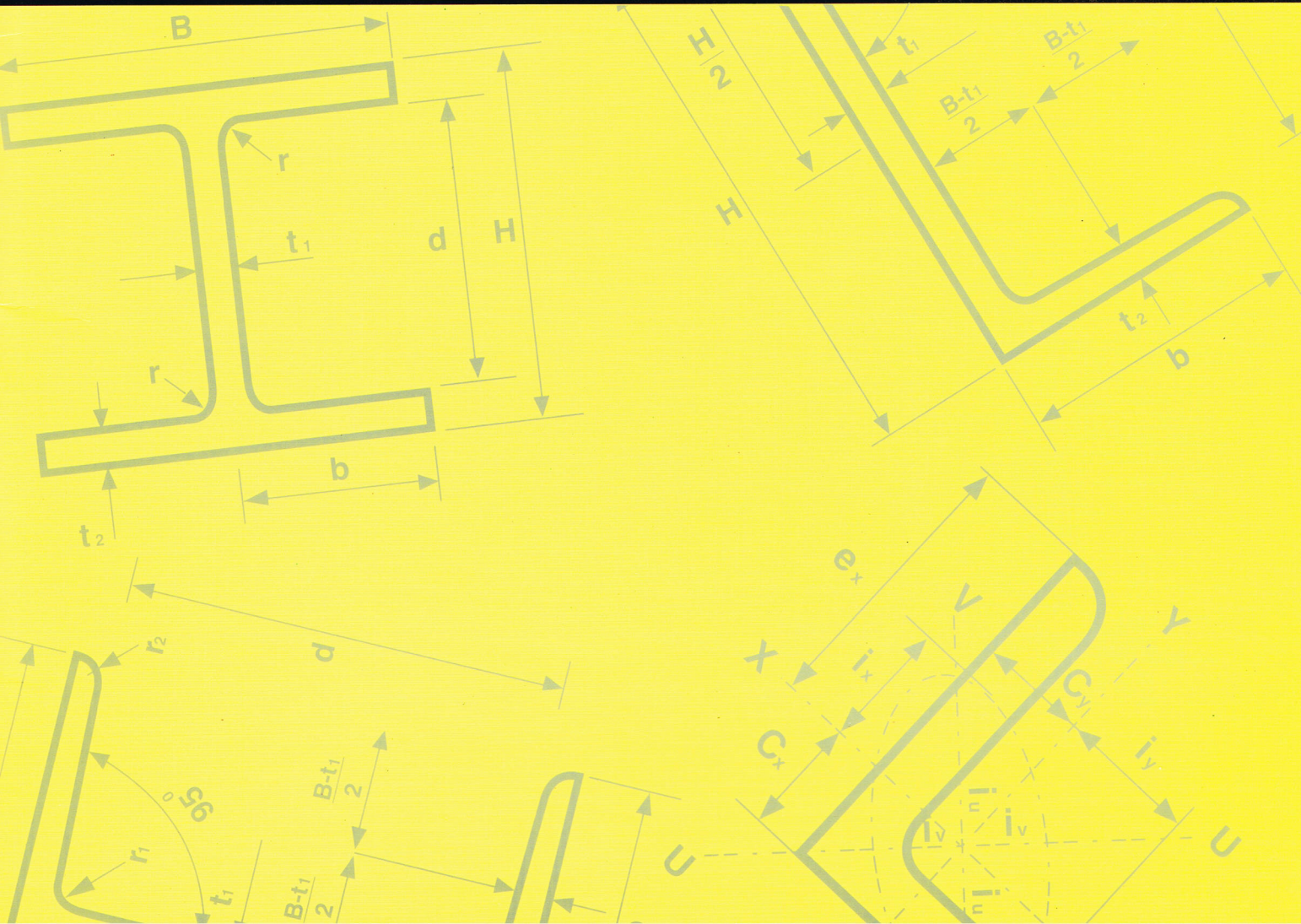
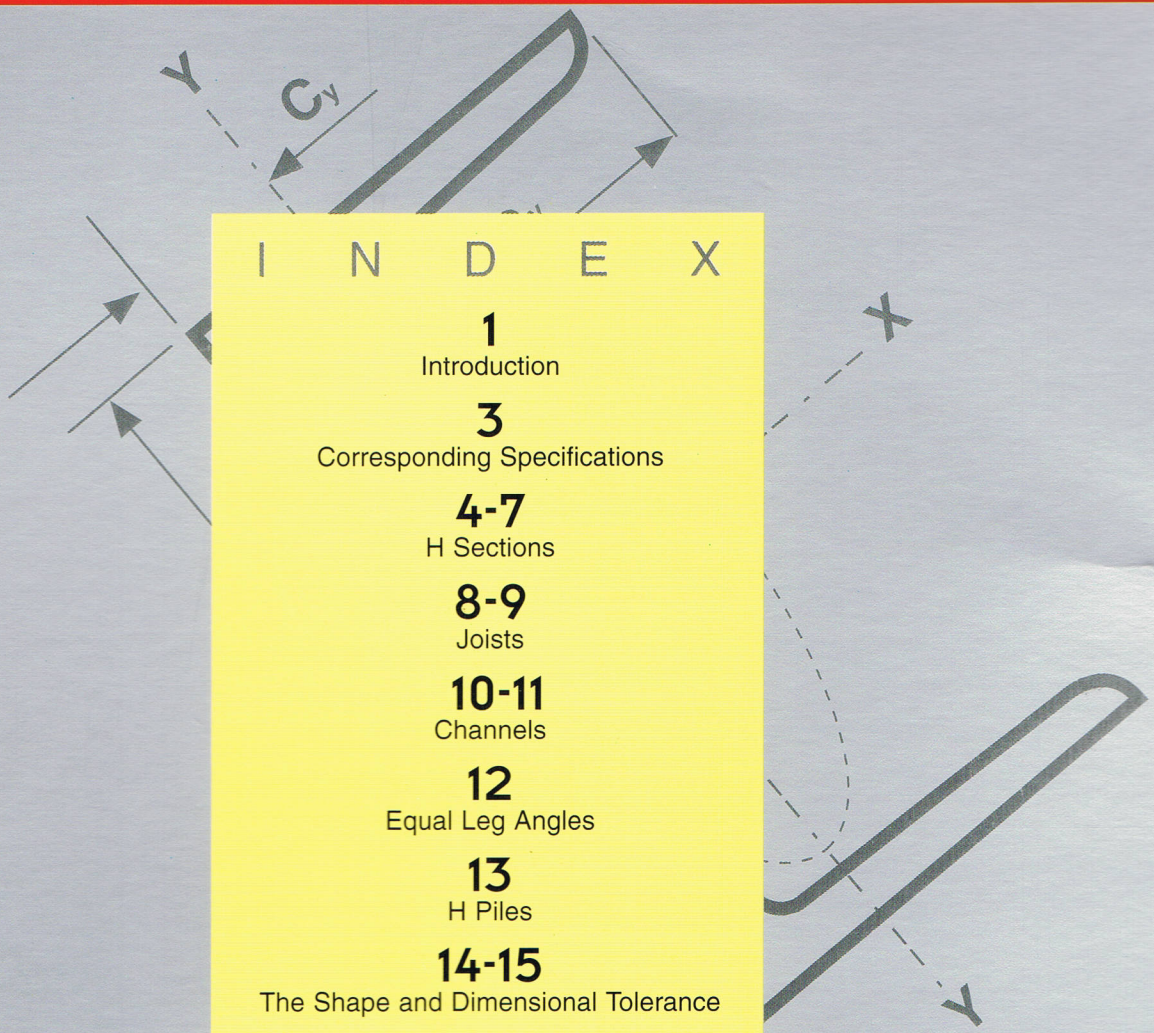
PERWAJA

STRUCTURAL SECTION





INDEX

INTRODUCTION

From an agricultural-based economy of past decades, Malaysia is now progressing towards a newly industrialised nation. To meet the demands of this tremendous growth, Perwaja Rolling Mill and Development Sdn. Bhd. was commissioned in July 1996 to produce medium and heavy sections. These world-class sections produced by state-of-the-art equipment mark a new era of Malaysia's steel industry towards an industrialised status.

SIRIM

Organisation

SIRIM QAS

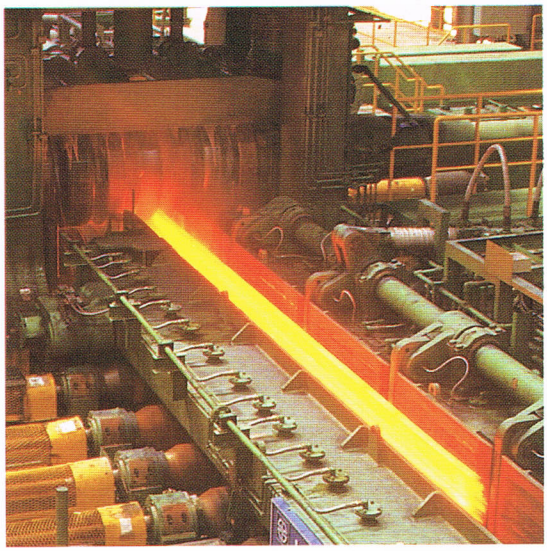
Product

PSB SINGAPORE

Organisation

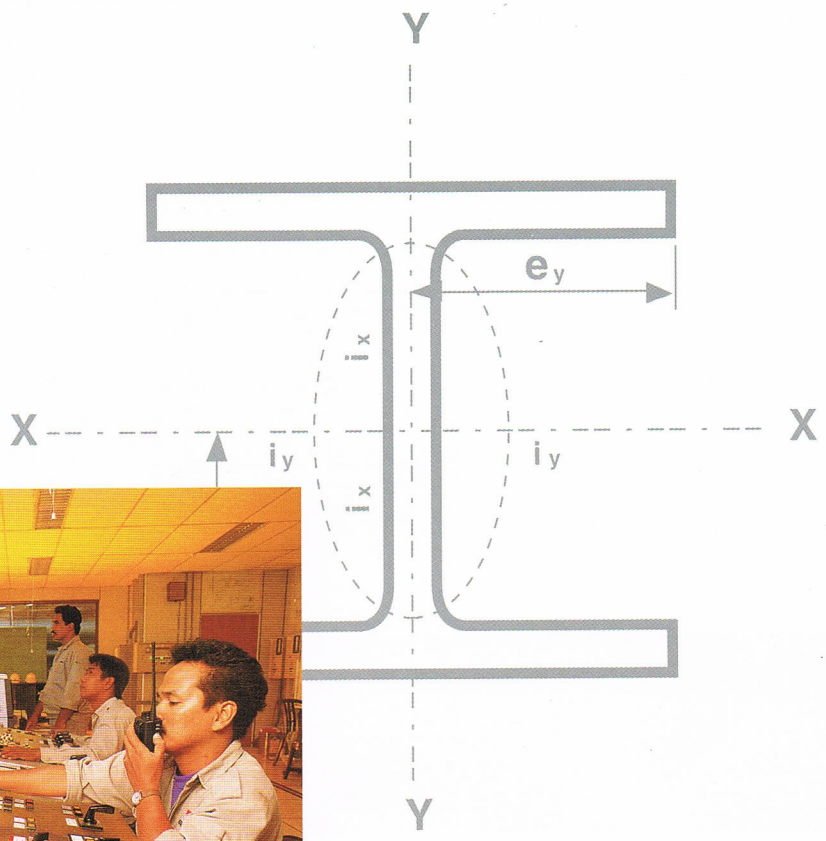
SINGAPORE QUALITY MARK

Product



CORRESPONDING SPECIFICATIONS

Material Quality and Applicable Standard



APPLICABLE STANDARD

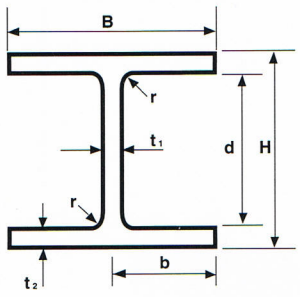
Standard	Code	Grade
BS	BS 4360	43 A, 50 B etc
JIS	JIS G 3101 JIS G 3106 JIS G 3136	SS 400, SS 490 etc SM 400, SM 490 etc SN 400, SN 490 etc
Other domestic and foreign grade specification can be met on request		

PRODUCT SPECIFICATION (WELDABLE QUALITY)

Specification	Grade	Chemical Composition						Tensile Test		Impact Test
		C	Si	Mn	P	S	Others	Yield Point N/mm^2	Tensile Strength N/mm^2	Energy J
BS 4360	43 A	≤0.25	≤0.50	≤1.60	≤0.05	≤0.05		275	430-580	-
	50 B	≤0.20	≤0.50	≤1.50	≤0.05	≤0.05		355	490-640	27
Available length: 6, 9,12m at 1m pitch										

SPECIFIC SECTIONAL DIMENSIONS, SECTIONAL AREA, UNIT MASS AND SECTIONAL CHARACTERISTICS

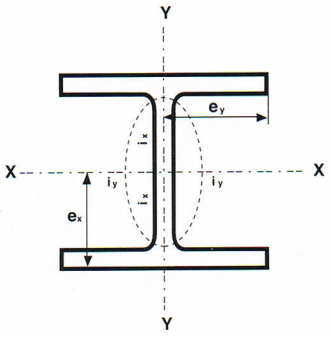
H-SECTIONS



Nominal Dimension	Mass Per Metre	Sectional Area	Depth Of Section	Width Of Section	Thickness		Root Radius	Depth Of Straight Portion Of Web	Ratio Of Buckling	
	kg/m	A cm^2	H mm	B mm	Web t_1 mm	Flange t_2 mm	r mm	d mm	Flange b/t_2	Web d/t_1
150 x 150	31.1	39.65	150	150	7	10	8	114	7.50	16.3
175 x 175	40.4	51.43	175	175	7.5	11	13	127	7.95	16.9
200 x 100	17.8	22.69	198	99	4.5	7	8	168	7.07	37.3
	20.9	26.67	200	100	5.5	8	8	168	6.25	30.5
200 x 150	29.9	38.11	194	150	6	9	8	160	8.33	26.7
200 x 200	49.9	63.53	200	200	8	12	13	150	8.33	18.8
	56.2	71.53	200	204	12	12	13	150	8.50	12.5
250 x 125	25.1	31.99	248	124	5	8	8	216	7.75	43.2
	29.0	36.97	250	125	6	9	8	216	6.94	36.0
250 x 175	43.6	55.49	244	175	7	11	13	196	7.95	28.0
250 x 250	63.8	81.31	244	252	11	11	13	196	11.45	17.8
	71.8	91.43	250	250	9	14	13	196	8.93	21.8
	81.6	103.9	250	255	14	14	13	196	9.11	14.0
300 x 150	32.0	40.80	298	149	5.5	8	13	256	9.31	46.5
	36.7	46.78	300	150	6.5	9	13	256	8.33	39.4
300 x 200	55.8	71.05	294	200	8	12	13	244	8.33	30.5
300 x 300	83.5	106.3	294	302	12	12	13	244	12.58	20.3
	93.0	118.5	300	300	10	15	13	244	10.00	24.4
	105	133.5	300	305	15	15	13	244	10.17	16.3
350 x 175	41.2	52.45	346	174	6	9	13	302	9.67	50.3
	49.4	62.91	350	175	7	11	13	302	7.95	43.1

SPECIFIC SECTIONAL DIMENSIONS, SECTIONAL AREA, UNIT MASS AND SECTIONAL CHARACTERISTICS

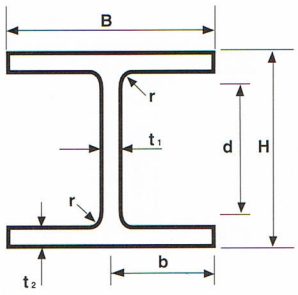
H-SECTIONS



Moment Of Inertia		Radius Of Gyration		Elastic Section Modulus		Plastic Section Modulus		Buckling Parameter	Torsional Index	Warping Constant	Torsional Constant
Ix	Iy	ix	iy	Zx	Zy	Sx	Sy	u	x	H	J
Axis x-x cm^4	Axis y-y cm^4	Axis x-x cm	Axis y-y cm	Axis x-x cm^3	Axis y-y cm^3	Axis x-x cm^3	Axis y-y cm^3			dm^6	cm^4
1623	563	6.40	3.77	216	75.1	243.0	114.4	0.841	14.00	0.028	12.70
2895	984	7.50	4.37	331	112	370.3	171.6	0.845	14.41	0.066	21.34
1543	113	8.25	2.24	156	22.9	175.4	35.5	0.883	28.27	0.010	3.32
1806	134	8.23	2.24	181	26.7	205.1	41.6	0.878	24.68	0.012	5.17
2625	507	8.30	3.65	271	67.6	301.0	103.1	0.876	21.05	0.043	9.43
4716	1601	8.62	5.02	472	160	525.5	243.8	0.846	15.44	0.141	30.16
4982	1702	8.35	4.88	498	167	565.5	257.3	0.826	13.63	0.150	43.59
3450	255	10.4	2.82	278	41.1	311.6	63.2	0.884	31.91	0.037	5.80
3965	294	10.4	2.82	317	47.0	358.1	72.7	0.880	28.26	0.043	8.61
6037	984	10.44	4.21	495	112.4	550.5	172.1	0.883	21.31	0.133	21.26
8703	2937	10.3	6.01	713	233.1	797.1	357.2	0.828	18.70	0.398	40.45
10748	3648	10.89	6.32	860	292	952.6	443.1	0.847	17.03	0.508	56.24
11399	3876	10.5	6.11	912	304	1030.7	467.5	0.826	15.12	0.539	81.12
6318	442	12.4	3.29	424	59.3	475.1	91.8	0.880	35.36	0.093	8.79
7209	507	12.4	3.29	481	67.7	542.1	105.1	0.876	31.58	0.107	12.73
11114	1602	12.5	4.75	756	160	841.8	245.3	0.882	23.87	0.318	31.77
16640	5514	12.5	7.20	1132	365	1259.8	558.2	0.829	21.20	1.095	60.30
20186	6753	13.1	7.55	1346	450	1483.9	682.9	0.847	19.29	1.371	82.87
21311	7102	12.6	7.30	1421	466	1596.4	714.4	0.828	17.32	1.440	115.71
11036	791	14.5	3.88	638	91.0	712.5	140.1	0.881	37.91	0.224	13.28
13500	984	14.6	3.96	771	112	864.2	173.4	0.883	32.11	0.282	22.47

SPECIFIC SECTIONAL DIMENSIONS, SECTIONAL AREA, UNIT MASS AND SECTIONAL CHARACTERISTICS

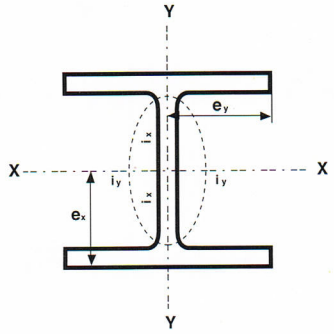
H-SECTIONS



Nominal Dimension	Mass Per Metre	Sectional Area	Depth Of Section	Width Of Section	Thickness		Root Radius	Depth Between Fillets	Ratio Of Buckling	
	kg/m	A cm^2	H mm	B mm	Web t_1 mm	Flange t_2 mm	r mm	d mm	Flange b/t_2	Web d/t_1
350 x 250	78.1	99.53	340	250	9	14	13	286	8.93	31.8
350 x 350	105.0	133.3	338	351	13	13	13	286	13.50	22.0
	113.0	144.0	344	348	10	16	13	286	10.88	28.6
	129.3	164.7	344	354	16	16	13	286	11.06	17.8
	135.0	171.9	350	350	12	19	13	286	9.21	23.8
	154.2	196.4	350	357	19	19	13	286	9.39	15.1
400 x 200	56.1	71.41	396	199	7	11	13	348	9.05	49.7
	65.4	83.37	400	200	8	13	13	348	7.69	43.5
400 x 300	105.0	133.3	390	300	10	16	13	332	9.38	33.2
450 x 200	65.1	82.97	446	199	8	12	13	396	8.29	49.5
	74.9	95.43	450	200	9	14	13	396	7.14	44.0
450 x 300	120.8	153.9	440	300	11	18	13	378	8.33	34.4
500 x 200	77.9	99.29	496	199	9	14	13	442	7.11	49.1
	88.2	112.3	500	200	10	16	13	442	6.25	44.2
	102.0	129.35	506	201	11	19	13	442	5.29	40.2
500 x 300	111.0	141.2	482	300	11	15	13	426	10.00	38.7
	125.0	159.2	488	300	11	18	13	426	8.33	38.7
600 x 200	92.4	117.8	596	199	10	15	13	540	6.63	54.0
	103.0	131.7	600	200	11	17	13	540	5.88	49.1
	118.0	149.8	606	201	12	20	13	540	5.00	45.0
600 x 300	133.0	169.2	582	300	12	17	13	522	8.82	43.5
	147.0	187.2	588	300	12	20	13	522	7.50	43.5
	170.0	217.1	594	302	14	23	13	522	6.57	37.3

SPECIFIC SECTIONAL DIMENSIONS, SECTIONAL AREA, UNIT MASS AND SECTIONAL CHARACTERISTICS

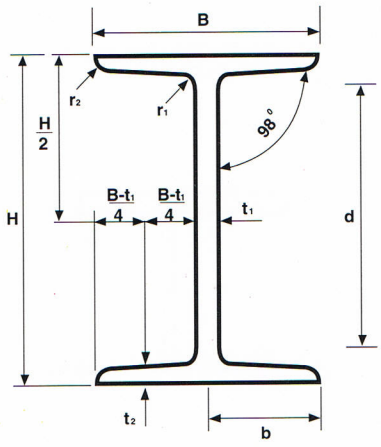
H-SECTIONS



Moment Of Inertia		Radius Of Gyration		Elastic Section Modulus		Plastic Section Modulus		Buckling Parameter	Torsional Index	Warping Constant	Torsional Constant
Ix	Iy	ix	iy	Zx	Zy	Sx	Sy	u	x	H	J
Axis x-x cm^4	Axis y-y cm^4	Axis x-x cm	Axis y-y cm	Axis x-x cm^3	Axis y-y cm^3	Axis x-x cm^3	Axis y-y cm^3			dm^6	cm^4
21228	3644	14.6	6.05	1249	292	1382.2	444.9	0.881	24.08	0.969	58.43
27742	9376	14.4	8.39	1642	534	1821.6	815.4	0.827	22.87	2.474	86.18
32846	11242	15.1	8.84	1910	646	2091.9	977.8	0.848	21.09	3.023	111.62
34882	11842	14.56	8.48	2028	669	2269.4	1024.1	0.826	18.90	3.182	158.83
39846	13583	15.23	8.89	2277	776	2515.4	1176.3	0.847	17.97	3.719	186.92
42347	14428	14.68	8.57	2420	808	2729.8	1240.7	0.826	16.13	3.946	264.85
19771	1446	16.6	4.50	999	145	1114.3	223.3	0.883	36.74	0.535	25.12
23457	1736	16.8	4.56	1173	174	1312.7	267.0	0.885	31.74	0.649	39.71
37864	7204	16.9	7.35	1942	480	2141.2	730.1	0.879	24.43	2.518	100.04
28134	1579	18.4	4.36	1262	159	1422.7	245.4	0.876	38.23	0.742	34.25
32887	1870	18.6	4.43	1462	187	1651.7	289.6	0.878	33.45	0.887	51.95
54731	8106	18.8	7.26	2488	540	2756.5	823.4	0.885	24.88	3.606	141.88
40834	1842	20.3	4.31	1647	185	1869.2	287.8	0.874	37.38	1.068	52.89
46811	2138	20.4	4.36	1872	214	2129.9	332.8	0.875	33.20	1.249	76.40
55481	2578	20.7	4.46	2193	256	2495.7	399.2	0.880	28.66	1.525	119.58
58274	6756	20.3	6.92	2418	450	2695.7	689.9	0.877	32.13	3.680	95.52
68859	8106	20.8	7.14	2822	540	3132.2	824.9	0.887	27.97	4.473	144.01
66641	1976	23.8	4.10	2236	199	2575.8	312.3	0.861	42.65	1.663	70.01
75557	2274	24.0	4.16	2519	227	2903.8	358.3	0.863	38.21	1.926	98.23
88320	2716	24.3	4.3	2915	270	3357.4	425.7	0.868	33.34	2.324	148.24
98950	7659	24.18	6.73	3400	511	3821.7	786.0	0.876	35.24	6.105	139.32
114350	9009	24.71	6.94	3889	601	4348.2	921.0	0.886	31.10	7.259	200.00
133561	10572	24.80	6.98	4497	700	5056.6	1077.1	0.885	27.20	8.606	306.47

SPECIFIC SECTIONAL DIMENSIONS, SECTIONAL AREA, UNIT MASS AND SECTIONAL CHARACTERISTICS

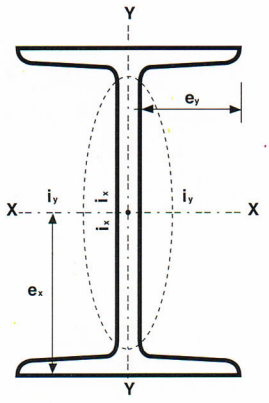
JOISTS



Nominal Dimension	Mass Per Metre	Sectional Area	Web	Flange	Thickness		Corner Radius		Ratio Of Buckling		Depth Between Fillets
Dimension (mm)	kg/m	A cm^2	H mm	B mm	Web t_1 mm	Flange t_2 mm	r_1 mm	r_2 mm	Flange b/t_2	Web d/t_1	d mm
200 x 100	26.0	33.06	200	100	7	10	10	5	5.00	22.3	156.1
200 x 150	50.4	64.16	200	150	9	16	15	7.5	4.69	14.7	132.0
250 x 125	38.3	48.79	250	125	7.5	12.5	12	6	5.00	26.1	195.9
	55.5	70.7	250	125	10	19	21	10.5	3.29	16.7	167.4
300 x 150	48.3	61.58	300	150	8	13	12	6	5.77	30.4	243.2
	65.5	83.47	300	150	10	18.5	19	9.5	4.05	22.0	220.1
	76.8	97.88	300	150	11.5	22	23	11.5	3.41	17.9	206.3
350 x 150	58.5	74.58	350	150	9	15	13	6.5	5.00	31.9	287.5
	87.2	111.1	350	150	12	24	25	12.5	3.13	20.7	248.8
400 x 150	72.0	91.73	400	150	10	18	17	8.5	4.17	32.5	324.6
	95.9	122.1	400	150	12.5	25	27	13.5	3.00	23.5	293.4
450 x 175	91.7	116.8	450	175	11	20	19	9.5	4.38	33.2	365.4
	116.0	146.1	450	175	13	26	27	13.5	3.37	26.1	339.7
600 x 190	133.0	169.4	600	190	13	25	25	12.5	3.80	38.0	494.1
	176.0	224.5	600	190	16	35	38	19	2.71	28.2	451.7

SPECIFIC SECTIONAL DIMENSIONS, SECTIONAL AREA, UNIT MASS AND SECTIONAL CHARACTERISTICS

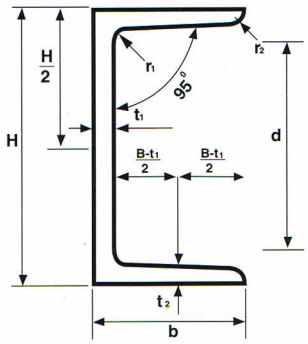
JOISTS



Moment Of Inertia		Radius Of Gyration		Elastic Section Modulus		Plastic Section Modulus		Buckling Parameter	Torsional Index	Warping Constant	Torsional Constant
Ix	Iy	ix	iy	Zx	Zy	Sx	Sy	u	x	H	J
Axis x-x cm^4	Axis y-y cm^4	Axis x-x cm	Axis y-y cm	Axis x-x cm^3	Axis y-y cm^3	Axis x-x cm^3	Axis y-y cm^3			dm^6	cm^4
2170	138	8.10	2.04	217	27.6	250.8	46.3	0.879	18.09	0.0129	11.68
4460	753	8.34	3.43	446	100.4	513.6	163.0	0.891	10.85	0.0687	59.12
5180	337	10.30	2.63	414	53.9	473.3	89.2	0.889	18.56	0.0495	25.60
7310	538	10.2	2.76	585	86.1	685.3	136.4	0.899	11.84	0.0775	86.23
9480	588	12.41	3.09	632	78.4	718.1	131.5	0.887	21.41	0.1253	35.46
12700	886	12.34	3.26	847	118	977.0	191.5	0.896	14.97	0.1863	95.54
14700	1080	12.3	3.32	980.0	144	1140.3	228.9	0.898	12.43	0.2247	156.74
15200	702	14.3	3.07	869	93.6	996.0	156.0	0.882	22.45	0.2041	53.22
22400	1180	14.2	3.26	1280.0	157	1495.4	251.3	0.896	13.68	0.3370	202.10
24100	864	16.2	3.07	1205.0	115	1387.2	190.2	0.882	21.86	0.3285	89.72
31700	1240	16.1	3.19	1585.0	165	1854.3	262.4	0.891	15.30	0.4655	235.06
39200	1510	18.3	3.60	1742.1	173	2001.5	285.1	0.884	22.01	0.7275	142.72
48800	2020	18.3	3.72	2169	231	2516.1	371.5	0.892	16.68	0.9644	302.52
98400	2460	24.1	3.81	3280.0	259	3796.4	426.1	0.877	24.32	2.1191	303.31
130000	3540	24.1	3.97	4333.3	373	5076.7	588.2	0.889	16.94	3.0183	799.61

SPECIFIC SECTIONAL DIMENSIONS, SECTIONAL AREA, UNIT MASS AND SECTIONAL CHARACTERISTICS

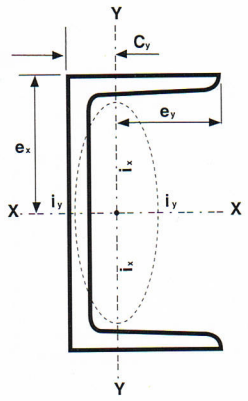
CHANNELS



Nominal Dimension (mm)	Mass Per Metre	Sectional Area	Web	Flange	Thickness		Corner Radius		Ratio Of Buckling		Depth Of Straight Portion Of Web	Moment Of Inertia	
Dimension (mm)	kg/m	A cm^2	H mm	B mm	Web t_1 mm	Flange t_2 mm	r_1 mm	r_2 mm	Flange b/t_2	Web d/t_1	d mm	Ix Axis x-x cm^4	Iy Axis y-y cm^4
150 x 75	18.6	23.71	150	75	6.5	10	10	5	7.50	16.3	105.7	861	117
	24.0	30.59	150	75	9	12.5	15	7.5	6.00	10.2	91.7	1050	147
180 x 75	21.3	27.20	180	75	7	10.5	11	5.5	7.14	19.0	132.9	1380	131
200 x 80	24.6	31.33	200	80	7.5	11	12	6	7.27	20.0	149.7	1950	168
200 x 90	30.3	38.65	200	90	8	13.5	14	7	6.67	17.5	140.2	2490	277
250 x 90	34.6	44.07	250	90	9	13	14	7	6.92	21.3	191.3	4180	294
	40.2	51.17	250	90	11	14.5	17	8.5	6.21	16.6	182.9	4680	329
300 x 90	38.1	48.57	300	90	9	13	14	7	6.92	26.8	241.3	6440	309
	43.8	55.75	300	90	10	15.5	19	9.5	5.81	22.7	227.2	7410	360
	48.6	61.91	300	90	12	16	19	9.5	5.63	18.9	226.4	7870	379
380 x 100	54.5	69.39	380	100	10.5	16	18	9	6.25	29.3	307.2	14500	535
	62.0	78.96	380	100	13	16.5	18	9	6.06	23.6	306.4	15600	565
	67.3	85.71	380	100	13	20	24	12	5.00	22.2	288.4	17600	655

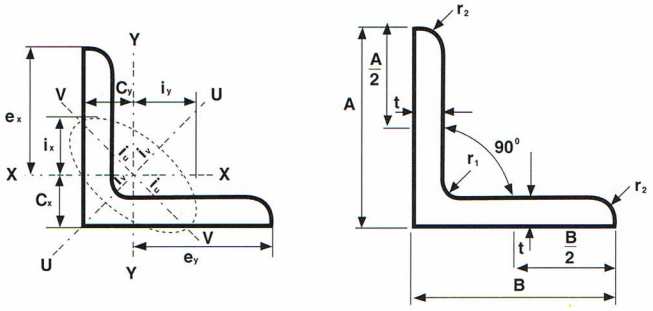
SPECIFIC SECTIONAL DIMENSIONS, SECTIONAL AREA, UNIT MASS AND SECTIONAL CHARACTERISTICS

CHANNELS



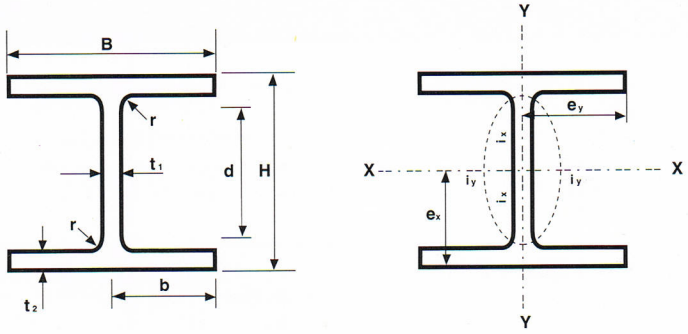
Radius of Gyration		Elastic Sections Modulus		Plastic Sections Modulus		Buckling Parameter	Torsional Index	Warping Constatnt	Torsional Constatnt
ix	iy	Zx	Zy	Sx	Sy	u	x	H	J
Axis x-x cm	Axis y-y cm	Axis x-x cm^3	Axis y-y cm^3	Axis x-x cm^3	Axis y-y cm^3			dm^6	cm^4
6.03	2.22	115	22.4	134.3	45.1	0.913	13.10	0.005	7.08
5.86	2.19	140	28.2	167.7	56.2	0.908	9.89	0.006	15.24
7.12	2.19	153	24.4	180.5	48.3	0.910	15.25	0.008	8.70
7.89	2.32	195	29.0	229.4	57.9	0.904	16.29	0.012	11.09
8.03	2.68	249	44.2	290.9	88.7	0.919	13.24	0.020	19.90
9.74	2.58	334	44.5	396.4	87.6	0.902	17.36	0.033	21.33
9.56	2.54	374	49.8	450.5	98.2	0.896	14.95	0.037	32.87
11.5	2.52	429	45.5	512.5	89.4	0.890	21.57	0.052	22.54
11.5	2.54	494	53.9	590.7	106.5	0.898	18.02	0.059	36.15
11.3	2.47	525	56.3	637.8	111.0	0.888	16.67	0.062	46.44
14.5	2.78	763	70.4	915.9	137.8	0.888	22.84	0.144	46.02
14.1	2.68	821	73.5	1007.6	144.6	0.875	20.79	0.151	62.79
14.3	2.76	926	87.6	1121.6	172.5	0.892	17.90	0.171	89.42

SPECIFIC SECTIONAL DIMENSIONS, SECTIONAL AREA, UNIT MASS AND SECTIONAL CHARACTERISTICS
EQUAL LEG ANGLES



Nominal Dimension	Mass Per Metre	Sectional Area		Corner Radius		Position of centre of gravity cm		Geometrical Moment of Inertia cm^4				Radius of gyration of Area cm				Modulus of Section cm^3	
Dimension (mm)	kg/m	cm^2	t	r_1 mm	r_2 mm					max	min			max	min		
						C_x	C_y	I_x	I_y	I_u	I_v	i_x	i_y	i_u	i_v	Z_x	Z_y
125 x 125	18.9	24.03	10	12	8	3.43	3.43	351	351	559	144	3.82	3.82	4.82	2.45	38.8	38.8
	22.4	28.56	12	12	8.5	3.51	3.51	413	413	656	169	3.8	3.8	4.79	2.44	45.9	45.9
130 X 130	17.9	22.74	9	12	6	3.53	3.53	366	366	583	150	4.01	4.01	5.06	2.57	38.7	38.7
	23.4	29.76	12	12	8.5	3.64	3.64	467	467	743	192	3.96	3.96	5.00	2.54	49.9	49.9
	28.8	36.75	15	12	8.5	3.76	3.76	568	568	902	234	3.93	3.93	4.95	2.53	61.5	61.5
150 X 150	27.3	34.77	12	14	7	4.14	4.14	740	740	1180	304	4.61	4.61	5.82	2.96	68.1	68.1
	33.6	42.74	15	14	10	4.24	4.24	888	888	1410	365	4.56	4.56	5.75	2.92	82.6	82.6
	41.9	53.38	19	14	10	4.40	4.40	1090	1090	1730	451	4.52	4.52	5.69	2.91	103	103
175 X 175	31.8	40.52	12	15	11	4.73	4.73	1170	1170	1860	480	5.38	5.38	6.78	3.44	91.8	91.8
	39.4	50.21	15	15	11	4.85	4.85	1440	1440	2290	589	5.35	5.35	6.75	3.42	114	114
200 X 200	45.3	57.75	15	17	12	5.46	5.46	2180	2180	3470	891	6.14	6.14	7.75	3.93	150	150
	59.7	76.0	20	17	12	5.67	5.67	2820	2820	4490	1160	6.09	6.09	7.68	3.90	197	197
	73.6	93.75	25	17	12	5.86	5.86	3420	3420	5420	1410	6.04	6.04	7.61	3.88	242	242

WORKING LOAD FOR H-PILES

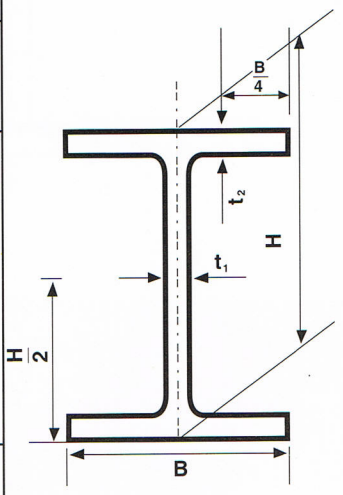
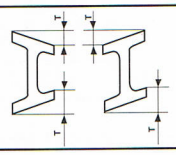
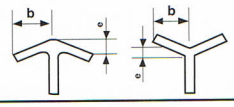
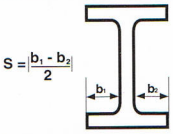
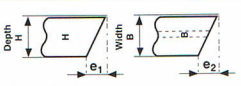


PRODUCT SPECIFICATION			GRADE BS43A		GRADE BS50B	
Perwaja H-Pile	Flange Thickness (mm)	Sectional Area (cm^2)	Design Strength (N/mm^2)	Allowable Working Load/Pile (kN)	Design Strength (N/mm^2)	Allowable Working Load/Pile (kN)
200X200X49.9	12	63.53	275	524	355	677
200X200X56.2	12	71.53	275	590	355	762
250X250X63.8	11	81.31	275	671	355	866
250X250X71.8	14	91.43	275	754	355	974
250X250X81.6	14	103.93	275	857	355	1107
300X300X83.5	12	106.33	275	877	355	1132
300X300X93.0	15	118.45	275	977	355	1261
300X300X105.0	15	133.45	275	1101	355	1421
350X350X105.0	13	133.27	275	1099	355	1419
350X350X113.0	16	144.01	275	1188	355	1534
350X350X129.3	16	164.65	275	1358	355	1754
350X350X135.0	19	171.89	265	1367	345	1779
350X350X154.2	19	196.39	265	1561	345	2033

Note: Maximum working load is calculated based on 0.3 X minimum yield strength of steel

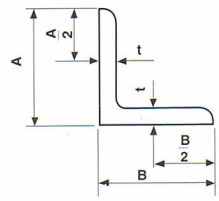
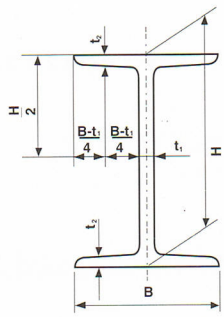
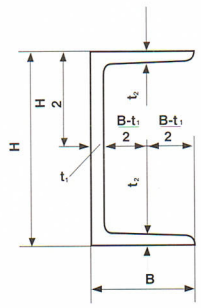
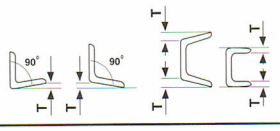
THE SHAPE AND DIMENSIONAL TOLERANCES

Shape and Dimensional Tolerances of H Sections and H Piles

Item			H Sections JIS G 3192	H Piles JIS A 5526	Remarks
Width (B)			B < 100 ± 2.0 100 ≤ B<200 ± 2.5 200 ≤ B ± 3.0	± 3.0	
Depth (H)			H < 400 ± 2.0 400 ≤ H<600 ± 3.0 600 ≤ H ± 4.0	H < 400 ± 3.0 H ≤ 400 ± 4.0	
Thickness	(t_2)	t_2 < 16 16 ≤ t_2 < 25 25 ≤ t_2 < 40 40 ≤ t_2 < 100 100 ≤ t_2	± 1.0 ± 1.5 ± 1.7 ± 2.0 ± 2.0	+ not specified - 0.8 (t_1,t_2 ≤ 13) + not specified - 6% (t_1,t_2 > 13)	
	(t_1)	t_1 < 16 16 ≤ t_1 < 25 25 ≤ t_1 < 40 40 ≤ t_1	± 0.7 ± 1.0 ± 1.5 ± 2.0		
Length		7m or under	+ 40 0	+ not specified 0	
		Over 7m	Add 5mm to the plus side tolerance given in the above column for every 1m increase in length or its fraction.		
Out-of-square (T)			H ≤ 300 T ≤ B/100, provided that 1.5mm is the maximum. H > 300 T ≤ 1.2B/100, provided that 1.5 mm is the maximum.	H ≤ 300 T ≤ 1.2B/100 H > 300 T ≤ 1.5B/100	
Warp of flange (e)			–	–	
Bend			H ≤ 300 0.15% or under of length H > 300 0.10% or under of length	H ≤ 300 0.2% or under of length H > 300 0.10% or under of length	
Web-off-center			H ≤ 300 and B ≤ 200 S ≤ 2.5 H > 300 B > 200 S ≤ 3.5	H ≤ 300 3.0max H > 300 4.5max	
Ends-out-of-square (e_1, e_2)			1.6% or under of width B or of depth H, provided that 3.0mm is the maximum.	1.6% or under of width B or of depth H	
Concavity of web (e)			H < 400 2.0 max 400 ≤ H < 600 2.5 max 600 ≤ H 3.0 max		

THE SHAPE AND DIMENSIONAL TOLERANCES

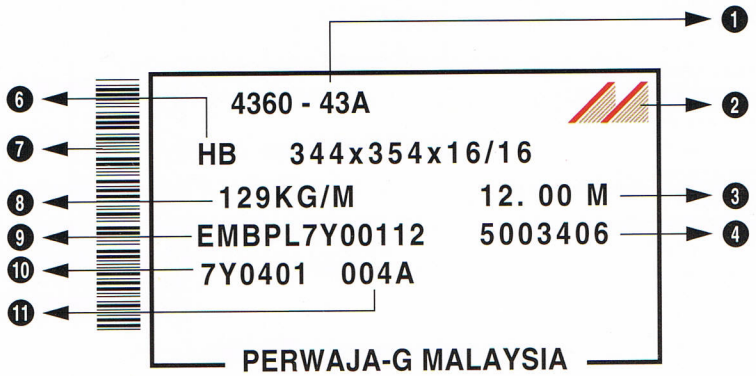
Shape and Dimension Tolerances of Angles, Joists and Channels

Dimension			Tolerance JIS G 3192	Remarks
Leg length (A or B)	A, B < 50		±1.5	
	50 ≤ A, B < 100		±2.0	
	100 ≤ A, B < 200		±3.0	
	200 ≤ A, B		±4.0	
Depth (H)	H < 100		±1.5	
	100 ≤ H < 200		±2.0	
	200 ≤ H < 400		±3.0	
	400 ≤ H		±4.0	
Thickness (t, t_1, t_2)	A < 130	t < 6.3	±0.6	
		6.3 ≤ t < 10	±0.7	
		10 ≤ t < 16	±0.8	
		16 ≤ t	±1.0	
	A ≥ 130	t < 6.3	±0.7	
		6.3 ≤ t < 10	±0.8	
		10 ≤ t < 16	±1.0	
		16 ≤ t < 25	±1.2	
		25 ≤ t <40	±1.5	
Length	7m or under		+40 0	
	Over 7m		Add 5mm to the plus side tolerance given in the above column for every 1m increase in length or its fraction.	
Out-of-square (T)	Joist		2.0% or under of width B	
	Sections excluding Joist		2.5% or under of width of flange B (or leg length)	
Bend	Joist		0.2% or under of length	
	Section excluding Joist		0.30% or under of length	To be applied to bend such as sweep and camber.

REMARKS : **The purchaser may designate that the out-of-square shall be 2% or under of the leg length for equal leg angles 200 mm or more in leg length.**

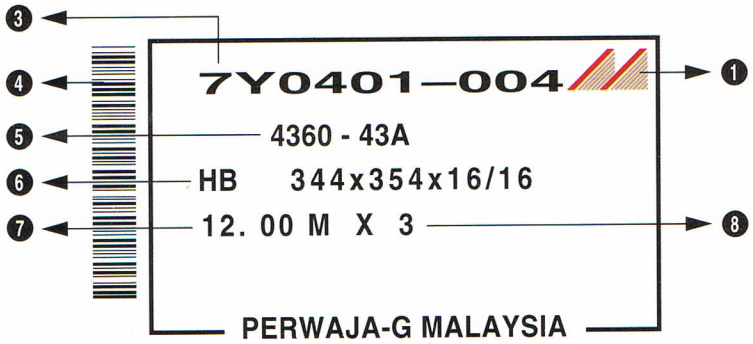
LABELS

PRODUCT LABEL



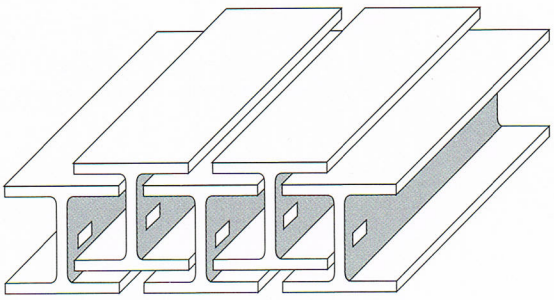
1. Standard CODE / Specification
   Example: 4360 - 43A
2. PERWAJA'S LOGO MARK
   (PERWAJA STEEL SDN BHD)
3. PRODUCT LENGTH
   Example: 12.00M, 10.00M, ...
4. HEAT NUMBER
   Example: 5003406, ...
6. COMMODITY / PRODUCT SIZE
   Example: HB 344X354X16/16, HB 294X302X12/12, ...
   - Commodity
   - Product Size
7. BAR CODE
8. UNIT WEIGHT PRODUCT
   Example: 129KG/M
9. PURCHASER'S ORDER NUMBER / CODE
   Example: EMBPL7Y00112, LH7X00112PG, ...
10. LOT NUMBER
    Example: 7Y0401 .....
11. PRODUCT NUMBER
    Example: 004A .....

BUNDLE LABEL

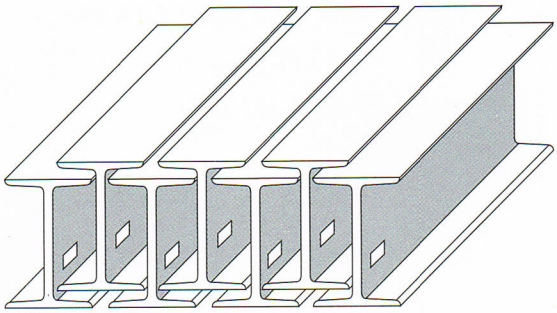


1. PERWAJA'S LOGO MARK
   (PERWAJA STEEL SDN BHD)
3. BUNDLE NUMBER
   Example: 7Y0401 - 004 .....
4. BAR CODE
5. Standard CODE / Specification
   Example: SS400, SHK400M, 4360-43A .....
6. COMMODITY / PRODUCT SIZE
   Example: HB 344X354X16/16, HB 294X302X12/12, ...
   - Commodity
   - Product Size
7. PRODUCT LENGTH
   Example: 12.00M, 9.00M, ...
8. NUMBER OF PRODUCT PIECES IN BUNDLE
   Example: 1, 3, 5, ...

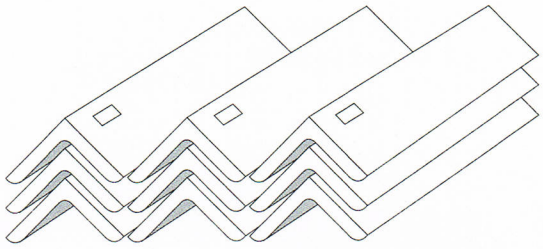
BASIC BUNDLING



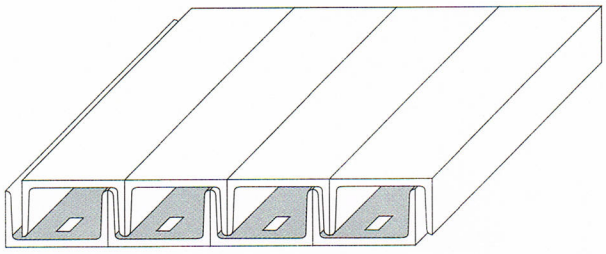
H-Section and H-Pile



Joist

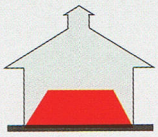


Angle



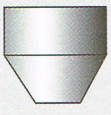
Channel

STEEL MAKING SHOP

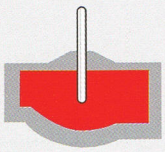


DRI STORAGE SHED

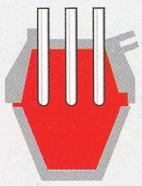
SCRAP



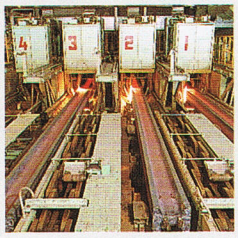
SUB - MATERIALS



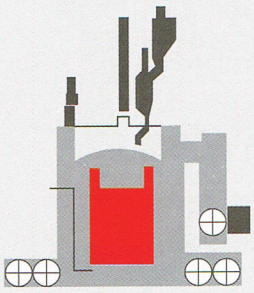
ELECTRIC ARC FURNACE



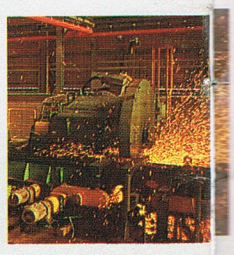
LADLE FURNACE



BLOOM & BEAM BLANK CONTINUOUS CASTER



VACUUM DEGASSER



COLD SAW

INSPECTION BED

PRODUCTS

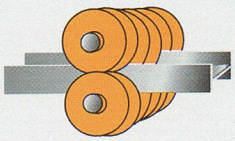
ING PROCESS

ROLLING MILL

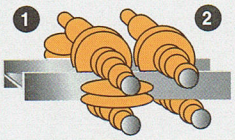
BLOOMS

BEAM BLANKS

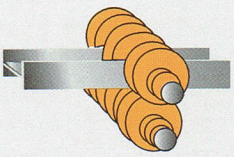
REHEATING FURNACE



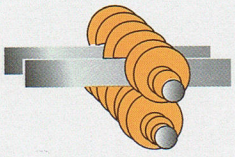
BREAK-DOWN MILL



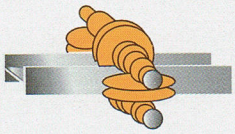
❶ UNIVERSAL MILL
❷ EDGING MILL



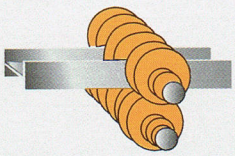
STRUCTURAL ROUGHING MILL



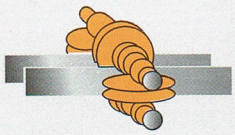
STRUCTURAL ROUGHING MILL



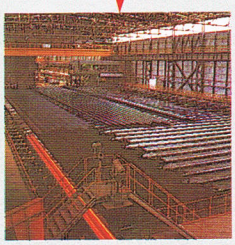
UNIVERSAL FINISHING MILL



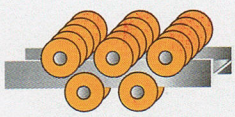
STRUCTURAL FINISHING MILL



UNIVERSAL FINISHING MILL



COOLING BED



ROLLER STRAIGHTENER

INFORMATION FOR ORDERS AND INQUIRIES

Please specify the following when inquiring about or ordering steel sections.

1 Product Names (Shapes and Specifications)
2 Size
3 Quantity
4 Intended application and condition of use
5 Whether inspection certification is required
6 Whether witness of inspection is required
7 Delivery date
8 Destination

Si Conversion Factors

Quantity	Multiply	By	To Obtain	
Force	Ounce-Force	0.278 014	Newton	N
	Pound-Force	4.448 222	Newton	N
	Newton	3.596 942	Ounce-Force	
	Newton	0.224 809	Pound-Force	lbf
Bending Moment	Pound-Force-Inch	0.112 985	Newton-Metre	N-m
	Pound-Force-Foot	1.355 818	Newton-Metre	N-m
	Newton-Metre	8.850 748	Pound-Force-Inch	lbf-in
	Newton-Metre	0.737 562	Pound-Force-Foot	lbf-ft
Angle	Degree	$17.453\ 29 \times 10^{-3}$	Radian	rad
	Radian	57.295 788	Degree	
Length	Inch	25.400	Millimetre	mm
	Foot	0.304 800	Metre	m
	Yard	0.914 400	Metre	m
	Mile (U.S. Statute)	1.609 347	Kilometre	km
	Millimetre	$39.370\ 079 \times 10^{-3}$	Inch	in
	Metre	3.280 840	Foot	ft
	Metre	1.093 613	Yard	yd
	Kilometre	0.621 370	Mile	mi
Area	Square Inch	$0.645\ 160 \times 10^{3}$	Square Millimetre	mm^2
	Square Foot	0.092 903	Square Metre	m^2
	Square Yard	0.836 127	Square Metre	m^2
	Square Mile (U.S. Statute)	2.589 998	Square Kilometre	km^2
	Acre	$4.046\ 873 \times 10^{3}$	Square Metre	m^2
	Acre	0.404 687	Hectare	
	Square Millimetre	$1.550\ 003 \times 10^{-3}$	Square Inch	in^2
	Square Metre	10.763 910	Square Foot	ft^2
	Square Metre	1.195 990	Square Yard	yd^2
	Square Kilometre	0.386 101	Square Mile	mi^2
	Square Metre	$0.247\ 104 \times 10^{-3}$	Acre	
	Hectare	2.471 044	Acre	
Volume	Cubic Inch	$16.387\ 06 \times 10^{3}$	Cubic Millimetre	mm^3
	Cubic Foot	$28.316\ 85 \times 10^{-3}$	Cubic Metre	m^3
	Cubic Yard	0.764 555	Cubic Metre	m^3
	Gallon (U.S. Liquid)	3.785 412	Litre	l
	Quart (U.S. Liquid)	0.946353	Litre	l
	Cubic Millimetre	$61.023\ 759 \times 10^{-6}$	Cubic Inch	in^3
	Cubic Metre	35.314 662	Cubic Foot	ft^3
	Cubic Metre	1.307 951	Cubic Yard	yd^3
	Litre	0.264 172	Gallon (U.S. Liquid)	gal
	Litre	1.056 688	Quart (U.S. Liquid)	qt
Mass	Ounce (Avoirdupois)	28.349 52	Gram	g
	Pound (Avoirdupois)	0.453 592	Kilogram	kg
	Short Ton	$0.907\ 185 \times 10^{3}$	Kilogram	kg
	Gram	$35.273\ 996 \times 10^{-3}$	Ounce (Avoirdupois)	oz av
	Kilogram	2.204 622	Pound (Avoirdupois)	lb av
	Kilogram	$1.102\ 311 \times 10^{-3}$	Short Ton	

Manufacturer:

PERWAJA

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