + 2 \cdot (h - t_w) + 2 \cdot \pi \cdot r] \frac{L}{L}$$

A_{tot} total area

$$A_{tot} = h \cdot b$$

b section width

d height of the straight web part

$$d = h - 2 \cdot t_f - 2 \cdot r$$

G mass per unit length

h depth of section

h_i inner depth between flanges

$$h_i = h - 2 \cdot t_f$$

I moment of inertia

$$I_y = \frac{1}{12} \cdot [b \cdot h^3 - (b - t_w) \cdot (h - 2 \cdot t_f)^3] + 0.03 \cdot r^4 + 0.2146 \cdot r^2 \cdot (h - 2 \cdot t_f - 0.4468 \cdot r)^2$$

$$I_z = \frac{1}{12} \cdot [2 \cdot t_f \cdot b^3 + (h - 2 \cdot t_f) \cdot t_w^3] + 0.03 \cdot r^4 + 0.2146 \cdot r^2 \cdot (t_w + 0.4468 \cdot r)^2$$

i radius of gyration

$$i_y = \sqrt{\frac{I_y}{A}} \quad i_z = \sqrt{\frac{I_z}{A}}$$

I_t torsional moment of inertia

$$I_t = \frac{2}{3} \cdot (b - 0.63 \cdot t_f) \cdot t_f^3 + \frac{1}{3} \cdot (h - 2 \cdot t_f) \cdot t_w^3 + 2 \cdot \frac{t_w}{t_f} \cdot \left(0.145 + 0.1 \cdot \frac{r}{t_f} \right) \cdot \left[\frac{(r + \frac{t_w}{2})^2 + (r + t_f)^2 - r^2}{2 \cdot r + t_f} \right]^4$$

P_o outer perimeter

$$P_0 = 2 \cdot (h + b)$$

r root radius

t_f flange thickness

t_w web thickness

W_{el} elastic section modulus

$$W_{el,y} = \frac{2 \cdot I_y}{h} \quad W_{el,z} = \frac{2 \cdot I_z}{b}$$

W_{pl} plastic section modulus

$$W_{pl,y} = \frac{t_w \cdot h^2}{b^2 \cdot t_f} + (b - t_w) \cdot (h - t_f) \cdot t_f + \frac{4 - \pi}{2} \cdot r^2 \cdot (h - 2 \cdot t_f) + \frac{3 \cdot \pi - 10}{3} \cdot r^3$$
$$W_{pl,z} = \frac{b^2 \cdot t_f}{2} + \frac{h - 2 \cdot t_f}{4} \cdot t_w^2 + r^3 \cdot \left(\frac{10}{3} - \pi \right) + \left(2 - \frac{\pi}{2} \right) \cdot t_w \cdot r^2$$

I_w warping constant
referred to the shear centre

$$I_w = \frac{t_f \cdot b^3}{24} \cdot (h - t_f)^2$$

Cross-section classification according to AS/NZS 3679.2
1993-1 -1: 2005

Class 1 - Cross-sections are those which can form a plastic hinge with the rotation capacity required for plastic analysis.

Class 2 - Cross-sections are those which can develop their plastic moment resistance, but have limited rotation capacity.

Class 3 - Cross-sections are those in which the calculated stress in the extreme compression fibre of the steel member can reach its yield strength, but local buckling is liable to prevent development of the plastic moment resistance.

Class 4 - Cross-sections are those in which it is necessary to make explicit allowances for the effects of local buckling when determining their moment resistance or compression resistance.

In the structural shapes tables, the classification of the sections is indicated for both cases "pure bending" about strong axis y-y (web in bending, flange in compression) and "pure compression" (web and flange in compression).

