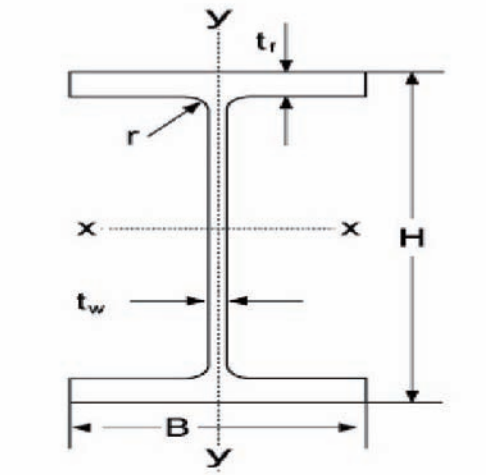
Sectional Properties

Narrow Parallel Flange Beams as per IS 12778 / (DIN 1025)

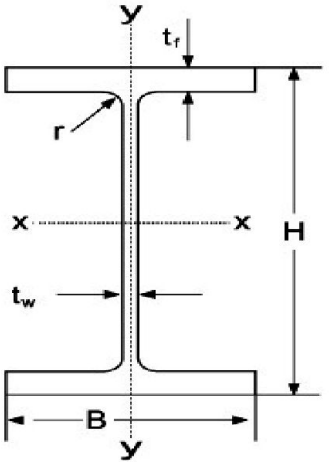
Beam (NPB)	Mass	Area	Dimensions					Sectional Properties							
			Depth	Width	Web Thick	Flange Thick	Root Rad	Moment of Inertia		Radius of Gyration		Section Modulus		Plastic Section Modulus	
	M	A	H	B	t_w	t_f	r	I_x	I_y	r_x	r_y	Z_x	Z_y	Z_{px}	Z_{py}
	kg/m	cm^2	mm	mm	mm	mm	mm	cm^4	cm^4	cm	cm	cm^3	cm^3	cm^3	cm^3
NPB 100X55	8.10	10.32	100	55	4.1	5.7	7	171.01	15.92	4.07	1.24	34.20	5.79	39.41	9.15
NPB 120X60	10.37	13.21	120	64	4.4	6.3	7	317.75	27.67	4.90	1.45	52.96	8.65	60.73	13.58
NPB 140X70	12.90	16.43	140	73	4.7	6.9	7	541.22	44.92	5.74	1.65	77.32	12.31	88.35	19.25
NPB 160X80	15.77	20.09	160	82	5	7.4	9	869.29	68.31	6.58	1.84	108.66	16.66	123.87	26.10
NPB 180X90	15.37	19.58	177	91	4.3	6.5	9	1062.74	81.89	7.37	2.05	120.08	18.00	135.34	27.96
NPB 180X90	18.80	23.95	180	91	5.3	8	9	1316.96	100.85	7.42	2.05	146.33	22.16	166.42	34.60
NPB 180X90	21.27	27.10	182	92	6	9	9	1505.23	117.29	7.45	2.08	165.41	25.50	189.16	39.91
NPB 200X100	18.43	23.47	197	100	4.5	7	12	1591.47	117.17	8.23	2.23	161.57	23.43	181.67	36.54
NPB 200X100	22.36	28.49	200	100	5.6	8.5	12	1943.17	142.37	8.26	2.24	194.32	28.47	220.66	44.62
NPB 200X100	25.09	31.96	202	102	6.2	9.5	12	2211.05	168.86	8.32	2.30	218.92	33.11	249.44	51.90
NPB 200X130	27.37	34.87	207	133	5.8	8.5	12	2665.50	334.05	8.74	3.10	257.54	50.23	288.18	77.47
NPB 200X130	31.56	40.20	210	134	6.4	10	12	3153.46	401.92	8.86	3.16	300.33	59.99	337.19	92.46
NPB 200X150	30.46	38.80	194	150	6	9	12	2674.64	507.03	8.30	3.62	275.74	67.60	306.78	103.54
NPB 200X165	35.69	45.46	201	165	6.2	10	12	3414.20	749.52	8.67	4.06	339.72	90.85	376.80	138.58
NPB 200X165	42.48	54.11	205	166	7.2	12	12	4165.96	915.97	8.77	4.11	406.43	110.36	454.30	168.46
NPB 200X165	48.00	61.14	210	166	6.5	14.5	12	5024.83	1106.37	9.07	4.25	478.56	133.30	534.68	202.43



Sectional Properties

Narrow Parallel Flange Beams as per IS 12778 / (DIN 1025)

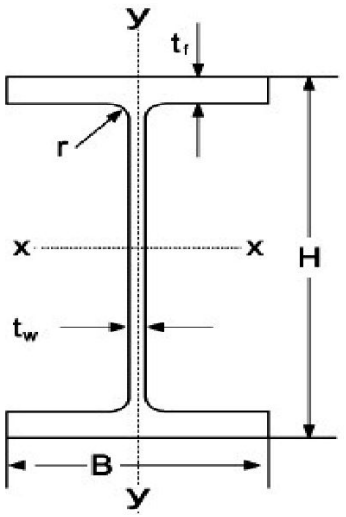
Beam (NPB)	Mass	Area	Dimensions					Sectional Properties							
			Depth	Width	Web Thick	Flange Thick	Root Rad	Moment of Inertia		Radius of Gyration		Section Modulus		Plastic Section Modulus	
	M	A	H	B	t_w	t_f	r	I_x	I_y	r_x	r_y	Z_x	Z_y	Z_{px}	Z_{py}
	kg/m	cm^2	mm	mm	mm	mm	mm	cm^4	cm^4	cm	cm	cm^3	cm^3	cm^3	cm^3
NPB 220X110	22.18	28.26	217	110	5	7.7	12	2316.51	171.42	9.05	2.46	213.50	31.17	240.23	48.49
NPB 220X110	26.20	33.37	220	110	5.9	9.2	12	2771.84	204.89	9.11	2.48	251.99	37.25	285.43	58.11
NPB 220X110	29.35	37.39	222	112	6.6	10.2	12	3134.05	239.83	9.16	2.53	282.35	42.83	321.17	66.91
NPB 240X120	26.15	33.32	237	120	5.2	8.3	15	3290.46	240.13	9.94	2.68	277.68	40.02	311.61	62.41
NPB 240X120 (IPE 240)	30.71	39.12	240	120	6.2	9.8	15	3891.62	283.63	9.97	2.69	324.30	47.27	366.68	73.93
NPB 240X120	34.32	43.72	242	122	7	10.8	15	4369.26	328.54	10.00	2.74	361.10	53.86	410.31	84.40
NPB 250X125	30.11	38.36	250	125	6	9	15	4138.18	294.32	10.39	2.77	331.05	47.09	373.65	73.63
NPB 250X150	34.08	43.41	258	146	6.1	9.2	15	5120.46	478.59	10.86	3.32	396.94	65.56	444.26	101.53
NPB 250X150	39.78	50.68	262	147	6.6	11.2	15	6200.00	594.53	11.06	3.43	473.28	80.89	530.17	124.91
NPB 250X150	46.49	59.22	266	148	7.6	13.2	15	7381.40	715.21	11.16	3.48	554.99	96.65	625.47	149.41
NPB 250X175	43.94	55.98	244	175	7	11	15	6091.39	984.25	10.43	4.19	499.29	112.49	555.60	172.49
NPB 270X135	30.74	39.15	267	135	5.5	8.7	15	4917.29	357.97	11.21	3.02	368.34	53.03	412.53	82.35
NPB 270X135 (IPE 270)	36.07	45.95	270	135	6.6	10.2	15	5789.78	419.87	11.23	3.02	428.87	62.20	484.04	96.96
NPB 270X135	42.26	53.84	274	136	7.5	12.2	15	6947.04	513.48	11.36	3.09	507.08	75.51	574.69	117.71



Sectional Properties

Narrow Parallel Flange Beams as per IS 12778 / (DIN 1025)

Beam (NPB)	Mass	Area	Dimensions					Sectional Properties							
			Depth	Width	Web Thick	Flange Thick	Root Rad	Moment of Inertia		Radius of Gyration		Section Modulus		Plastic Section Modulus	
	M	A	H	B	t_w	t_f	r	I_x	I_y	r_x	r_y	Z_x	Z_y	Z_{px}	Z_{py}
	kg/m	cm^2	mm	mm	mm	mm	mm	cm^4	cm^4	cm	cm	cm^3	cm^3	cm^3	cm^3
NPB 300X150 (IPE 300)	36.53	46.53	297	150	6.1	9.2	15	7173.49	518.97	12.42	3.34	483.06	69.20	541.83	107.33
NPB 300X150 (IPE 300)	42.25	53.82	300	150	7.1	10.7	15	8356.10	603.78	12.46	3.35	557.07	80.50	628.40	125.23
NPB 300X150 (IPE 300)	49.32	62.83	304	152	8	12.7	15	9994.20	745.72	12.61	3.45	657.51	98.12	743.86	152.59
NPB 300X165	39.88	50.80	310	165	5.8	9.7	15	8794.62	727.61	13.16	3.78	567.40	88.19	630.54	135.70
NPB 300X165	45.76	58.30	313	166	6.6	11.2	15	10210.04	855.57	13.23	3.83	652.40	103.08	727.91	158.77
NPB 300X165	53.47	68.11	317	167	7.6	13.2	15	12122.66	1026.84	13.34	3.88	764.84	122.98	857.61	189.65
NPB 350X250	79.18	100.87	340	250	9	14	18	21530.29	3650.06	14.61	6.02	1266.49	292.01	1402.36	446.20
NPB 400X180 (IPE 400)	57.38	73.10	397	180	7	12	21	20292.57	1170.59	16.66	4.00	1022.30	130.07	1144.02	202.09
NPB 400X180 (IPE 400)	66.31	84.47	400	180	8.6	13.5	21	23128.35	1317.82	16.55	3.95	1156.42	146.42	1307.26	229.02
NPB 400X180 (IPE 400)	75.66	96.39	404	182	9.7	15.5	21	26747.02	1564.25	16.66	4.03	1324.11	171.90	1502.29	269.11



Sectional Properties

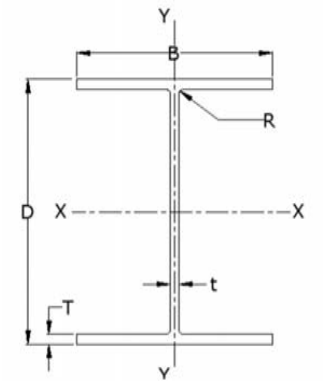
Narrow Parallel Flange Beams as per IS 12778 / (DIN 1025)

Beam (NPB)	Mass	Area	Dimensions					Sectional Properties							
			Depth	Width	Web Thick	Flange Thick	Root Rad	Moment of Inertia		Radius of Gyration		Section Modulus		Plastic Section Modulus	
	M	A	H	B	t_w	t_f	r	I_x	I_y	r_x	r_y	Z_x	Z_y	Z_{px}	Z_{py}
	kg/m	cm^2	mm	mm	mm	mm	mm	cm^4	cm^4	cm	cm	cm^3	cm^3	cm^3	cm^3
NPB 400X200	67.28	85.71	400	200	8	13	21	24223.63	1738.37	16.81	4.50	1211.18	173.84	1355.08	269.29
NPB 450X190 (IPE 450)	67.15	85.55	447	190	7.6	13.1	21	29758.80	1502.40	18.65	4.19	1331.49	158.15	1494.42	245.76
NPB 450X190 (IPE 450)	77.58	98.83	450	190	9.4	14.6	21	33742.91	1675.86	18.48	4.12	1499.69	176.41	1701.93	276.40
NPB 450X190 (IPE 450)	92.36	117.66	456	192	11	17.6	21	40923.40	2085.36	18.65	4.21	1794.89	217.23	2046.40	341.01
NPB 500X200 (IPE 500)	79.36	101.10	497	200	8.4	14.5	21	42933.41	1939.22	20.61	4.38	1727.70	193.92	1946.16	301.64
NPB 500X200 (IPE 500)	90.69	115.53	500	200	10.2	16	21	48198.50	2141.68	20.43	4.31	1927.94	214.17	2194.27	335.90
NPB 500X200 (IPE 500)	107.31	136.71	506	202	12	19	21	57777.26	2621.75	20.56	4.38	2283.69	259.58	2613.13	408.55
NPB 550X210 (IPE 550)	105.52	134.43	550	210	11.1	17.2	24	67116.46	2667.58	22.34	4.45	2440.60	254.06	2787.22	400.56
NPB 600X220 (IPE 600)	107.56	137.03	597	220	9.8	17.5	24	82918.80	3116.28	24.60	4.77	2777.85	283.30	3141.42	442.09
NPB 600X220 (IPE 600)	122.45	155.99	600	220	12	19	24	92083.40	3387.34	24.30	4.66	3069.45	307.94	3512.64	485.68
NPB 600X220 (IPE 600)	154.46	196.77	610	224	15	24	24	118302.06	4520.75	24.52	4.79	3878.76	403.64	4471.27	640.11
NPB 750X270 (IPE 750)	145.29	185.08	750	265	13.2	16.6	17	161957.86	5165.33	29.58	5.28	4318.88	389.84	5009.90	616.68
NPB 750X270 (IPE 750)	174.54	222.34	760	270	14.4	21.6	17	206350.6	7106.97	30.46	5.65	5430.28	526.44	6244.16	827.22
NPB 750X270 (IPE 750)	202.48	257.95	770	270	15.6	26.6	17	249536.79	8752.39	31.10	5.83	6481.48	648.33	7431.05	1016.07

SECTIONAL PROPERTIES

Wide Parallel Flange Beams as per IS 12778 / (DIN 1025)

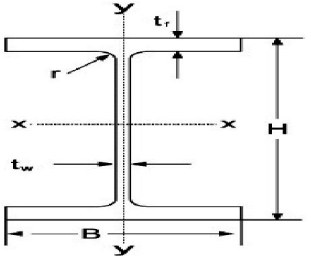
Beam (WPB)	Mass	Area	Dimensions					Sectional Properties							
			Depth	Width	Web Thick	Flange Thick	Root Rad	Moment of Inertia		Radius of Gyration		Section Modulus		Plastic Section Modulus	
	M	A	H	B	t_w	t_f	r	I_x	I_y	r_x	r_y	Z_x	Z_y	Z_{px}	Z_{py}
	kg/m	cm^2	mm	mm	mm	mm	mm	cm^4	cm^4	cm	cm	cm^3	cm^3	cm^3	cm^3
WPB 100x100	12.24	15.60	91	100	4.2	5.5	12	236.51	92.06	3.89	2.43	51.98	18.41	58.36	28.45
WPB 100x100	16.67	21.24	96	100	5	8	12	349.22	133.81	4.06	2.51	72.76	26.76	83.02	41.14
WPB 100x100	20.44	26.04	100	100	6	10	12	449.54	167.27	4.16	2.53	89.91	33.45	104.22	51.43
WPB 100x100	41.79	53.24	120	106	12	20	12	1142.61	399.15	4.63	2.74	190.44	75.31	235.82	116.32
WPB 120x120	14.57	18.55	109	120	4.2	5.5	12	413.36	158.81	4.72	2.93	75.85	26.47	84.13	40.63
WPB 120x120	19.89	25.34	114	120	5	8	12	606.15	230.90	4.89	3.02	106.34	38.48	119.50	58.86
WPB 120x120	26.70	34.01	120	120	6.5	11	12	864.37	317.52	5.04	3.06	144.06	52.92	165.22	80.97
WPB 120x120	52.13	66.41	140	126	12.5	21	12	2017.57	702.77	5.51	3.25	288.22	111.55	350.62	171.63
WPB 140x140	18.08	23.03	128	140	4.3	6	12	719.45	274.83	5.59	3.45	112.41	39.26	123.79	59.94
WPB 140x140	24.66	31.42	133	140	5.5	8.5	12	1033.13	389.32	5.73	3.52	155.36	55.62	173.51	84.85
WPB 140x140	33.72	42.96	140	140	7	12	12	1509.23	549.67	5.93	3.58	215.60	78.52	245.44	119.79
WPB 140x140	63.24	80.56	160	146	13	22	12	3291.36	1144.34	6.39	3.77	411.42	156.76	493.84	240.52
WPB 150x150	22.96	29.25	152	152	5.8	6.8	8	1243.48	398.36	6.52	3.69	163.62	52.42	181.56	79.98
WPB 150x150	30.11	38.36	158	153	6.5	9.4	8	1761.41	561.58	6.78	3.83	222.96	73.41	248.94	111.77
WPB 150x150	36.97	47.09	162	154	8	11.5	8	2213.83	700.81	6.86	3.86	273.31	91.01	308.90	138.91
WPB 160x160	23.84	30.37	148	160	4.5	7	15	1282.88	478.73	6.50	3.97	173.36	59.84	190.43	91.37
WPB 160x160	30.44	38.78	152	160	6	9	15	1672.97	615.57	6.57	3.98	220.13	76.95	245.17	117.64
WPB 160x160	42.59	54.26	160	160	8	13	15	2492.00	889.23	6.78	4.05	311.50	111.15	353.98	169.97
WPB 160x160	76.19	97.06	180	166	14	23	15	5098.26	1758.77	7.25	4.26	566.47	211.90	674.58	325.47



Sectional Properties

Wide Parallel Flange Beams as per IS 12778 / (DIN 1025)

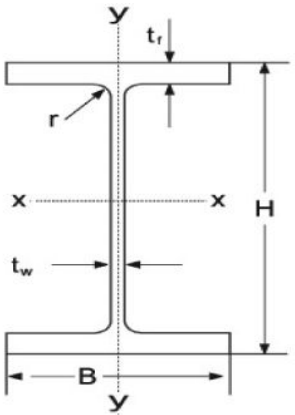
Beam (WPB)	Mass	Area	Dimensions					Sectional Properties							
			Depth	Width	Web Thick	Flange Thick	Root Rad	Moment of Inertia		Radius of Gyration		Section Modulus		Plastic Section Modulus	
	M	A	H	B	t_w	t_f	r	I_x	I_y	r_x	r_y	Z_x	Z_y	Z_{px}	Z_{py}
	kg/m	cm^2	mm	mm	mm	mm	mm	cm^4	cm^4	cm	cm	cm^3	cm^3	cm^3	cm^3
WPB 200x200 (HE 200 A)	42.26	53.84	190	200	6.5	10	18	3692.15	1335.51	8.28	4.98	388.65	133.55	429.52	203.83
WPB 200x200 (HE 200 B)	61.30	78.09	200	200	9	15	18	5696.17	2003.37	8.54	5.07	569.62	200.34	642.58	305.82
WPB 220x220 (HE 220 A)	50.51	64.35	210	220	7	11	18	5409.69	1954.56	9.17	5.51	515.21	177.69	568.50	270.61
WPB 220x220 (HE 220 B)	71.47	91.05	220	220	9.5	16	18	8090.96	2843.26	9.43	5.59	735.54	258.48	827.09	393.89
WPB 240x240 (HE 240 A)	60.32	76.84	230	240	7.5	12	21	7763.17	2768.81	10.05	6.00	675.06	230.73	744.68	351.71
WPB 240x240 (HE 240 B)	83.20	105.99	240	240	10	17	21	11259.29	3922.66	10.31	6.08	938.27	326.89	1053.20	498.44
WPB 260x260 (HE 260 A)	68.16	86.83	250	260	7.5	12.5	24	10454.94	3667.56	10.97	6.50	836.39	282.12	919.85	430.19
WPB 260x260 (HE 260 B)	92.99	118.45	260	260	10	17.5	24	14919.41	5134.51	11.22	6.58	1147.65	394.96	1282.99	602.27
WPB 280x280 (HE 280 A)	76.36	97.27	270	280	8	13	24	13673.28	4762.64	11.86	7.00	1012.84	340.19	1112.31	518.16
HE 280 B	103.13	131.37	280	280	10.5	18	24	19270.25	6594.52	12.11	7.08	1376.45	471.04	1534.52	717.60
WPB 300x300 (HE 300 A)	88.34	112.54	290	300	8.5	14	27	18263.47	6309.55	12.74	7.49	1259.55	420.64	1383.39	641.20
WPB 300x300	100.84	128.47	294	300	10	16	27	21046.24	7211.39	12.80	7.49	1431.72	480.76	1584.33	733.49
WPB 300x300 (HE 300 B)	117.04	149.09	300	300	11	19	27	25165.65	8562.82	12.99	7.58	1677.71	570.85	1868.79	870.18
WPB 300x300	237.92	303.09	340	310	21	39	27	59200.98	19403.07	13.98	8.00	3482.41	1251.81	4077.79	1913.22



SECTIONAL PROPERTIES

Wide Parallel Flange Beams as per IS 12778 / (DIN 1025)

Beam (WPB)	Mass	Area	Dimensions					Sectional Properties							
			Depth	Width	Web Thick	Flange Thick	Root Rad	Moment of Inertia		Radius of Gyration		Section Modulus		Plastic Section Modulus	
	M	A	H	B	t_w	t_f	r	I_x	I_y	r_x	r_y	Z_x	Z_y	Z_{px}	Z_{py}
	kg/m	cm^2	mm	mm	mm	mm	mm	cm^4	cm^4	cm	cm	cm^3	cm^3	cm^3	cm^3
WPB 320x300 (HE 320 A)	97.64	124.38	310	300	9	15.5	27	22928.56	6985.23	13.58	7.49	1479.26	465.68	1628.22	709.78
WPB 320x300 (HE 320 B)	126.66	161.35	320	300	11.5	20.5	27	30823.51	9238.82	13.82	7.57	1926.47	615.92	2149.37	939.13
WPB 340x300 (HE 340 A)	104.79	133.48	330	300	9.5	16.5	27	27693.07	7435.99	14.40	7.46	1678.37	495.73	1850.62	755.98
WPB 340x300 (HE 340)	134.16	170.91	340	300	12	21.5	27	36656.36	9689.93	14.65	7.53	2156.26	646.00	2408.25	985.76
WPB 360x300 (HE 360 A)	112.07	142.77	350	300	10	17.5	27	33089.75	7886.84	15.22	7.43	1890.84	525.79	2088.63	802.32
WPB 360x300 (HE 360 B)	141.81	180.64	360	300	12.5	22.5	27	43193.42	10141.16	15.46	7.49	2399.63	676.08	2683.14	1032.53
WPB 400x300 (HE 400 A)	124.81	158.99	390	300	11	19	27	45069.35	8563.82	16.84	7.34	2311.25	570.92	2561.97	872.90
WPB 400x300 (HE 400 B)	155.26	197.79	400	300	13.5	24	27	57680.48	10819.03	17.08	7.40	2884.02	721.27	3231.91	1104.08
WPB 450x300 (HE 450 A)	139.76	178.04	440	300	11.5	21	27	63721.58	9465.32	18.92	7.29	2896.44	631.02	3216.07	965.57
WPB 450x300 (HE 450 B)	171.12	217.99	450	300	14	26	27	79887.52	11721.32	19.14	7.33	3550.56	781.42	3982.57	1197.70



Sectional Properties

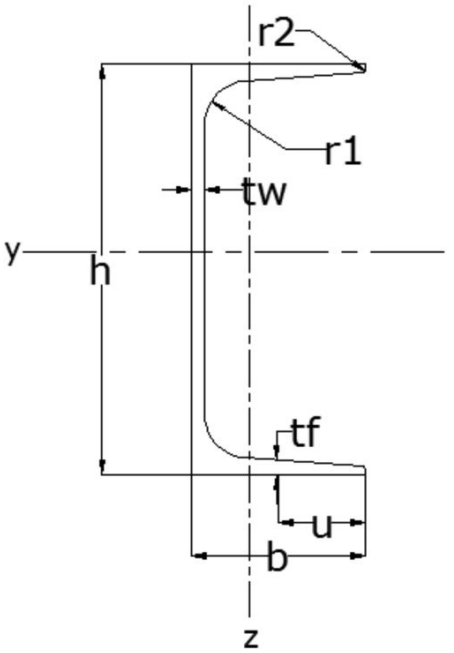
W Beam Section ASTM A6

Designation	Dimensions				Weight	Static Parameters			
						Moment of Inertia		Section Modulus	
Metric	Depth	Width	Web Thickness	Sectional Area		Ix	Iy	Wx	Wy
(mm x mm x kg/m)	(mm)	(mm)	(mm)	(cm^2)	(kg/m)	(cm^4)	(cm^4)	(cm^3)	(cm^3)
W 100 x 100 x 19.3	106	103	7.1	24.7	19.3	475.9	160.6	89.9	31.2
W 130 x 130 x 23.8	127	127	6.1	30.4	23.8	885.5	311	139.5	49
W 130 x 130 x 28.1	131	128	6.9	35.9	28.1	1099	381.4	167.7	59.6
W 150 x 100 x 13.0	148	100	4.3	16.3	13	622.8	83.0	83.2	16.7
W 150 x 100 x 13.5	150	100	4.3	17.3	13.5	685.5	91.8	91.4	18.4
W 150 x 100 x 18.0	153	102	5.8	22.9	18	915.9	125.9	122.1	25.4
W 150 x 100 x 24.0	160	102	6.6	30.6	24	1342	182.6	167.8	35.8
W 150 x 150 x 22.5	152	152	5.8	28.6	22.5	1206	386.6	158.6	50.9
W 150 x 150 x 29.8	157	153	6.6	37.9	29.8	1714	555.5	218.4	72.6

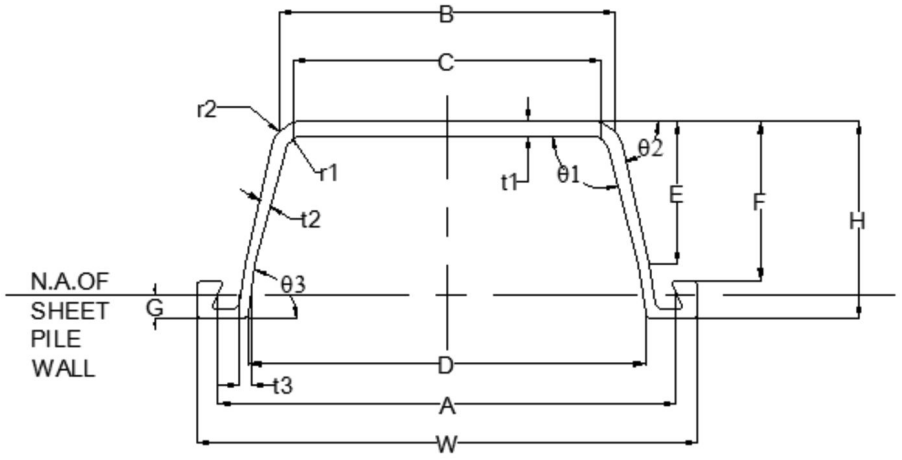
SECTIONAL PROPERTIES

Channels UPN as per DIN 1026-1

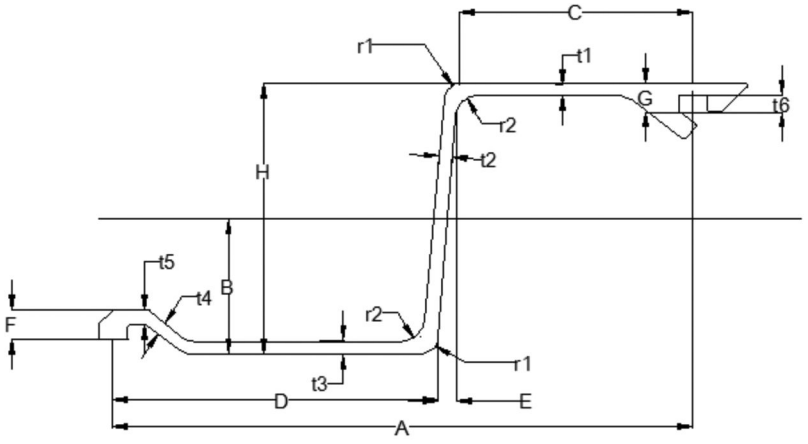
Dimensions	Dimensions							slope	Area	Mass	axis y-y					axis z-z			
	h	b	t_w	t_f	r_1	r_2	u		A	G	I_y	$W_{el.y}$	$W_{pl.y}$	i_y	A_{yz}	I_z	$W_{el.z}$	$W_{pl.z}$	i_z
	mm	mm	mm	mm	mm	mm	mm	%	mm^2	kg/m	mm^4x10_4	mm^3x10_3	mm^3x10_3	mm	mm^2	mm^4x10_4	mm^3x10_3	mm^3x10_3 </SUP	mm
UPN 200	200	75	8.5	11.5	11.5	6	37.5	8	3220	25.3	1910	191	228	77	1771	148	27	51.8	21.4
UPN 220	220	80	9	12.5	12.5	6.5	40	8	3740	29.4	2690	245	292	84.8	2062	197	33.6	64.1	23
UPN 240	240	85	9.5	13	13	6.5	42.5	8	4230	33.2	3600	300	358	92.2	2371	248	39.6	75.7	24.2
UPN 260	260	90	10	14	14	7	45	8	4830	37.9	4820	371	442	99.9	2712	317	47.7	91.6	25.6
UPN 280	280	95	10	15	15	7.5	47.5	8	5330	41.8	6280	448	532	109	2928	399	57.2	109	27.4
UPN 300	300	100	10	16	16	8	50	8	5880	46.2	8030	535	632	117	3177	495	67.8	130	29
UPN 320	320	100	14	17.5	17.5	8.75	43	5	7580	59.5	10870	679	826	121	4711	597	80.6	152	28.1
UPN 350	350	100	14	16	16	8	43	5	7730	60.6	12840	734	918	129	5084	570	75	143	27.2
UPN 400	400	110	14	18	18	9	48	5	9150	71.8	20350	1020	1240	149	5855	846	102	190	30.4



PILING SECTIONS - DIMENSIONS



U - TYPE PILING SECTIONS



Z - TYPE PILING SECTIONS

NOMINAL DIMENSIONS OF U - TYPE PILING SECTIONS																	
Designation	**W**	**H**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**t_1**	**t_2**	**t_3**	**t_4**	**t_5**	**t_6**	**r_1**	**r_2**
ISPS 1625 U	437	172	402.5	295.7	275.8	347.5	124.5	139.2	20.9	13	9	8.2	105	77	82.5	17	28
ISPS 2222 U	458	194.5	420	304	282	364.5	147.2	161	21.8	14	9.5	8.5	105	77	82.5	28	35

NOMINAL DIMENSIONS OF Z - TYPE PILING SECTIONS																
Designation	**H**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**t_1**	**t_2**	**t_3**	**t_4**	**t_5**	**t_6**	**r_1**	**r_2**
ISPS 1021 Z	185	400	92.5	165	221	14	20	20	8.5	7.5	8.5	9.5	9.5	9.5	12	16
ISPS 1481 Z	210	400	105	165	220	15	23	23	11.5	8.5	11.5	12.5	12.5	12.5	14	18

All dimensions are in millimeter