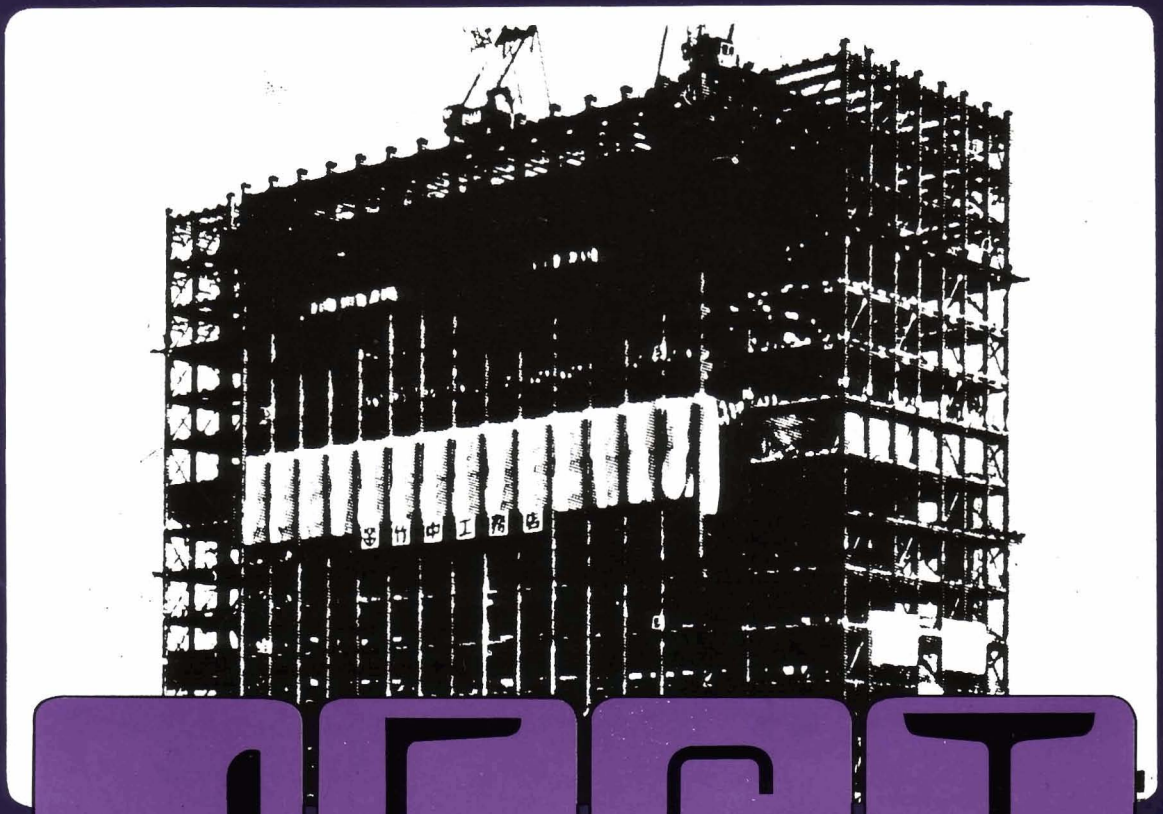
ตารางเหล็ก

สำหรับผู้รับเหมาก่อสร้างและวิศวกร



ทีกรุ๊ฟ

คำนำ

(สำหรับการพิมพ์ครั้งที่หนึ่ง)

ในวงการก่อสร้างงานเหล็กทั่วไป ผู้รับเหมาก่อสร้างและวิศวกรมักประสบปัญหา ในการคำนวณหาน้ำหนักเหล็กและข้อมูลคุณสมบัติต่างๆ ซึ่งแยกอยู่ในหลายเล่ม ไม่สะดวกแก่การปฏิบัติงานให้ได้ผลและทันต่อเหตุการณ์

ผู้เรียบเรียงมีประสบการณ์ในงานก่อสร้างมาเป็นเวลาหลายสิบปี ได้สะสมรวบรวมตารางเหล็กต่างๆ ที่จำเป็นต้องใช้ตามมาตรฐาน Japanese Industrial Standard (JIS), British Standard (BS), American Petroleum Institute (API), American Society for Testing and Material (ASTM) และวัสดุเหล็กที่ผลิตขึ้นในประเทศ จัดเรียบเรียงและพิมพ์ขึ้นไว้ใช้เป็นคู่มือในการคิดหาน้ำหนักเหล็ก คิดราคา และคำนวณออกแบบสำหรับบริษัทผู้รับเหมาก่อสร้างและบริษัทที่ปรึกษาออกแบบ

ผู้เรียบเรียงมั่นใจว่าตารางเหล็กเล่มนี้จะเป็นคู่มือที่เพิ่มความคล่องตัวในการปฏิบัติงานไม่มากก็น้อย

ผู้เรียบเรียง
Tee Group of Engineers

คำนำ

(สำหรับการพิมพ์ครั้งที่สอง)

หนังสือตารางเหล็กเล่มนี้ได้รับความสนใจจากวงการก่อสร้าง วิศวกร อาจารย์ และนิสิตนักศึกษา อย่างกว้างขวาง ผู้เรียงเรียงได้รับการสั่งซื้อและขายหมดภายในเวลาที่เร็วเกินความคาดหมาย ดังนั้นในการพิมพ์ครั้งที่ 2 นี้ ผู้เรียบเรียงจึงพยายามปรับปรุงแก้ไขเพิ่มเติม ตรวจสอบ ตัวเลข และออกแบบรูปเล่มใหม่ให้ดีขึ้น เพื่อให้ผู้ซื้อได้รับประโยชน์จากหนังสือเล่มนี้มากที่สุด

จากประสบการณ์ในการพิมพ์หนังสือตารางเหล็กเล่มนี้ ผู้เรียบเรียงจึงมั่นใจว่า หนังสือประเภทที่ใช้เป็นคู่มือในการปฏิบัติงาน เปิดออกเลือกใช้ได้ทันทีโดยไม่ต้องคิดคำนวณตามสูตรที่ยุ่งยากซับซ้อนและเสียเวลาเป็นหนังสือที่มีประโยชน์จริงและเป็นที่ต้องการในวงการก่อสร้างอย่างมาก ดังนั้น ผู้เรียบเรียงจึงกำลังจัดพิมพ์หนังสือตารางท่อและตารางก่อสร้าง เพื่อจัดจำหน่ายต่อไป

ผู้เรียบเรียง
Tee Group of Engineers

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น้ำหนักแผ่นเหล็กแผ่น

PLATE

Metric Size

PLATE

Kilograms of Standard Sizes (JIS - 0.7293 Kg/mm, ft²) ρ = 7850 kg/m³.

Thickness	UNIT WEIGHT	WIDTH x LENGTH, ft²										
		AREA, ft²										
		3x6	4x8	4x10	4x16	4x20	5x10	5x20	5x30	5x40	6x30	6x40
mm.	Kg / ft²	18	32	40	64	80	50	100	150	200	180	240
3.2	2.334	42.0	74.7	93.4	149	187	117	233	350	467	420	560
4.5	3.282	59.1	105	131	210	263	164	328	492	656	591	788
5	3.646	65.6	117	148	233	292	182	365	547	729	656	875
6	4.376	78.8	140	175	280	350	219	438	656	875	788	1,050
7	5.105	91.9	163	204	327	408	255	510	766	1,021	919	1,225
8	5.384	105	187	233	373	467	292	583	875	1,167	1,050	1,400
9	6.564	118	210	263	420	525	328	656	985	1,313	1,182	1,575
10	7.293	131	233	292	467	583	365	729	1,094	1,459	1,313	1,750
11	8.022	144	257	321	513	642	401	802	1,203	1,604	1,444	1,925
12	8.752	158	280	350	560	700	438	875	1,313	1,750	1,575	2,100
12.7	9.262	167	296	370	593	741	463	926	1,389	1,852	1,667	2,223
13	9.481	171	303	379	607	758	474	948	1,422	1,896	1,707	2,275
14	10.21	184	327	408	653	817	510	1,021	1,532	2,042	1,838	2,450
15	10.94	197	350	438	700	875	547	1,094	1,641	2,188	1,969	2,626
16	11.67	210	373	467	747	934	584	1,167	1,750	2,334	2,101	2,801
17	12.40	223	397	496	794	992	620	1,240	1,860	2,480	2,232	2,976
18	13.13	236	420	525	840	1,050	656	1,313	1,970	2,626	2,363	2,151
19	13.86	249	444	554	887	1,109	693	1,386	2,079	2,772	2,495	3,326
20	14.59	263	467	584	934	1,167	730	1,459	2,188	2,918	2,626	3,502
21	15.32	276	490	613	980	1,226	766	1,532	2,298	3,064	2,758	3,677
22	16.04	289	513	642	1,027	1,283	802	1,604	2,406	3,208	2,887	3,850
23	16.77	302	537	671	1,073	1,342	838	1,677	2,516	3,354	3,019	4,025
24	17.50	315	560	700	1,120	1,400	875	1,750	2,625	3,500	3,150	4,200
25	18.23	328	583	729	1,167	1,458	912	1,823	2,734	3,646	3,281	4,375
25.4	18.52	333	593	741	1,185	1,482	926	1,852	2,778	3,704	3,334	4,445
26	18.96	341	607	758	1,213	1,517	948	1,896	2,844	3,792	3,413	4,550
27	19.69	354	630	788	1,260	1,575	984	1,969	2,954	3,938	3,544	4,726
28	20.42	368	653	817	1,307	1,634	1,021	2,042	3,063	4,084	3,676	4,901
29	21.15	381	677	846	1,354	1,692	1,058	2,115	3,172	4,230	3,807	5,076
30	21.88	394	700	875	1,400	1,750	1,094	2,188	3,282	4,376	3,938	5,251
32	23.34	420	747	934	1,494	1,867	1,167	2,334	3,501	4,668	4,201	5,602
34	24.80	446	794	992	1,587	1,984	1,240	2,480	3,720	4,960	4,464	5,952
36	26.25	472	840	1,050	1,680	2,100	1,312	2,625	3,938	5,250	4,725	6,300
38	27.71	499	887	1,108	1,773	2,217	1,386	2,771	4,156	5,542	4,988	6,650
40	29.17	525	933	1,167	1,867	2,334	1,458	2,917	4,376	5,834	5,251	7,001
45	32.82	591	1,050	1,313	2,100	2,626	1,641	3,282	4,923	6,564	5,908	7,877
50	36.46	656	1,167	1,458	2,333	2,917	1,823	3,646	5,469	7,292	6,563	8,750
55	40.11	722	1,284	1,604	2,567	3,209	2,006	4,011	6,016	8,022	7,220	9,626
60	43.76	788	1,400	1,750	2,801	3,501	2,188	4,376	6,564	8,752	7,877	10,502
65	47.40	853	1,517	1,896	3,034	3,792	2,370	4,740	7,110	9,480	8,532	11,376
70	51.05	919	1,634	2,042	3,267	4,084	2,552	5,104	7,658	10,210	9,189	12,252

PLATE

Inch Size

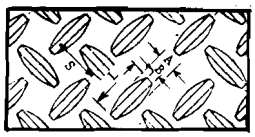
PLATE

Kilograms of Standard Sizes (JIS - 0.7293 Kg/mm, ft^2)

Thickness		Unit Weight	WIDTH x LENGTH, ft^2										
			AREA, ft^2										
in	mm.	Kg/ft^2	3x6	4x8	4x10	4x16	4x20	5x10	5x20	5x30	5x40	6x30	6x40
			18	32	40	64	80	50	100	150	200	180	240
1/8	3.175	2.316	41.7	74.1	92.6	148	185	116	232	347	463	417	556
5/32	3.696	2.894	52.1	92.6	116	185	232	145	290	434	579	521	694
3/16	4.763	3.473	62.5	111	139	222	278	174	384	521	695	625	834
7/32	5.556	4.052	72.9	130	162	259	324	203	406	608	810	729	972
1/4	6.350	4.631	83.3	148	185	296	370	232	464	695	926	834	1111
9/32	7.144	5.210	93.8	167	208	333	417	260	521	782	1042	938	1250
5/16	7.938	5.789	104	185	232	370	463	289	579	868	1158	1042	1389
11/32	8.731	6.368	115	204	255	408	509	318	637	955	1274	1146	1528
3/8	9.525	6.946	125	222	278	444	556	347	695	1042	1389	1250	1667
13/32	10.391	7.525	135	241	301	482	602	376	752	1129	1505	1354	1806
7/16	11.113	8.104	146	259	324	519	648	405	810	1218	1621	1459	1945
15/32	11.906	8.683	156	278	347	556	695	434	868	1302	1737	1563	2084
1/2	12.700	9.262	167	296	370	593	741	463	926	1389	1852	1667	2223
17/32	13.494	9.841	177	315	394	630	787	492	984	1476	1968	1771	2362
9/18	14.228	10.42	188	333	417	667	834	521	1042	1563	2084	1876	2501
19/32	15.081	11.00	198	352	440	704	880	550	1100	1650	2200	1980	2640
5/8	15.875	11.58	208	371	483	741	926	579	1158	1737	2318	2084	2779
21/32	16.669	12.16	129	389	486	778	973	608	1216	1824	2432	2189	2918
11/18	17.463	12.74	229	408	510	815	1019	637	1274	1915	2548	2293	3058
23/32	18.256	13.31	240	426	532	852	1065	666	1331	1998	2662	2396	3194
3/4	19.050	13.89	250	444	556	889	1111	694	1389	2084	2778	2500	3334
25/32	19.844	14.47	260	463	579	926	1158	724	1447	2170	2894	2605	3473
13/18	20.838	15.05	271	482	602	963	1204	752	1505	2258	3010	2709	3612
27/32	21.431	15.63	281	500	625	1000	1250	782	1563	2344	3126	2813	3751
7/8	22.225	16.21	292	519	648	1037	1297	810	1621	2432	3242	2918	3890
29/32	23.019	16.79	302	537	672	1074	1343	840	1679	2518	3358	3022	4030
15/18	23.813	17.37	313	556	695	1112	1390	868	1737	2606	3474	3127	4169
31/32	24.606	17.95	323	574	718	1149	1436	898	1795	2692	3590	3231	4308
1	25.400	18.52	333	593	741	1185	1482	926	1852	2778	3704	3334	4445
1 1/16	26.988	19.68	354	630	787	1260	1574	984	1968	2952	3936	3542	4723
1 1/8	28.570	20.84	375	667	834	1334	1667	1042	2084	3126	4168	3751	5002
1 3/16	30.163	22.00	396	704	880	1408	1760	1100	2200	3300	4400	3960	5280
1 1/4	31.750	23.16	417	741	926	1482	1853	1158	2316	3474	4632	4169	5558
1 5/16	33.338	24.31	438	778	972	1556	1945	1216	2431	3646	4862	4376	5834
1 3/8	34.925	25.47	458	815	1019	1630	2038	1274	2547	3820	5094	4585	6113
1 7/16	26.513	26.63	479	852	1065	1704	2130	1332	2663	3994	5326	4793	6391
1 1/2	36.100	27.79	500	889	1112	1778	2223	1390	2779	4168	5558	5002	6670
1 9/16	39.688	28.94	521	926	1158	1852	2315	1447	2894	4341	5788	5209	6946
1 5/8	41.275	30.10	542	963	1204	1926	2408	1505	3010	4515	6020	5418	7224
1 11/16	42.863	31.16	561	997	1246	1994	2493	1558	3116	4674	6232	5609	7478
1 3/4	44.450	32.42	584	1037	1297	2075	2594	1621	3242	4863	6484	5836	7781
1 13/16	46.034	33.57	604	1074	1343	2148	2686	1678	3357	5036	6714	6043	8057
1 7/8	47.625	34.73	625	1111	1389	2223	2778	1736	3473	5210	6946	6251	8335
2	50.800	37.05	667	1189	1482	2371	2964	1852	3705	5558	7410	6669	8892

CHECKERED PLATES

Standard Sizes of Floor Plates



Style	A	B	L	S
M	5.1	2.5	25.5	20.2
H	6.0	3.2	25.5	28.3

Metric Size

Thickness		Diamension							
		Width x Length							
		3ft x 6ft		4ftx 8ft		5ft x 10ft		5ft x 20ft	
		Weight of One Plate							
mm.	in	kg	lb	kg	lb	kg	lb	kg	lb
M 2.3	0.0906	33.0	72.7	66.1	146				
M 3.2	0.1260	44.8	98.7	89.7	198				
M 4.5	0.1772	61.9	136	123	271				
H 3.2	0.1260	45.1	99.4	80.2	177	125	276	251	553
H 4.5	0.1772	62.2	137	111	245	173	381	345	760
H 6	0.2362	81.9	181	146	322	227	500	455	1003
H 8	0.3150	108	238	192	423	300	661	601	1325
H 9	0.3543	121	267	216	476	337	743	674	1485
H 10	0.3937	134	295	239	527	373	822	747	1646
H 12	0.4724	161	355	286	563	446	983	892	1966

Inch Size

Thickness			Diamension							
			Width x Length							
			3ft x 6ft		4ftx 8ft		5ft x 10ft		5ft x 20ft	
			Weight of One Plate							
in	in	mm.	kg	lb	kg	lb	kg	lb	kg	lb
3/32	0.0938	2.381	34.1	75.2	60.0	134				
1/8	0.1250	3.175	44.5	98.1	79.2	175				
3/16	0.1875	4.763	65.4	144	116	256				
1/8	0.1250	3.175	44.8	98.7	79.7	176	124	237	249	549
3/16	0.1875	4.763	65.6	145	117	258	182	401	365	804
1/4	0.2500	6.350	86.5	191	154	339	240	529	480	1058
5/16	0.1325	7.938	107	236	191	421	298	657	596	1314
3/8	0.3750	9.525	128	282	228	503	356	785	712	1569
7/16	0.4375	11.112	149	328	265	584	414	912	828	1825
1/2	0.5000	12.700	170	375	302	666	472	1040	944	2081

STEEL SHEETS

Metric Size

SHEET

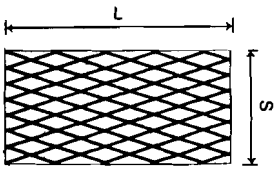
Thickness	Width Length	Width x Length, ft^2										
		Width x Length, mm^2										
		2.5 x 8	2.5 x 10	3 x 6	3 x 8	4 x 8	4 x 10	5 x 10	5 x 12	6 x 8	6 x 10	6 x 12
mm.	Kg / ft^2	762 x	762 x	914 x	914 x	1219 x	1219 x	1524 x	1524 x	1829 x	1829 x	1829 x
		2438	3048	1829	2438	2438	3048	3048	3658	2438	3048	3658
0.15	1.178	2.19	2.74	1.97	2.62	3.50	4.38	5.47	6.57	5.25	6.57	7.88
0.152	1.193	2.22	2.77	1.99	2.66	3.55	4.43	5.54	6.65	5.32	6.65	7.98
0.169	1.327	2.47	3.08	2.22	2.96	3.94	4.93	6.16	7.40	5.92	7.40	8.88
0.179	1.405	2.61	3.26	2.35	3.13	4.18	5.22	6.53	7.83	6.26	7.83	9.40
0.19	1.492	2.77	3.47	2.49	3.32	4.43	5.54	6.93	8.32	6.65	8.32	9.98
0.198	1.554	2.89	3.61	2.60	3.46	4.62	5.77	7.22	8.66	6.93	8.66	10.4
0.20	1.570	2.92	3.65	2.63	3.50	4.67	5.83	7.29	8.75	7.00	8.75	10.5
0.22	1.727	3.21	4.01	2.89	3.85	5.13	6.42	8.02	9.63	7.70	9.63	11.6
0.23	1.806	3.36	4.20	3.02	4.02	5.37	6.71	8.39	10.1	8.05	10.1	12.1
0.24	1.884	3.50	4.38	3.15	4.20	5.60	7.00	8.75	10.5	8.40	10.5	12.6
0.25	1.962	3.65	4.56	3.28	4.37	5.83	7.29	9.11	10.9	8.75	10.9	13.1
0.26	2.041	3.79	4.74	3.41	4.55	6.07	7.58	9.48	11.4	9.10	11.4	13.7
0.27	2.120	3.94	4.92	3.54	4.72	6.30	7.88	9.85	11.8	9.45	11.8	14.2
0.28	2.198	4.08	5.11	3.68	4.90	6.53	8.17	10.2	12.3	9.80	12.3	14.7
0.29	2.276	4.23	5.29	3.81	5.07	6.76	8.46	10.6	12.7	10.1	12.7	15.2
0.30	2.355	4.38	5.47	3.94	5.25	7.00	8.75	10.9	13.1	10.5	13.1	15.8
0.32	2.512	4.67	5.84	4.20	5.60	7.47	9.33	11.7	14.0	11.2	14.0	16.8
0.35	2.748	5.11	6.38	4.59	6.12	8.17	10.2	12.8	15.3	12.3	15.3	18.4
0.40	3.140	5.83	7.29	5.25	7.00	9.30	11.7	14.6	17.5	14.0	17.5	21.0
0.45	3.532	6.56	8.20	5.91	7.87	10.5	13.1	16.4	19.7	15.7	19.7	23.6
0.50	3.925	7.29	9.12	6.56	8.74	11.7	14.6	18.2	21.9	17.5	21.9	26.3
0.55	4.318	8.02	10.0	7.22	9.62	12.8	16.0	20.1	24.1	19.3	24.1	28.9
0.60	4.710	8.75	10.9	7.88	10.5	14.0	17.5	21.9	26.3	21.0	26.3	31.5
0.65	5.102	9.48	11.9	8.53	11.4	15.2	19.0	23.7	28.4	22.8	28.4	34.1
0.70	5.495	10.2	12.8	9.19	12.2	16.3	20.4	25.5	30.6	24.5	30.6	36.8
0.75	5.888	10.9	13.7	9.84	13.1	17.5	21.9	27.3	32.8	26.3	32.8	39.4
0.80	6.280	11.7	14.6	10.5	14.0	18.7	23.3	29.2	35.0	28.0	35.0	42.0
0.85	6.672	12.4	15.5	11.2	14.9	19.8	24.8	31.0	37.2	29.8	37.2	44.6
0.90	7.065	13.1	16.4	11.8	15.7	21.0	26.3	32.8	39.4	31.5	39.4	47.3
0.95	7.458	13.9	17.3	12.5	16.6	22.2	27.7	34.6	41.6	33.3	41.6	49.9
1.0	7.850	14.6	18.2	13.1	17.5	23.3	29.2	36.5	43.8	35.0	43.8	52.5
1.2	9.420	17.5	21.9	15.8	21.0	28.0	35.0	43.8	52.5	42.0	52.5	63.0
1.4	10.99	20.4	25.5	18.4	24.5	32.7	40.8	51.0	61.3	49.0	61.3	73.5
1.6	12.56	23.3	29.2	21.0	28.0	37.3	46.7	58.3	70.0	56.0	70.0	84.0
1.8	14.13	26.3	32.8	23.6	31.5	42.0	52.5	65.5	78.8	63.0	78.8	94.5
2.0	15.70	29.2	36.5	26.3	35.0	46.7	58.3	72.9	87.5	70.0	87.5	105
2.3	18.06	33.6	42.0	30.2	40.2	53.7	67.1	83.9	101	80.5	101	121
2.5	19.62	36.5	45.6	32.8	43.7	58.3	73.8	91.1	109	87.5	109	131
2.6	20.41	37.9	47.4	34.1	45.5	60.9	75.8	94.8	114	91.0	114	137
2.8	21.98	40.8	51.1	36.8	49.0	65.3	81.7	102	123	98.0	123	147
2.9	22.76	42.3	52.9	38.1	50.7	67.6	84.6	106	127	101	127	152
3.0	23.55	43.8	54.7	39.4	52.5	70.0	87.5	109	131	105	131	158
3.2	25.12	46.7	58.4	42.0	56.0	74.7	93.3	117	140	112	140	168

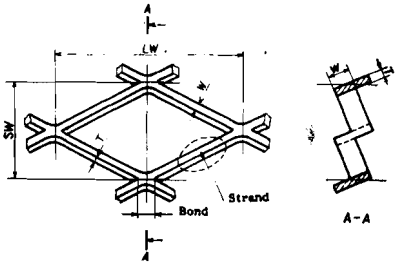
GALVANIZED SHEETS

JIS G3312

GAL SHEET

Zinc coating g/m² (oz/ft²)	Standard thickness (Base sheet) mm.	Width mm															
		762						914						1000	1219		
		Length mm															
		1829	2134	2438	2743	3048	3658	1829	2134	2438	2743	3048	3658	2000	2438	3048	3658
	0.20	2.44	2.85	3.26	3.66	4.07	4.89	2.93	3.42	3.91	4.39	4.88	5.86	3.51	5.21	6.51	7.82
183	0.25	2.99	3.49	3.99	4.48	4.98	5.98	3.59	4.18	4.78	5.38	5.98	7.17	4.29	6.37	7.97	9.56
(0.60)	0.27	3.21	3.74	4.28	4.81	5.35	6.42	3.85	4.49	5.13	5.77	6.42	7.70	4.61	6.84	8.56	10.3
	0.30	3.54	4.13	4.72	5.30	5.90	7.07	4.24	4.95	5.65	6.36	7.07	8.48	5.08	7.54	9.43	11.3
	0.20	2.53	2.95	3.37	3.79	4.21	5.06	3.03	3.54	4.04	4.55	5.05	6.06	3.63	5.39	6.74	8.09
	0.25	3.08	3.59	4.10	4.61	5.12	6.15	3.69	4.30	4.91	5.53	6.15	7.37	4.41	6.56	8.20	8.84
244	0.27	3.30	3.84	4.39	4.94	5.49	6.59	3.95	4.61	5.27	5.93	6.59	7.90	4.73	7.03	8.78	10.5
(0.80)	0.30	3.62	4.23	4.83	5.43	6.04	7.24	4.35	5.07	5.79	6.52	7.24	8.69	5.20	7.72	9.66	11.6
	0.35	4.17	4.86	5.56	6.25	6.95	8.34	5.00	5.83	6.67	7.50	8.34	10.0	5.98	8.89	11.1	13.3
	0.40	4.72	5.50	6.29	7.07	7.86	9.43	5.66	6.60	7.54	8.48	9.43	11.3	6.77	10.1	12.6	15.1
	0.50	5.81	6.78	7.75	8.71	9.68	11.6	6.97	8.13	9.29	10.5	11.6	13.9	8.34	12.4	15.5	18.6
305	0.60	6.99	8.15	9.32	11.5	11.6	14.0	8.39	9.78	11.2	12.6	14.0	16.8	10.0	14.9	18.6	22.4
(1.00)	0.80	9.18	10.7	12.2	13.8	15.3	18.4	11.0	12.8	14.7	16.5	18.3	22.0	13.2	19.6	24.5	29.4
	1.10	11.4	13.3	15.2	17.0	18.9	22.7	13.6	15.9	18.2	20.4	22.7	27.3	16.3	24.2	30.3	36.4
	0.27	3.49	4.07	4.65	5.23	5.81	6.97	4.18	4.88	5.57	6.27	6.97	8.36	5.00	7.43	9.29	11.2
	0.30	3.81	4.45	5.08	5.72	6.36	7.63	4.57	5.34	6.10	6.86	7.62	9.15	5.47	8.13	10.2	12.2
	0.35	4.36	5.09	5.81	6.54	7.27	8.72	5.23	6.10	6.97	7.84	8.72	10.5	6.26	9.30	11.6	14.0
	0.40	4.91	5.73	6.54	7.36	8.18	9.81	5.89	6.87	7.84	8.83	9.81	11.8	7.04	10.5	13.1	15.7
381	0.50	6.00	7.00	8.00	9.00	10.0	12.0	7.20	8.40	9.59	10.8	12.0	14.4	8.61	12.8	16.0	19.2
(1.25)	0.60	7.10	8.28	9.46	10.6	11.8	14.2	8.51	9.93	11.3	12.8	14.2	17.0	10.2	15.1	18.9	22.7
	0.80	9.29	10.8	12.4	13.9	15.5	18.6	11.1	13.0	14.8	16.7	18.6	22.3	13.3	19.8	24.8	29.7
	1.0	11.5	13.4	15.3	17.2	19.1	22.9	13.8	16.1	18.3	20.6	22.9	27.5	16.5	24.5	30.6	36.7
	1.2	13.7	15.9	18.2	20.5	22.8	27.3	16.4	19.1	21.8	24.6	27.3	32.8	19.6	29.1	36.4	43.7
	1.4	15.8	18.5	21.1	23.8	26.4	31.7	19.0	22.2	25.3	28.5	31.7	38.0	22.7	33.8	42.3	50.7
	1.6	18.0	21.0	24.0	27.0	30.1	36.1	21.6	25.2	28.8	32.4	36.1	43.3	25.9	38.5	48.1	57.7





EXPANDED METALS

JIS G3351

Standard Finish Dimensions

S mm	L mm	Area m^2
1829	914	1.672
2438	914	2.228
1829	1219	2.230
2438	1219	2.972
2438	1524	3.716
3048	1524	4.645
914	1829	1.672
1219	1829	2.230
2438	1829	4.459
914	2438	2.228
1219	2438	2.972
1829	2438	4.459
1524	3046	4.645

Dimensions and Weight

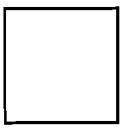
Symbol	Product number	Dimensions of mesh mm		Dimensions of strand mm		Rate of expansion	Unit Weight kg/m2	Length of bond mm
		SW	LW	T	W			
	11	34	135.4	4.5	7.0	2.43	14.5	30 min
	12	34	135.4	6.0	7.0	2.43	19.4	30 min
	13	34	135.4	6.0	9.0	1.89	24.9	30 min
XG	14	34	135.4	8.0	9.0	1.89	33.2	30 min
	21	36	101.6	4.5	7.0	2.57	13.7	10 min
	22	36	101.6	6.0	7.0	2.57	18.3	10 min
	23	36	101.6	6.0	9.0	2.00	23.6	10 min
	24	36	101.6	8.0	9.0	2.00	31.4	10 min
	31	12	30.5	1.2	1.5	4.00	2.36	
	32	12	30.5	1.6	2.0	3.00	4.19	-
	33	12	30.5	2.3	3.0	2.00	9.03	
	41	22	50.8	1.6	2.0	5.50	2.28	
	42	22	50.8	2.3	2.5	4.40	4.10	-
	43	22	50.8	3.2	3.5	3.14	8.00	
	51	25	61.0	1.6	2.5	5.00	2.51	
	52	25	61.0	2.3	3.0	4.17	4.33	-
	53	25	61.0	3.2	4.0	3.12	8.05	
	61	34	76.2	2.3	3.0	5.67	3.19	
XS	62	34	76.2	3.2	4.0	4.25	5.91	-
	63	34	76.2	4.5	5.0	3.40	10.4	
	71	50	152.4	2.3	3.5	7.14	2.53	
	72	50	152.4	3.2	4.0	6.25	4.02	-
	73	50	152.4	4.5	5.0	5.00	7.06	
	81	75	203.2	3.2	4.0	9.38	2.68	
	82	75	203.2	4.5	5.0	7.50	4.71	-
	83	75	203.2	6.0	6.0	6.25	7.54	
	91	115	304.8	3.2	5.0	11.5	2.18	
	92	115	304.8	4.5	6.0	9.58	3.69	-
	93	115	304.8	6.0	7.0	8.21	5.74	

FLAT BARS

Metric Size

Standard Sectional Dimension		Sectional Area cm2	Unit Weight kg/m	Standard Sectional Dimension		Sectional Area cm2	Unit Weight kg/m	Standard Sectional Dimension		Sectional Area cm2	Unit Weight kg/m	Standard Sectional Dimension		Sectional Area cm2	Unit Weight kg/m
Thick-ness mm	Width mm			Thick-ness mm	Width mm			Thick-ness mm	Width mm			Thick-ness mm	Width mm		
4.5	25	1.125	0.88	9	180	16.20	12.7	16	300	48.00	37.7	25	180	45.00	35.3
4.5	32	1.440	1.13	9	200	18.00	14.1	19	38	7.22	5.67	25	200	50.00	39.2
4.5	38	1.710	1.34	9	230	20.70	16.2	19	44	8.360	6.56	25	230	57.50	45.1
4.5	44	1.980	1.55	9	250	22.50	17.7	19	50	9.500	7.46	25	250	62.50	49.1
4.5	50	2.250	1.77	12	25	3.000	2.36	19	65	12.35	9.69	25	280	70.00	55.0
6	25	1.500	1.18	12	32	3.810	3.01	19	75	14.25	11.2	25	300	75.00	58.9
6	32	1.920	1.51	12	38	4.560	3.58	19	90	17.10	13.4	28	100	28.00	22.0
6	38	2.280	1.79	12	44	5.280	4.14	19	100	19.00	14.9	28	125	35.00	27.5
6	44	2.640	2.07	12	50	6.000	4.71	19	125	23.75	18.6	28	150	42.00	33.0
6	50	3.000	2.36	12	65	7.800	6.12	19	150	28.50	22.4	28	180	50.40	39.6
6	65	3.900	3.06	12	75	9.000	7.06	19	180	34.20	26.8	28	200	56.00	44.0
6	75	4.500	3.53	12	90	10.80	8.48	19	200	38.00	29.8	28	230	64.40	50.6
6	90	5.400	4.24	12	100	12.00	9.42	19	230	43.70	34.3	28	250	70.00	55.0
6	100	6.000	4.71	12	125	15.00	11.8	19	250	47.50	37.3	28	280	78.40	61.5
6	125	7.500	5.89	12	150	18.00	14.1	19	280	53.20	41.8	28	300	84.00	65.9
8	25	2.000	1.57	12	180	21.60	17.0	19	300	57.00	44.7	32	100	32.00	25.1
8	32	2.560	2.01	12	200	24.00	18.8	22	50	11.00	8.64	32	125	40.00	31.4
8	38	3.040	2.39	12	230	27.60	21.7	22	65	14.30	11.2	32	150	48.00	37.7
8	44	3.520	2.76	12	250	30.00	23.6	22	75	16.50	13.0	32	180	57.60	45.2
8	50	1.000	3.14	12	280	33.60	26.4	22	90	19.80	15.5	32	200	64.00	50.2
8	65	5.200	4.08	12	300	36.00	28.3	22	100	22.00	17.3	32	230	73.60	57.8
8	75	6.000	4.71	16	32	5.120	4.02	22	125	27.50	21.6	32	250	80.00	62.8
8	90	7.200	5.65	16	38	6.080	4.77	22	150	33.00	25.9	32	280	89.60	70.3
8	100	8.000	6.28	16	44	7.040	5.53	22	180	39.60	31.1	32	300	96.00	75.4
8	125	10.00	7.85	16	50	8.000	6.28	22	200	44.00	34.5	36	100	36.00	28.3
9	25	2.250	1.77	16	65	10.40	8.16	22	230	50.60	39.7	36	125	45.00	35.3
9	32	2.280	2.26	16	75	12.00	9.42	22	250	55.00	43.2	36	150	54.00	42.4
9	38	3.420	2.68	16	90	14.40	11.3	22	280	61.60	48.4	36	180	64.80	50.9
9	44	3.960	3.11	16	100	16.00	12.6	22	300	66.00	51.8	36	200	72.00	56.5
9	50	4.500	3.53	16	125	20.00	15.7	25	50	12.50	9.81	36	230	82.80	65.0
9	65	5.850	4.59	16	150	24.00	18.8	25	65	16.25	12.8	36	250	90.00	70.6
9	75	6.750	5.30	16	180	28.80	22.6	25	75	18.75	14.7	36	280	100.8	79.1
9	90	8.100	6.36	16	200	32.00	25.1	25	90	22.50	17.7	36	300	108.0	84.8
9	100	9.000	7.06	16	230	36.80	28.9	25	100	25.00	19.6				
9	125	11.25	8.83	16	250	40.00	31.4	25	125	31.25	24.5				
9	150	13.50	10.6	16	280	44.80	35.2	25	150	37.50	29.4				

SQUARE BARS



Size in	lb/ft	kg/m	Size in	lb/ft	kg/m	Size in	lb/ft	kg/m
3/16	.1195	.178	1- 3/32	4.067	6.052	2-13/16	26.895	40.024
13/64	.1403	.209	1- 1/8	4.303	6.404	2-27/32	27.496	40.918
7/32	.1627	242	1- 5/32	4.546	6.765	2- 7/8	28.103	41.822
15/64	.1868	.278	1- 3/16	4.795	7.136	2-29/32	28.717	42.736
1/4	.2125	.316	1- 7/32	5.050	7.515	2-15/16	29.338	43.661
17/64	.2399	.357	1- 1/4	5.313	7.907	2-31/32	29.966	44.595
9/32	.2689	.400	1- 9/32	5.581	8.306	3	30.600	45.538
19/64	.2997	.446	1- 5/16	5.857	8.716	3- 1/32	31.241	47.455
5/16	.3320	.494	1-11/32	6.139	9.136	3- 1/16	31.888	47.455
21/64	.3661	.545	1- 3/8	6.428	9.566	3- 3/32	32.542	48.428
11/32	.4018	.598	1-13/32	6.724	10.007	3- 1/8	33.203	42.421
23/64	.4391	.653	1- 7/16	7.026	10.456	3- 5/32	33.871	50.406
3/8	.4718	.711	1-15/32	7.335	10.916	3- 3/16	34.545	51.409
25/64	.5188	.772	1- 1/2	7.650	11.385	3- 7/32	35.225	52.421
13/32	.5611	835	1-17/32	7.972	11.864	3- 1/4	35.913	53.444
27/64	.6051	.900	1- 9/16	8.301	12.352	3- 9/32	36.606	54.476
7/16	.6508	.969	1-19/32	8.636	12.852	3- 5/16	37.307	55.519
29/64	.6981	1.039	1- 5/8	8.978	13.361	3-11/32	38.014	56.571
15/32	.7471	1.112	1-21/32	9.327	13.880	3- 3/8	38.728	57.633
31/64	.7977	1.187	1-11/16	9.682	14.409	3-13/32	39.449	58.706
1/2	.8500	1.265	1-23/32	10.044	14.947	3- 7/16	40.176	59.789
33/64	.9040	1.345	1- 3/4	10.413	15.497	3-15/32	40.910	60.881
17/32	.9596	1.428	1-25/32	10.788	16.055	3- 1/2	41.650	61.982
35/64	1.0168	1.513	1-13/16	11.170	16.623	3- 9/16	43.151	64.261
9/16	1.0758	1.601	1-27/32	11.558	17.200	3- 5/8	44.678	66.489
37/64	1.1364	1.691	1- 7/8	11.953	17.788	3-11/16	46.232	68.801
19/32	1.1986	1.784	1-29/32	12.355	18.386	3- 3/4	47.813	71.153
39/64	1.2625	1.879	1-15/16	12.763	18.993	3-13/16	49.420	73.545
5/8	1.3281	1.977	1-31/32	13.178	19.162	3- 7/8	51.053	75.978
41/64	1.3954	2.077	2	13.600	20.239	3-15/16	52.713	78.466
21/32	1.4643	2.179	2- 1/32	14.028	20.877	4	54.400	80.956
43/64	1.5348	2.284	2- 1/16	14.463	21.524	4- 1/16	56.113	83.506
11/16	1.6070	2.392	2- 3/32	14.905	22.181	4- 1/8	57.853	86.096
45/64	1.6809	2.501	2- 1/8	15.353	22.848	4- 3/16	59.620	88.762
23/32	1.7564	2.614	2- 5/32	15.808	23.525	4- 1/4	61.413	91.394
47/64	1.8336	2.729	2- 3/16	16.270	24.212	4- 5/16	63.232	94.101
3/4	1.9125	2.846	3- 7/32	16.738	24.909	4- 3/8	65.078	96.848
49/64	1.9930	2.966	2- 1/4	17.213	25.616	4- 7/16	66.951	99.635
25/32	2.0752	3.088	2- 9/32	17.694	26.332	4- 1/2	63.850	102.461
51/64	2.1590	3.213	2- 5/16	18.182	27.058	4- 9/16	70.776	105.327
13/16	2.2445	3.340	2-11/32	18.677	27.795	4- 5/8	72.728	108.231
53/64	2.3317	3.470	2- 3/8	19.178	28.541	4-11/16	74.707	111.177
27/32	2.4205	3.602	2-13/32	19.606	29.297	4- 3/4	76.713	114.162
55/64	2.5110	3.737	2- 7/16	20.201	30.063	4-13/16	78.745	117.186
7/8	2.6031	3.874	2-15/32	20.722	30.838	4- 7/8	80.803	120.249
57/64	2.6969	4.031	2- 1/2	21.250	31.624	4-15/16	82.888	123.351
29/32	2.7924	4.156	2-17/32	21.785	32.420	5	85.000	126.494
59/64	2.8895	4.300	2- 9/16	22.326	33.225	5- 1/16	87.138	129.676
15/16	2.9883	4.447	2-19/32	22.874	34.041	5- 1/8	89.303	132.899
61/64	3.0887	4.597	2- 5/8	23.428	34.866	5- 3/16	91.495	136.161
31/32	3.1908	4.748	2-21/32	23.989	35.701	5- 1/4	93.713	139.462
63/64	3.2946	4.903	2-11/16	24.557	36.546	5- 5/16	95.957	142.801
1	3.4000	5.060	2-23/32	25.131	37.400	5- 3/8	98.228	146.180
1- 1/32	3.616	5.381	2- 3/4	25.713	38.255	5- 7/16	100.526	149.600
1- 1/16	3.838	5.712	2-25/32	26.300	39.139	5- 1/12	102.850	150.059

REFERENCE: UNITED STATES STELEL EXPORT COMPANY

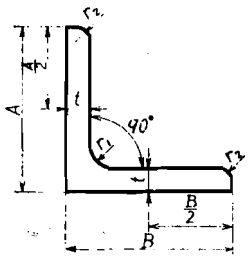
ROUND BARS

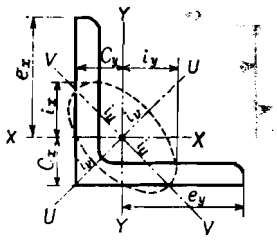
Metric Size

Diameter		Unit Weight			Diameter		Unit Weight		
mm	in	kg/m.	kg/ft	lb/ft	mm	in	kg/m.	kg/ft	lb/ft
6	0.236	0.222	0.0677	0.149	40	1.579	9.87	3.01	6.032
7	0.276	0.302	0.0921	0.203	42	1.654		3.31	7.324
8	0.315	0.395	0.120	0.265	44	1.732		3.64	7.996
9	0.354	0.499	0.152	0.335	46	1.811		3.93	8.736
10	0.394	0.617	0.183	0.415	48	1.890		4.33	9.542
11	0.433	0.746	0.227	0.501	50	1.969		4.70	10.35
12	0.472	0.888	0.271	0.597	55	2.165		5.69	12.57
13	0.512	1.04	0.316	0.699	60	2.362		6.77	14.92
14	0.561	1.21	0.368	0.813	65	2.559		7.94	17.47
15	0.591	1.39	0.423	0.934	70	2.759		9.21	20.29
16	0.630	1.58	0.481	1.062	75	2.935		10.6	23.32
17	0.069	1.78	0.543	1.196	80	3.150		12.0	26.54
18	0.709	2.00	0.609	1.344	85	3.346		13.6	29.90
19	0.748	2.23	0.678	1.498	90	3.543		15.2	33.53
20	0.787	2.47	0.752	1.660	95	3.740		17.0	37.36
21	0.827	2.72	0.829	1.826	100	3.937		18.8	41.46
22	0.860	2.98	0.910	2.002	105	4.134		20.7	45.69
23	0.908	3.26	0.994	2.191	110	4.331		22.7	50.13
24	0.945	3.55	1.09		115	4.528		24.9	54.83
25	0.984	3.85	1.17	2.587	120	4.724		27.1	59.67
26	1.024	4.17	1.27	2.802	125	4.921		29.4	64.71
28	1.102	4.83	1.47	3.246	130	5.118		31.8	69.88
30	1.181	5.51	1.69	3.729	135	5.315		34.2	75.26
32	1.260	6.31	1.92	4.240	140	5.512		36.8	81.31
34	1.335	7.13	2.17	4.791	145	5.709		39.5	87.36
36	1.417	7.99	2.44	5.369	150	5.906		42.3	93.40
38	1.496	8.90	2.71	5.981	200	7.874		75.3	165.97

Inch Size

Diameter			Unit Weight			Diameter			Unit Weight		
in	in	mm	kg/m	kg/ft	lb/ft	in	in	mm	kg/m	kg/ft	lb/ft
3/16	0.1875	4.763	0.140	0.0426	0.09392	7/8	0.8750	22.225	3.05		2.046
1/4	0.2500	6.350	0.249	0.0750	0.1671	15/16	0.9375	28.813	3.50		2.356
5/16	0.3126	7.930	0.388	0.118	0.2601	1	1.0000	25.400	3.98		2.668
3/8	0.3750	9.525	0.559	0.170	0.3748	1 1/8	1.1250	28.575	5.03		3.373
7/16	0.4375	11.113	0.761	0.232	0.3113	1 1/4	1.2500	31.750	6.21		4.167
1/2	0.5000	12.700	0.995	0.303	0.6680	1 3/8	1.3750	34.925	7.52		5.049
9/16	0.5625	14.288	1.26	0.384	0.0470	1 1/2	1.5000	38.100	8.95		6.091
5/8	0.6250	15.875	1.55	0.474	1.045	1 5/8	1.6250	41.275	10.5		7.055
11/16	0.6875	17.463	1.88	0.573	1.263	1 3/4	1.7500	44.450	12.2		8.179
3/4	0.7500	19.050	2.24	0.682	1.504	1 7/8	1.8750	47.625	14.0		9.392
13/16	0.8125	20.638	2.63	0.801	1.766	2	2.000	50.800	15.9		10.68

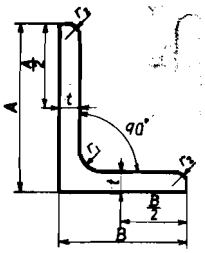


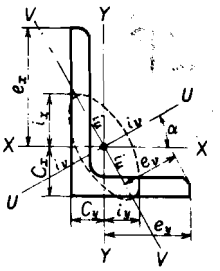


Geometrical moment of inertia $I = ai^2$
Radius of gyration of area $i = \sqrt{I/a}$
Modulus of section $Z = I/e$
(a : sectional area)

EQUAL ANGLE JIS G 3192

Standard sectional dimension mm				Sectional Area cm^2	Unit Weight kg/m	Reference											
A x B	t	r_1	r_2			Position of Center of Gravity cm		Geometrical moment of inertia cm^4				Radius of Gyration of Area cm				Modulus of Section cm^3	
						Cx	Cy	Ix	Iy	Max ix	Min iy	i_x	i_y	Max ix	Min iy	Z_x	Z_y
25 X 25	3	4	2	1.427	1.12	0.719	0.719	0.797	0.797	1.28	0.332	0.747	0.747	0.940	0.483	0.448	0.448
30 X 30	3	4	2	1.727	1.36	0.844	0.844	1.42	1.42	2.26	0.590	0.908	0.908	1.14	0.585	0.661	0.661
40 X 40	3	4.5	2	2.336	1.83	1.09	1.09	3.53	3.53	5.60	1.46	1.23	1.23	1.55	0.790	1.21	1.21
40 X 40	5	4.5	3	3.755	2.95	1.17	1.17	5.42	5.42	8.59	2.25	1.20	1.20	1.51	0.774	1.91	1.91
45 X 45	4	6.5	3	3.492	2.74	1.27	1.24	6.50	6.50	10.3	2.70	1.36	1.36	1.72	0.880	2.00	2.00
45 X 45	5	6.5	3	4.302	3.38	1.28	1.28	7.91	7.91	12.5	3.29	1.36	1.36	1.71	0.874	2.46	2.46
50 X 50	4	6.5	3	3.892	3.06	1.37	1.37	9.06	9.06	14.4	3.76	1.53	1.53	1.92	0.983	2.49	2.49
50 X 50	5	6.5	3	4.802	3.77	1.41	1.41	11.1	11.1	17.5	4.58	1.52	1.52	1.91	0.976	3.08	3.08
50 X 50	6	6.5	4.5	5.644	4.43	1.44	1.44	12.6	12.6	20.0	5.23	1.50	1.50	1.88	0.963	3.55	3.55
60 X 60	4	6.5	3	4.692	3.68	1.61	1.61	16.0	16.0	25.4	6.62	1.85	1.85	2.33	1.19	3.66	3.66
60 X 60	5	6.5	3	5.802	4.55	1.66	1.66	19.6	19.6	31.2	8.09	1.84	1.84	2.32	1.18	4.52	4.52
65 X 65	5	8.5	3	6.367	5.00	1.77	1.77	25.3	25.3	40.1	10.5	1.99	1.99	2.51	1.28	5.35	5.35
65 X 65	6	8.5	4	7.527	5.91	1.81	1.81	29.4	29.4	46.6	12.2	1.98	1.98	2.49	1.27	6.26	6.26
65 X 65	8	8.5	6	9.761	7.66	1.88	1.88	36.8	36.8	58.3	15.3	1.94	1.94	2.44	1.25	7.96	7.96
70 X 70	6	8.5	4	8.127	6.38	1.93	1.93	37.1	37.1	58.9	15.3	2.14	2.14	2.69	1.37	7.33	7.33
75 X 75	8	8.5	4	8.727	6.85	2.06	2.06	46.1	46.1	73.2	19.0	2.30	2.30	2.90	1.48	8.47	8.47
75 X 75	9	8.5	6	12.69	9.96	2.17	2.17	64.4	64.4	102	26.7	2.25	2.25	2.84	1.45	12.1	12.1
75 X 75	12	8.5	6	16.56	13.0	2.29	2.29	81.9	81.9	129	34.5	2.22	2.22	2.79	1.44	15.7	15.7
80 X 80	6	8.5	4	9.327	7.32	2.18	2.18	56.4	56.4	89.6	23.2	2.46	2.46	3.10	1.58	9.70	9.70
90 X 90	8	10	5	10.55	8.28	2.42	2.42	80.7	80.7	128	33.4	2.77	2.77	3.48	1.78	12.3	12.3
90 X 90	7	10	5	12.22	9.59	2.46	2.46	93.0	93.0	148	38.3	2.76	2.78	3.48	1.77	14.2	14.2
90 X 90	10	10	7	17.00	13.3	2.57	2.57	125	125	199	51.7	2.71	2.71	3.42	1.74	19.5	19.5
90 X 90	13	10	7	21.71	17.0	2.69	2.69	156	156	248	65.3	2.68	2.68	3.38	1.73	24.8	24.8
100 X 100	7	10	5	13.62	10.7	2.71	2.71	129	129	205	53.2	3.08	3.08	3.88	1.98	17.7	17.7
100 X 100	10	10	7	19.00	14.9	2.82	2.82	175	175	278	72.0	3.04	3.04	3.83	1.95	24.4	24.4
100 X 100	13	10	7	24.31	19.1	2.94	2.94	220	220	348	91.1	3.00	3.00	3.78	1.94	31.1	31.1
120 X 120	8	12	5	18.76	14.7	3.24	3.24	258	258	410	106	3.71	3.71	4.67	2.38	29.5	29.5
130 X 130	9	12	6	22.74	17.9	3.53	3.53	366	368	583	150	4.01	4.01	5.06	2.57	38.7	38.7
130 X 130	12	12	8.5	29.76	23.4	3.64	3.64	467	467	743	192	3.96	3.96	5.00	2.54	49.9	49.9
130 X 130	15	12	8.5	36.75	28.8	3.76	3.76	568	568	902	234	3.93	3.93	4.95	2.53	21.5	21.5
150 X 150	12	14	7	34.77	27.3	4.14	4.14	740	740	1180	304	4.61	4.61	5.82	2.96	68.1	68.1
150 X 150	15	14	10	42.74	33.6	4.24	4.24	888	888	1410	365	4.56	4.56	5.75	2.92	82.6	82.6
150 X 150	19	14	10	53.38	41.9	4.40	4.40	1090	1090	1730	451	4.52	4.52	5.69	2.91	103	103
175 X 175	12	15	11	40.52	31.8	4.73	4.73	1170	1170	1860	480	5.38	5.38	6.78	3.44	91.8	91.8
175 X 175	15	15	11	50.21	39.4	4.85	4.85	1440	1440	2290	589	5.35	5.35	6.75	3.42	114	114
200 X 200	15	17	12	57.75	45.3	5.46	5.46	2180	2180	3470	891	6.14	6.14	7.75	3.93	150	150
200 X 200	20	17	12	76.00	59.7	5.67	5.67	2820	2820	4490	1160	6.09	6.09	7.68	3.90	197	197
200 X 200	25	17	12	93.75	73.6	5.86	5.86	3420	3420	5420	1410	6.04	6.04	7.61	3.88	242	242
250 X 250	25	24	12	119.4	93.7	7.10	7.10	6950	6950	11000	2860	7.63	7.63	9.62	4.90	388	388
250 X 250	35	24	18	162.6	128	7.45	7.45	9110	9110	14400	3790	7.49	7.49	9.42	4.83	519	519

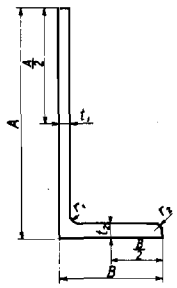




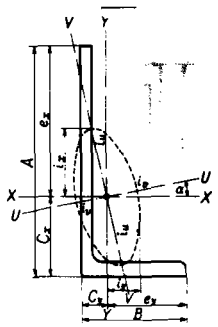
Geometrical moment of inertia $I = al^2$
Radius of gyration of area $i = \sqrt{I/a}$
Modulus of section $Z = I/e$
(a : sectional area)

UNEQUAL ANGLE JIS G 3192

Standard sectional dimension mm				Sectional Area cm^3	Unit Weight kg/m	Reference												
A x B	t	r_1	r_2			Position of Center of Gravity cm		Geometrical moment of inertia cm^4				Radius of Gyration of Area cm				tan α	Modulus of Section cm^3	
						Cx	Cx	Ix	Iy	Max Iu	Max Iv	ix	iy	Max iu	Min iv		Zx	Zy
90 x 75	9	8.5	6	14.04	11.0	2.75	2.00	109	68.1	143	34.1	2.78	2.20	3.19	1.56	0.676	17.4	12.4
100 x 75	7	10	5	11.87	9.32	3.06	1.83	118	56.9	144	30.8	3.15	2.19	3.49	1.61	0.548	17.0	10.0
100 x 75	10	10	7	16.50	13.0	3.17	1.94	159	76.1	194	41.3	3.11	2.15	3.43	1.58	0.543	23.3	13.7
125 x 75	7	10	5	13.62	10.7	4.10	1.64	219	60.4	243	36.4	4.01	2.11	4.23	1.64	0.362	26.1	10.3
125 x 75	10	10	7	19.00	14.9	4.22	1.75	299	80.8	330	49.0	3.96	2.06	4.17	1.61	0.357	36.1	14.1
125 x 75	13	10	7	24.31	19.1	4.35	1.87	376	101	415	61.9	3.93	2.04	4.13	1.60	0.352	46.1	17.9
125 x 90	10	10	7	20.50	16.1	3.95	2.22	318	138	380	76.2	3.94	2.59	4.30	1.93	0.505	37.2	20.3
125 x 90	13	10	7	26.26	20.6	4.07	2.34	401	173	477	96.3	3.91	2.57	4.26	1.91	0.501	47.5	25.9
150 x 90	9	12	6	20.94	16.4	4.95	1.99	485	133	537	80.4	4.81	2.52	5.06	1.96	0.361	48.2	19.0
150 x 90	12	12	8.5	27.36	21.5	5.07	2.10	619	167	685	102	4.76	2.47	5.00	1.93	0.357	62.3	24.3
150 x100	9	12	6	21.84	17.1	4.76	2.30	502	181	579	104	4.79	2.88	5.15	2.18	0.439	49.1	23.5
150 x100	12	12	8.5	28.56	22.4	4.88	2.41	612	223	738	132	4.74	2.83	5.09	2.15	0.435	63.4	30.1
150 x100	15	12	8.5	35.25	27.7	5.00	2.53	782	276	897	161	4.71	2.80	5.04	2.14	0.431	78.2	37.0

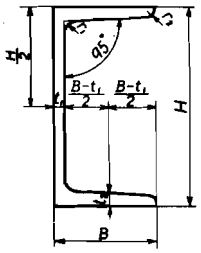


Geometrical moment of inertia $I = al^2$
Radius of gyration of area $i = \sqrt{I/a}$
Modulus of section $Z = I/e$
(a : sectional area)

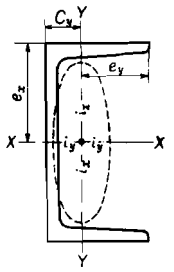


UNEQUAL ANGLE AND UNEQUAL THICKNESS JIS G 3192

Standard sectional dimension mm					Sectional Area cm^2	Unit Weight kg/m	Reference												
A x B	t_1	t_2	r_1	r_2			Position of Center of Gravity cm		Geometrical moment of inertia cm^4				Radius of Gyration of Area cm				tan α	Modulus of Section cm^3	
							Cx	Cy	Ix	Iy	Max Iu	Max Iv	ix	iy	Max iu	Min iv		Zx	Zy
200 x 90	9	14	14	7	29.66	23.3	6.36	2.15	1210	200	1290	125	6.39	2.60	6.58	2.05	0.263	88.7	29.2
250 x 90	10	15	17	8.5	37.47	29.4	8.61	1.92	2440	223	2520	147	8.08	2.44	8.20	1.98	0.182	149	31.5
250 x 90	12	16	17	8.5	42.95	33.7	8.99	1.89	2790	238	2870	160	8.07	2.35	8.18	1.93	0.173	174	33.5
300 x 90	11	16	19	9.5	46.22	36.3	11.0	1.76	4370	245	4440	168	9.72	2.30	9.80	1.90	0.136	229	33.8
300 x 90	13	17	19	9.5	52.67	41.3	11.3	1.75	4940	259	5020	181	9.63	2.22	9.76	1.85	0.128	265	35.8
350 x 100	12	17	22	11	57.74	45.3	13.0	1.87	7440	362	7550	251	11.3	2.50	11.4	2.08	0.124	338	44.5
400 x 100	13	18	24	12	68.59	53.8	15.4	1.77	11500	388	11600	277	12.9	2.38	13.0	2.01	0.0996	467	47.1

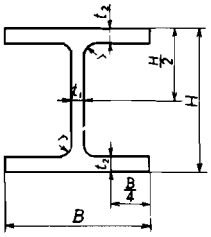


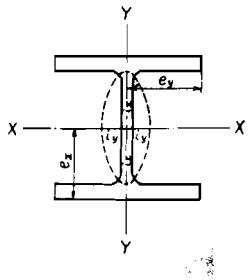
Geometrical moment of inertia $I = al^2$
Radius of gyration or area $i = \sqrt{I/a}$
Modulus of section $Z = I/e$
(a : sectional area)



CHANNEL JIS G 3192

Standard sectional dimension mm					Sectional Area cm^2	Unit Weight kg/m	Reference							
H x B	t_1	t_2	r_1	r_2			Position of Center of Gravity cm		Geometrical moment of inertia cm^4		Radius of Gyration of Area cm		Modulus of Section cm^3	
							Cx	Cy	Ix	ix	Iy	iy	Zx	Zy
75 x 40	5	7	8	4	8.818	6.92	0	1.28	75.3	12.2	2.92	1.17	20.1	4.47
100 x 50	5	7.5	8	4	11.92	9.36	0	1.54	188	26.0	3.97	1.48	37.6	7.52
125 x 65	6	8	8	4	17.11	13.4	0	1.90	424	61.8	4.98	1.90	67.8	13.4
150 x 75	6.5	10	10	5	23.71	18.6	0	2.28	861	117	6.03	2.22	115	22.4
150 x 75	9	12.5	15	7.5	30.59	24.0	0	2.31	1050	147	5.86	2.19	140	28.3
180 x 75	7	10.5	11	5.5	27.20	21.4	0	2.13	1380	131	7.12	2.19	153	24.3
200 x 80	7.5	11	12	6	31.33	24.6	0	2.21	1950	168	7.88	2.32	195	29.1
200 x 90	8	13.5	14	7	38.65	30.3	0	2.74	2490	277	8.02	2.68	249	44.2
250 x 90	9	13	14	7	44.07	34.6	0	2.40	4180	294	9.74	2.58	334	44.5
250 x 90	11	14.5	17	8.5	51.17	40.2	0	2.40	4680	329	9.56	2.54	374	49.9
300 x 90	9	13	14	7	48.57	38.1	0	2.22	6440	309	11.5	2.52	429	45.7
300 x 90	10	15.5	19	9.5	55.74	43.8	0	2.34	7410	360	11.5	2.54	494	54.1
300 x 90	12	16	19	9.5	61.90	48.6	0	2.28	7870	379	11.3	2.48	525	56.4
380 x100	10.5	16	18	9	69.39	54.5	0	2.41	14500	535	14.5	2.78	763	70.5
380 x100	13	16.5	18	9	78.96	62.0	0	2.33	15600	565	14.1	2.67	823	73.6
380 x100	13	20	24	12	85.71	67.3	0	2.54	17600	655	14.3	2.76	926	87.8





Geometrical moment of inertia $I = ai^2$
Radius of gyration or area $i = \sqrt{I/a}$
Modulus of section $Z = I/e$
(a : sectional area)

H-BEAM JIS G 3192

Standard sectional dimension mm					Sectional Area cm^2	Unit Weight kg/m	Reference					
Nominal Dimension (Height x flage)	H x B	t_1	t_2	r			Geometrical moment of inertia cm^4		Radius of Gyration of Area cm		Modulus of Section cm^3	
							Ix	Iy	ix	iy	Zx	Zy
100 x 50	100 x 50	5	7	8	11.85	9.30	187	14.8	3.98	1.12	37.5	5.91
100 x 100	100 x100	6	8	10	21.90	17.2	383	134	4.18	2.47	76.5	26.7
125 x 60	125 x 60	6	8	9	16.84	13.2	413	29.2	4.95	1.32	66.1	9.73
125 x 125	125 x125	6.5	9	10	30.31	23.8	847	293	5.29	3.11	136	47.0
150 x 75	150 x 75	5	7	8	17.85	14.0	666	49.5	6.11	1.66	88.8	13.2
150 X 100	148 X100	6	9	11	26.84	21.1	1020	151	6.17	2.37	138	30.1
150 X 150	150 X150	7	10	11	40.14	31.5	1640	563	6.39	3.75	219	75.1
175 X 90	175 X 90	5	8	9	23.04	18.1	1210	97.5	7.26	2.06	139	21.7
175 X 175	175 X175	7.5	11	12	51.21	40.2	2880	984	7.50	4.38	330	112
200 X 100	198 X 99	4.5	7	11	23.18	18.2	1580	114	8.26	2.21	184	23.0
	200 X100	5.5	8	11	27.16	21.3	1840	134	8.24	2.22	184	26.8
200 X 150	194 X150	6	9	13	39.01	30.6	2690	507	8.30	3.61	277	67.6
200 X 200	200 X200	8	12	13	63.53	49.9	4720	1600	8.62	5.02	472	160
	200 X204	12	12	13	71.53	56.2	4980	1700	8.35	4.88	498	167
250 X 125	248 X124	5	8	12	32.68	25.7	3540	255	10.4	2.79	285	41.1
	250 X125	6	9	12	37.66	29.6	4050	294	10.4	2.79	324	47.0
250 X 175	244 X175	7	11	16	56.24	44.1	6120	984	10.4	4.18	502	113
250 X 250	250 X250	9	14	16	92.18	72.4	10800	3650	10.8	6.29	867	292
	250 X255	14	14	16	104.7	82.2	11500	3880	10.5	6.09	919	304
300 X 150	298 X149	5.5	8	13	40.80	32.0	6320	442	12.4	3.29	424	59.3
	300 X150	6.5	9	13	46.78	36.7	7210	508	12.4	3.29	481	67.7
300 X 200	294 X200	8	12	18	72.38	56.8	11300	1600	12.5	4.71	771	160
	294 X302	12	12	18	107.7	84.5	16900	5520	12.5	7.16	1150	365
300 X 300	300 X300	10	15	18	119.8	94.0	20400	6750	13.1	7.51	1360	450
	300 X305	15	15	18	134.8	106	21500	7100	12.6	7.26	1440	466
350 X 175	346 X174	6	9	14	52.68	41.4	11100	792	14.5	3.88	641	91.0
	350 X175	7	11	14	63.14	49.6	13600	948	14.7	3.95	775	112
350 X 250	340 X250	9	14	20	101.5	79.7	21700	3650	14.6	6.00	1280	292

H-BEAM continued

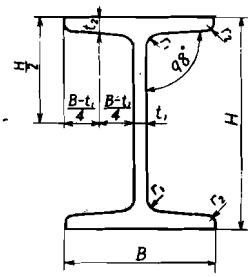
Standard sectional dimension mm					Sectional Area cm^2	Unit Weight kg/m	Reference					
Nominal Dimension (Height x flage)	H x B	t_1	t_2	r			Geometrical moment of inertia cm^4		Radius of Gyration of Area cm		Modulus of Section cm^3	
							Ix	Ix	ix	iy	Zx	Zy
350X350	344X348	10	16	20	146.0	115	33300	11200	15.1	8.78	1940	646
	350X350	12	19	20	173.9	137	40300	13600	15.2	8.84	2300	776
400X200	396X199	7	11	16	72.16	56.6	20000	1450	16.7	4.48	1010	145
	400X200	8	13	16	84.12	66.0	23700	1740	16.8	4.54	1190	174
400X300	390X300	10	16	22	136.0	107	38700	7210	16.9	7.28	1980	481
400X400	*388X402	15	15	22	178.5	140	49000	16300	16.6	9.54	2520	809
	*394X398	11	18	22	186.8	147	56100	18900	17.3	10.1	2850	951
	400X400	13	21	22	218.7	172	66600	22400	17.5	10.1	3330	1120
	*400X408	21	21	22	250.7	197	70900	23800	16.8	9.75	3540	1170
	*414X405	18	28	22	295.4	232	92800	31000	17.7	10.2	4480	1530
	*428X407	20	35	22	360.7	283	119000	39400	18.2	10.4	5570	1930
	*458X417	30	50	22	528.6	415	187000	60500	18.8	10.7	8170	2900
	*498X432	45	70	22	770.1	605	298000	94400	19.7	11.1	12000	4370
450X200	446X199	8	12	18	84.30	66.2	28700	1580	18.5	4.33	1290	159
	450X200	9	14	18	96.76	76.0	33500	1870	18.6	4.40	1490	187
450X300	440X300	11	18	24	157.4	124	56100	8110	18.9	7.18	2550	541
500X200	496X199	9	14	20	101.3	79.5	41900	1840	20.3	4.27	1690	185
	500X200	10	16	20	114.2	89.6	47800	2140	20.5	4.33	1610	214
	*506X201	11	19	20	131.3	103	56500	2580	20.7	4.43	2230	257
500X300	482X300	11	15	26	145.5	114	60400	6760	20.4	6.82	2500	451
	488X300	11	18	26	163.5	128	71000	8110	20.8	7.04	2910	541
600X200	596X199	10	15	22	120.5	94.6	68700	1980	23.9	4.05	2310	199
	600X200	11	17	22	134.4	106	77600	2280	24.0	4.12	2590	228
	*606X201	12	20	22	152.5	120	90400	2720	24.3	4.22	2980	271
600X300	582X300	12	17	28	174.5	137	103000	7670	24.3	6.63	3530	511
	588X300	12	20	28	192.5	151	118000	9020	24.8	6.85	4020	601
	*594X302	14	23	28	222.4	175	137000	10600	24.9	6.90	4620	701
700X300	*692X300	13	20	28	211.5	166	172000	9020	28.6	6.53	4980	602
	700X300	13	24	28	235.5	185	201000	10800	29.3	6.78	5760	722
800X300	*792X300	14	22	28	243.4	191	254000	9930	32.3	6.39	6410	662
	800X300	14	26	28	267.4	210	292000	11700	33.0	6.62	7290	782
900X300	*890X299	15	23	28	270.9	213	345000	10300	35.7	6.16	7760	688
	900X300	16	28	28	309.8	243	411000	12600	36.4	6.39	9140	843
	*912X302	18	34	28	364.0	286	498000	15700	37.0	6.56	10900	1040

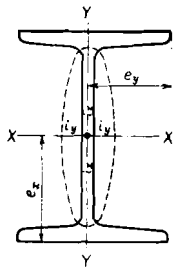
STEEL H PILES

JIS A 5526

(Metric Series)

Nominal Size	Dimension				Sectional Area cm^2	Unit Weight kg/m	Reference						
							Geometrical moment of inertia cm^4		Modulus of Section		Radius of Gyration of Area cm		Area of Outer Surface m^2/m
	H mm	B mm	t_1 mm	t_2 mm			Ix cm^4	Iy	Zx cm^3	Zy cm^3	ix cm	iy cm	
200X200	200	204	12	12	71.53	56.2	498 X 10	170 X 10	498	167	8.36	4.88	1.17
250X250	244	252	11	11	82.06	64.4	879 X 10	292 X 10	720	233	10.3	5.98	1.45
	250	255	14	14	104.7	82.2	115 X 10^2	388 X 10	919	304	10.5	6.09	1.46
300X300	294	302	12	12	107.7	84.5	169 X 10^2	552 X 10	115 X 10	365	12.5	7.16	1.74
	300	300	10	15	119.8	94.0	204 X 10^2	675 X 10	136 X 10	450	13.1	7.51	1.75
	300	305	15	15	134.8	106	215 X 10^2	710 X 10	144 X 10	466	12.6	7.26	1.76
	338	351	13	13	135.3	106	282 X 10^2	938 X 10	167 X 10	534	14.4	8.33	2.02
350X350	344	354	16	16	166.6	131	353 X 10^2	118 X 10^2	205 X 10	669	14.6	8.43	2.04
	350	350	12	19	173.9	137	403 X 10^2	136 X 10^2	230 X 10	776	15.2	8.84	2.04
	350	357	19	19	198.4	156	428 X 10^2	144 X 10^2	245 X 10	809	14.7	8.53	2.06
	388	402	15	15	178.5	140	490 X 10^2	163 X 10^2	252 X 10	809	16.6	9.54	2.32
	394	405	18	18	214.4	168	597 X 10^2	200 X 10^2	303 X 10	985	16.7	9.65	2.33
	400	400	13	21	218.7	172	666 X 10^2	224 X 10^2	333 X 10	1120	17.5	10.1	2.34
400X400	400	408	21	21	250.7	197	709 X 10^2	238 X 10^2	354 X 10	1170	16.8	9.75	2.35
	414	405	18	28	295.4	232	928 X 10^2	310 X 10^2	448 X 10	1350	17.7	10.2	2.38
	428	407	20	35	360.7	283	119 X 10^3	394 X 10^2	557 X 10	1930	18.2	10.4	2.41

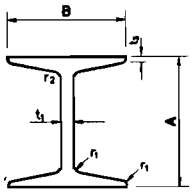


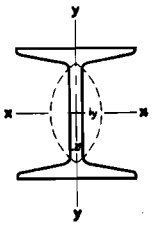


Geometrical moment of inertia $I = ai^2$
Radius of gyration or area $i = \sqrt{I/a}$
Modulus of section $Z = I / e$
(a : sectional area)

I-BEAM JIS G 3192

Standard Sectional Dimension mm					Sectional Area cm^2	Unit Weight kg/m	Reference							
H x B	t_1	t_2	r_1	r_2			Position of Centre of Gravity cm		Geometrical moment of inertia cm^4		Radius of Gyration of Area cm		Modulus of Section cm^3	
							Cx	Cy	Ix	Iy	ix	iy	Zx	Zy
100X 75	5.	8	7	3.5	16.43	12.9	0	0	281	47.3	4.14	1.70	56.2	12.6
125X 75	5.5	9.5	9	4.5	20.45	16.1	0	0	538	57.5	5.13	1.68	86.0	15.3
150X 75	5.5	9.5	9	4.5	21.83	17.1	0	0	819	57.5	6.12	1.62	109	15.3
150X125	8.5	14	13	6.5	46.15	36.2	0	0	1760	385	6.18	2.89	235	61.6
180X100	6	10	10	5	30.06	23.6	0	0	1670	138	7.45	2.14	186	27.5
200X100	7	10	10	5	33.06	26.0	0	0	2170	138	8.11	2.05	217	27.7
200X150	9	16	15	7.5	64.16	50.4	0	0	4460	753	8.34	3.43	446	10.0
250X125	7.5	12.5	12	6	48.79	38.3	0	0	5180	337	10.3	2.63	414	53.9
250X125	10	19	21	10.5	70.73	55.5	0	0	7310	538	10.2	2.76	585	86.0
300X150	8	13	12	6	61.58	48.3	0	0	9480	588	12.4	3.09	632	78.4
300X150	10	18.5	19	9.5	83.47	65.5	0	0	12700	886	12.3	3.26	849	118
300X150	11.5	22	23	11.5	97.88	76.8	0	0	14700	1080	12.2	3.32	978	143
350X150	9	15	13	6.5	74.58	58.5	0	0	15200	702	14.3	3.07	870	93.5
350X150	12	24	25	12.5	111.1	87.2	0	0	22400	1180	14.2	3.26	1280	158
400X150	10	18	17	8.5	91.73	72.0	0	0	21400	864	16.2	3.07	1200	115
400X150	12.5	25	27	13.5	122.1	95.8	0	0	31700	1240	16.1	3.18	1580	165
450X175	11	20	19	9.5	116.8	91.7	0	0	39200	1510	18.3	3.60	1740	173
450X175	13	26	27	13.5	146.1	115	0	0	48800	2020	18.3	3.72	2170	231
600X190	13	25	25	12.5	169.4	133	0	0	98400	2460	24.1	3.81	3280	259
600X190	16	35	38	19	224.5	176	0	0	130000	3540	24.1	3.97	4330	373





MINING I-BEAM

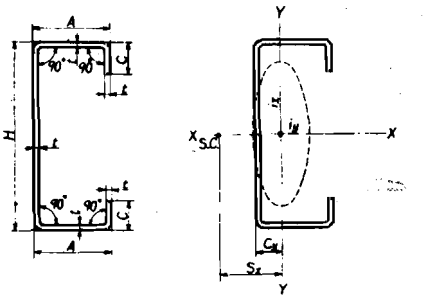
Size	Depth	Flange Width	Thickness			Corner Radius		Sectional Area	Weight			Moment of Inertia		Radius of Gyration		Modulus of Section	
	A	B	t	t	t	r	r					Jx	Jy	ix	iy	Zx	Zy
	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	cm^2 (in^2)	kg/m	kg/m	lb/ft	cm^4 (in^4)	cm^4 (in^4)	cm (in)	cm (in)	cm^3 (in^3)	cm^3 (in^3)
MI 105	105 (4.134)	84 (3.307)	9 (.354)	19 (.748)	7 (.276)	15 (.591)	4 (.157)	28.89 (4.478)	22.7	6.92	15.25	488.4 (11.73)	97.8 (2.350)	4.13 (1.624)	1.83 (.737)	93.1 (5.681)	23.3 (1.422)
MI 115	115 (4.528)	94 (3.740)	11 (.433)	22 (.866)	7 (.276)	16 (.630)	4 (.157)	36.51 (5.659)	28.7	8.75	19.29	733.0 (17.61)	153.2 (3.680)	4.48 (1.764)	2.65 (.806)	127.5 (7.780)	32.3 (1.971)

Standard Length: 3.5m 4.5m 5.5m 6.0m 7.0m 8.0m 9.0m 10.0m 11.0m 12.0m
15ft 20ft 25ft 30ft 35ft 40ft

Maximum Lenght: 25.0m or 80ft.

MINING I-BEAMS IN THREE GRADES Mining I-Beams are supplied in three grades to suit the various requirements of mines and are cut to lenght

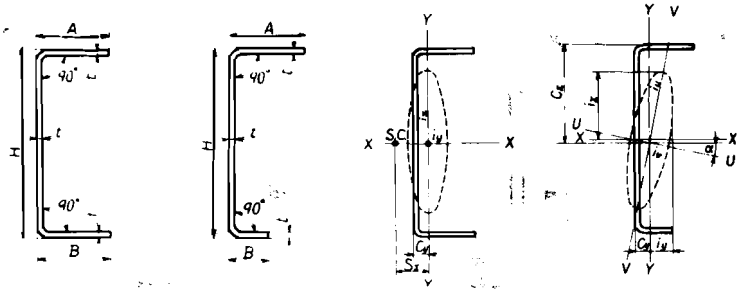
Grade	Ultimate Tensile Strenght	Yielding Point	Minimum Elongation
Grade 1	50 kg/mm^2 minimum	30 kg/m^2 minimum	20%
Grade 2	57 kg/mm^2 minimum	34 kg/mm^2 minimum	16%
Grade 3	67 kg/mm^2 minimum	40 kg/mm^2 minimum	12%



LIGHT LIP CHANNEL

JIS G3350

Dimensions mm		Sectional Area cm^2	Unit Weight kg/m	Centre of Gravity cm		Secondary Moment of Area cm^4		Radius of Gyration of Area cm		Modulus of Section cm^3		Centre of Shear cm	
HxAxC	t			Cx	Cy	Ix	Iy	ix	iy	Zx	Zy	Sx	Sy
250 x 75 x 25	4.5	18.92	14.9	0	2.07	1690	129	9.44	2.62	135	23.8	5.1	0
200 x 75 x 20	4.5	16.67	13.1	0	2.32	990	121	7.61	2.69	99.0	23.3	5.6	0
	4.0	14.95	11.7	0	2.32	895	110	7.74	2.72	89.5	21.3	5.7	0
	3.2	12.13	9.52	0	2.33	736	92.3	7.70	2.76	73.6	17.8	5.7	0
200X75X20	4.5	16.22	12.7	0	2.19	963	109	7.71	2.60	96.3	20.6	5.3	0
	4.0	14.55	11.4	0	2.19	871	100	7.74	2.62	87.1	18.9	5.3	0
	3.2	11.81	9.27	0	2.19	716	84.1	7.79	2.67	71.6	15.8	5.4	0
150X75X25	4.5	14.42	11.3	0	2.65	501	109	5.90	2.75	66.9	22.5	6.3	0
	4.0	12.95	10.2	0	2.65	455	99.8	5.93	2.78	60.6	20.6	6.3	0
	3.2	10.53	8.27	0	2.66	375	83.6	5.97	2.82	50.0	17.3	6.4	0
150X65X20	4.0	11.75	9.22	0	2.11	401	63.7	5.48	2.33	53.3	14.5	5.0	0
	3.2	9.567	7.51	0	2.11	332	53.8	5.89	2.37	44.3	12.2	5.1	0
	2.3	7.012	5.50	0	2.12	248	41.1	5.94	2.42	33.0	9.37	5.2	0
150X50X20	4.5	11.72	9.20	0	1.54	368	35.7	5.60	1.75	49.0	10.5	3.7	0
	3.2	8.607	6.76	0	1.54	280	28.3	5.71	1.81	37.4	8.19	3.8	0
	2.3	6.322	4.96	0	1.55	210	21.9	5.77	1.86	28.0	6.33	3.8	0
125X50X20	4.5	10.59	8.32	0	1.68	238	33.5	4.74	1.78	38.0	10.0	4.0	0
	4.0	9.548	7.50	0	1.68	217	33.1	4.77	1.81	34.7	9.38	4.0	0
	3.2	7.807	6.13	0	1.68	181	26.6	4.82	1.85	29.0	8.02	4.0	0
	2.3	5.747	4.51	0	1.69	137	20.6	4.88	1.89	21.9	6.22	4.1	0
120X60X25	4.5	11.72	9.20	0	2.25	252	58.0	4.63	2.22	41.9	15.5	5.3	0
120X60X20	3.2	8.287	6.51	0	2.12	186	40.9	4.74	2.22	31.0	10.5	4.9	0
	2.3	6.092	4.78		2.13	140	31.3	4.79	2.27	23.3	8.10	5.1	0
120X40X20	3.2	7.007	5.50	0	1.32	144	15.3	4.53	1.48	24.0	5.71	3.4	0
100X50X20	4.5	9.469	7.43	0	1.86	139	30.9	3.82	1.81	27.7	9.82	4.3	0
	4.0	8.548	6.71	0	1.86	127	28.7	3.85	1.83	25.4	9.13	4.3	0
	3.2	7.007	5.50	0	1.86	107	24.5	3.90	1.87	21.3	7.81	4.4	0
	2.8	6.205	4.87	0	1.88	99.8	23.2	3.96	1.91	20.0	7.44	4.3	0
	2.3	5.172	4.06	0	1.86	80.7	19.0	3.95	1.92	16.1	6.06	4.4	0
	2.0	4.537	3.56	0	1.86	71.4	16.9	3.97	1.93	14.3	5.40	4.4	0
	1.6	3.672	2.88	0	1.87	58.4	14.0	3.99	1.95	11.7	4.47	4.5	0
90X45X20	3.2	6.367	5.00	0	1.72	76.9	18.3	3.48	1.69	17.1	6.57	4.1	0
	2.3	4.712	3.70	0	1.73	58.6	14.2	3.53	1.74	13.0	5.14	4.1	0
	1.6	3.352	2.63	0	1.73	42.6	10.5	3.56	1.77	9.46	5.80	4.2	0
75X45X15	2.3	4.137	3.25	0	1.72		11.8	3.00	1.69	9.90	4.24	4.0	0
	2.0	3.637	2.86	0	1.72		10.5	3.01	1.70	8.79	3.76	4.0	0
	1.6	2.952	2.32	0	1.72		8.71	3.03	1.72	7.24	3.13	4.1	0
75X35X15	2.3	3.677	2.89	0	1.29	31.0	6.58	2.91	1.34	8.28	2.98	3.1	0
70X40X25	1.6	3.032	2.38	0	1.80	22.0	8.00	2.69	1.62	6.29	3.64	4.4	0
60X30X10	2.3	2.872	2.25	0	1.06	15.6	3.32	2.33	1.07	5.20	1.71	2.5	0
	2.0	2.537	1.99	0	1.06	14.0	3.01	2.35	1.09	4.65	1.55	2.5	0
	1.6	2.072	1.63	0	1.06	11.6	2.56	2.37	1.11	3.88	1.32	2.5	0



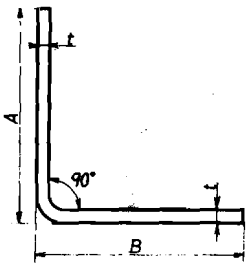
LIGHT CHANNEL

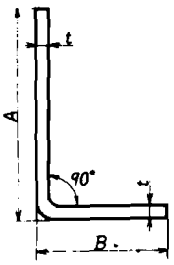
JIS G 3350

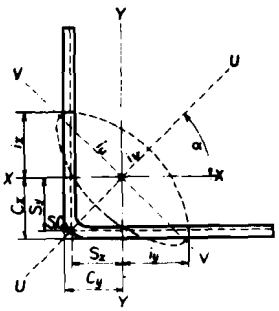
Dimensions mm		Sectional Area cm^2	Unit Weight kg/m	Centre of Gravity cm		Secondary Moment of Area cm^4		Radius of Gyration of Area cm		Modulus of Section cm^3		Centre of Shear cm	
HxAxC	t			Cx	Cy	Ix	Iy	ix	iy	Zx	Zy	Sx	Sy
450X75X75	6.0	34.82	27.3	0	1.19	8100	122	15.5	1.87	374	19.4	2.7	0
	4.5	26.33	20.7	0	1.13	6130	94.3	15.6	1.89	286	14.8	2.7	0
400X75X75	6.0	31.82	25.0	0	1.28	6230	120	14.0	1.94	312	19.2	2.9	0
	4.5	24.08	18.9	0	1.21	4780	92.2	14.1	1.96	239	14.7	2.9	0
350X50X50	4.5	19.58	15.4	0	0.75	2750	27.5	11.9	1.19	157	6.48	1.6	0
	4.0	17.47	13.7	0	0.73	2470	2478	11.9	1.19	141	5.81	1.6	0
300X50X50	4.5	17.33	13.6	0	0.82	1850	26.8	10.3	1.24	123	6.41	1.8	0
	4.0	15.47	12.1	0	0.80	1660	24.1	10.4	1.25	111	5.74	1.8	0
250X75X75	6.0	22.82	17.9	0	1.66	1940	107	9.23	2.17	155	18.4	3.7	0
250X50X50	4.5	15.08	11.8	0	0.91	1160	25.9	8.78	1.31	93.0	6.31	2.0	0
	4.0	13.47	10.6	0	0.88	1050	23.3	8.81	1.32	83.7	5.66	2.0	0
200X75X75	6.0	19.82	15.6	0	1.87	1130	101	7.56	2.25	113	17.9	4.1	0
	4.5	12.83	10.1	0	2.08	448	71.4	5.91	2.36	59.8	13.2	4.6	0
200X50X50	4.0	11.47	9.00	0	1.00	600	22.2	7.23	1.39	60.0	5.55	2.2	0
	3.2	9.263	7.27	0	0.97	490	18.2	7.28	1.40	49.0	6.51	2.3	0
	6.0	16.82	13.2	0	2.15	573	91.9	5.84	2.34	76.4	17.2	4.6	0
150X75X75	4.5	12.83	10.1	0	2.08	448	71.4	5.91	2.36	59.8	13.2	4.6	0
	4.0	11.47	9.00	0	2.06	404	64.2	5.93	2.36	53.9	11.8	4.6	0
150X50X50	4.5	10.58	8.31	0	1.20	329	22.8	5.58	1.47	43.9	5.99	2.6	0
	3.2	7.663	6.02	0	1.14	244	16.9	5.64	1.48	32.5	4.37	2.6	0
	2.3	5.576	4.38	0	1.10	181	12.5	5.69	1.50	24.1	3.20	2.6	0
120X40X40	3.2	6.063	4.76	0	0.94	122	8.43	4.48	1.18	20.3	2.75	2.1	0
100X50X50	3.2	6.063	4.76	0	1.40	93.6	14.9	3.93	1.57	18.7	4.15	3.1	0
	2.3	4.426	3.47	0	1.36	69.9	11.1	3.97	1.58	14.5	3.04	3.1	0
100X10X40	3.2	5.423	4.26	0	1.03	78.6	7.99	3.81	1.21	15.7	2.69	2.2	0
	2.3	3.966	3.11	0	0.99	58.9	5.96	3.85	1.23	11.8	1.98	2.2	0
80X40X40	2.3	3.506	2.75	0	1.11	34.9	5.56	3.16	1.26	8.73	1.92	2.4	0
60X30X30	2.3	2.586	2.03	0	0.86	11.2	2.27	2.34	0.94	4.72	1.06	1.8	0
	1.6	1.836	1.44	0	0.82	10.3	1.64	2.37	0.95	3.45	0.75	1.8	0
40X40X40	3.2	3.503	2.75	0	1.51	9.21	5.72	1.62	1.28	4.60	2.30	3.0	0
	2.3	2.586	2.03	0	1.46	7.13	3.54	1.66	1.17	3.57	1.39	3.0	0
38X15X15	1.6	1.004	0.788	0	0.40	2.04	0.20	1.42	0.45	1.07	0.18	0.8	0
19X12X12	1.6	0.6039	0.474	0	0.41	0.32	0.08	0.72	0.37	0.33	0.11	0.8	0
150X75X30	6.0	14.12	11.1	6.33	1.56	4.06	56.4	5.36	2.00	46.9	9.49	2.2	4.5
100X50X15	2.3	3.621	2.84	3.91	0.94	46.4	4.96	3.58	1.17	7.12	1.22	1.2	3.0
75X40X15	3.2	3.823	3.00	3.91	0.80	21.0	3.93	2.34	1.01	4.68	1.23	1.2	2.1
	2.3	2.816	2.21	3.01	0.81	20.8	3.12	2.72	1.05	4.63	0.98	1.2	2.1
50X25X10	2.3	1.781	1.40	1.97	0.54	5.59	0.79	1.77	0.67	1.84	0.40	0.7	1.5
40X40X15	3.2	2.703	2.12	1.46	1.14	5.71	3.68	1.45	1.17	2.24	1.29	1.4	1.2

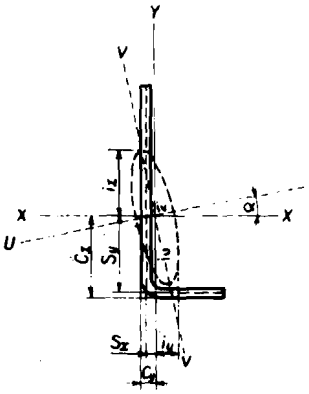
LIGHT ANGLE

JIS G 3350





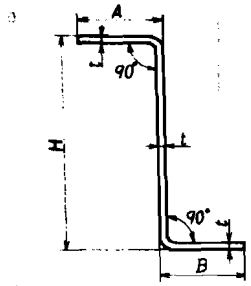


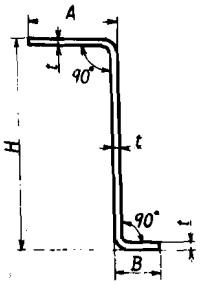


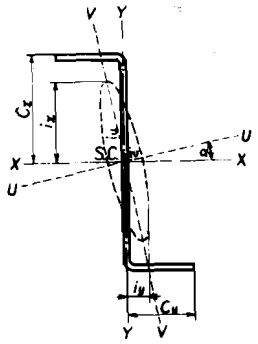
Dimensions mm		Sectional Area cm²	Unit Weight kg/m	Centre of Gravity cm		Secondary Moment of Area cm⁴				Radius of Gyration of Area cm				tan α	Modulus of Section cm³		Centre of Shear cm	
A x B	t			Cx	Cy	Ix	Iy	Iu	Iv	ix	iy	iu	iv		Zx	Zy	Sx	Sy
60 x 60	3.2	3.672	2.88	1.65	1.65	13.1	13.1	21.3	5.03	1.89	1.89	2.41	1.17	1.00	3.02	3.02	1.49	1.49
50X50	3.2	3.032	2.38	1.40	1.40	7.47	7.47	12.1	2.83	1.75	1.75	2.00	0.97	1.00	2.07	2.07	1.24	1.24
	2.3	2.13	1.74	1.36	1.36	5.54	5.54	8.94	2.13	1.58	1.58	2.01	0.98	1.00	1.52	1.52	1.24	1.24
40X40	3.2	2.392	1.88	1.15	1.15	3.72	3.72	6.04	1.39	1.25	1.25	1.59	0.76	1.00	1.30	1.30	0.99	0.99
30X30	3.2	1.752	1.38	0.90	0.90	1.50	1.50	2.45	0.54	0.92	0.92	1.18	0.56	1.00	0.71	0.71	0.74	0.74
75X30	3.2	3.192	2.51	2.86	0.57	18.9	1.94	19.6	1.47	2.43	0.78	2.48	0.62	0.198	4.07	0.80	0.41	2.70

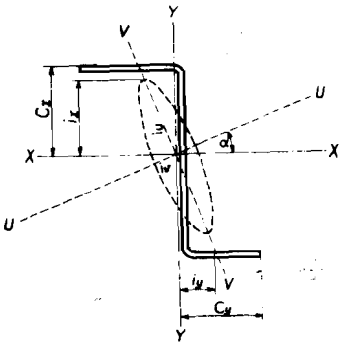
LIGHT "Z"

JIS G 3350





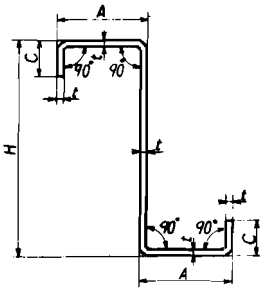


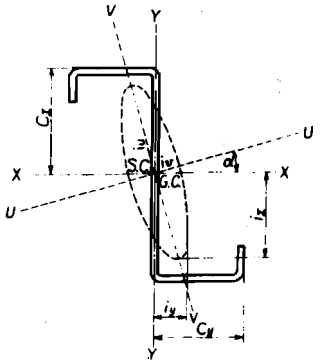


Dimensions mm		Sectional Area cm²	Unit Weight kg/m	Centre of Gravity cm		Secondary Moment of Area cm⁴				Radius of Gyration of Area cm				tan α	Modulus of Section cm³		Centre of Shear cm	
H x A x B	t			Cx	Cy	Ix	Iy	Iu	Iv	ix	iy	iu	iv		Zx	Zy	Sx	Sy
100 x 50x 50	3.2	6.063	4.76	5.00	4.84	93.6	24.2	109	8.70	3.93	2.00	4.24	1.20	0.427	18.7	5.00	0	0
	2.3	4.426	3.47	5.00	4.88	69.9	17.9	81.2	6.53	3.97	2.01	4.28	1.21	0.423	14.0	3.66	0	0
75 x 30x 30	3.2	3.983	3.13	3.75	2.84	31.6	4.91	34.5	2.00	2.82	1.11	2.94	0.71	0.313	8.42	1.73	0	0
60 x 30x 30	2.3	2.586	2.03	3.00	2.88	14.3	3.69	16.5	1.31	2.34	1.19	2.53	0.71	0.430	4.72	1.28	0	0
40 x 20x 20	2.3	1.666	1.31	2.00	1.88	3.86	1.03	4.54	0.35	1.52	0.79	1.65	0.46	0.443	1.93	0.55	0	0
75 x 40x 30	2.3	3.161	2.48	3.49	3.13	26.8	6.15	30.6	2.39	2.91	1.40	3.11	0.865	0.394	6.68	1.69	0.00	1.38
75 x 30x 20	2.3	2.701	2.12	3.44	2.09	20.7	2.25	21.9	1.08	2.77	0.913	2.85	0.613	0.245	5.10	0.839	0.03	1.86

LIGHT LIP "Z"

JIS G 3350



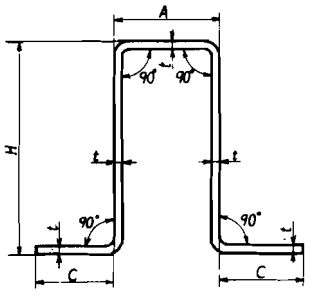


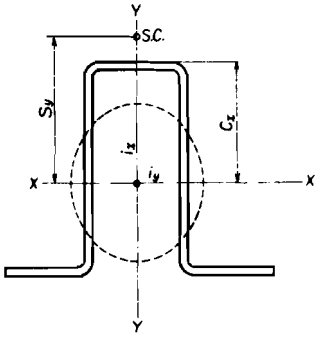
Dimensions mm		Sectional Area cm^2	Unit Weight kg/m
H x A x C	t		
100 x 50x20	3.2	7.007	[illegible]
	2.3	5.172	4.06

Centre of Gravity cm		Secondary Moment of Area cm^4				Radius of Gyration of Area cm				tan α	Modulus of Section cm^3		Centre of Shear cm	
Cx	Cy	Ix	Iy	Iu	Iv	ix	iy	iu	iv		Zx	Zy	Sx	Sy
5.00	4.84	107	44.8	137	14.7	3.90	2.53	4.41	1.45	0.572	21.3	9.25	0	0
5.00	4.88	80.7	34.8	104	11.4	3.95	2.59	4.49	1.48	0.581	16.1	7.13	0	0

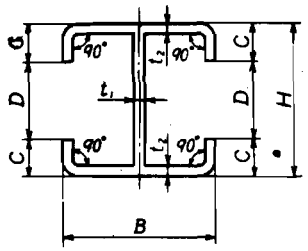
LIGHT HAT

JIS G 3350

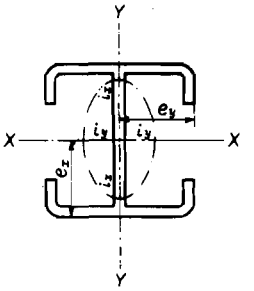




Dimensions mm		Sectional Area cm^2	Unit Weight kg/m	Centre of Gravity cm		Secondary Moment of Area cm^4		Radius of Gyration of Area cm		Modulus of Section cm^3		Centre of Shear cm	
H x A x C	t			Cx	Cy	Ix	Iy	ix	iy	Zx	Zy	Sx	Sy
60 x 30x25	2.3	4.358	[illegible]	3.37	0	20.9	14.7	2.19	1.83	6.20	3.66	0	4.1
	1.6	3.083	2.42	3.35	0	15.3	10.5	2.23	1.84	4.58	2.62	0	4.2
60 x 30 x 20	2.3	4.128	3.24	3.23	0	19.4	11.4	2.17	1.66	5.88	3.26	0	4.5
	1.6	2.923	2.29	3.21	0	14.2	8.21	2.20	1.68	4.41	2.35	0	4.6
50 x 40 x 30	3.2	5.932	4.66	2.83	0	20.9	35.9	1.88	2.46	7.36	7.19	0	3.8
50 x 40 x 20	2.3	3.898	3.06	2.56	0	13.8	17.1	1.88	2.10	5.39	4.28	0	3.5
40 x 20 x 20	2.3	2.978	2.34	2.36	0	6.08	5.40	1.43	1.35	2.58	1.80	0	2.8
	1.6	2.123	1.67	2.34	0	4.56	3.67	1.47	1.35	1.95	1.29	0	2.9

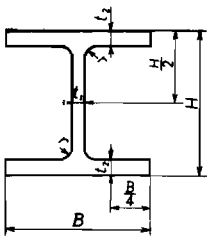


Geometrical moment of inertia $I = aI^2$
Radius of gyration or area $i = \sqrt{I/a}$
Modulus of section $Z = I/e$
(a : sectional area)

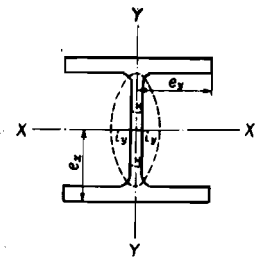


LIGHT LIP "H" JIS G 3353

Height mm	Width mm	Length of lip mm	Thickness of web mm	Thickness of flange mm	Cross Sectional Area cm	Unit Weight kg/m	Geometrical Moment of inertia cm^4		Radius of Gyration of Area cm		Modulus of Section cm^3	
							Ix	Iy	ix	iy	Zx	Zy
60	60	10	2.3	2.3	4.606	3.61	30.4	14.1	2.57	1.75	10.1	4.72
75	90	15	2.3	2.3	6.794	5.35	71.2	50.4	3.24	2.70	19.0	11.2
90	90	20	2.3	2.3	7.506	5.96	111	59.3	3.82	2.79	24.6	13.2
			2.3	3.2	9.570	7.51	144	79.4	3.88	2.88	32.1	17.6
			3.2	3.2	11.28	8.90	204	103	4.24	2.99	40.8	20.7
100	100	20	2.3	2.3	8.286	6.50	155	75.9	4.41	3.12	30.5	15.2
			2.3	3.2	10.44	8.20	197	103	4.51	3.32	39.6	20.7
			3.2	3.2	11.28	8.90	204	103	4.24	2.99	40.8	20.7
120	120	20	2.6	2.6	10.86	8.52	291	138	5.18	3.56	48.5	23.1
			2.6	3.2	12.52	9.83	344	167	5.25	3.64	57.4	27.8
			3.2	3.2	13.20	10.3	352	167	5.15	3.56	58.6	27.8
150	100	20	3.2	3.2	13.88	10.1	511	104	6.30	2.84	68.1	20.8
150	150	25	3.2	3.2	16.72	13.1	701	330	6.47	4.45	93.4	44.1
200	200	40	45	6.0	39.69	31.2	2910	1480	8.56	6.10	291	148
250	250	45	45	6.0	49.14	38.6	5770	2810	10.8	7.57	461	225
300	300	50	4.5	6.0	58.59	46.0	10100	4780	13.1	9.03	671	318
		60	6.0	9.0	87.19	68.4	14600	7480	12.9	9.26	972	499
450	300	50	4.5	6.0	65.34	51.3	24500	4780	19.4	8.55	1090	318
		60	6.0	9.0	96.19	75.5	36000	7480	19.3	8.82	1600	499



Geometrical moment of inertia $I = ai^2$
Radius of gyration or area $i = \sqrt{I/a}$
Modulus of section $Z = I/e$
(a : sectional area)



LIGHT "H" JIS G 3353

Height mm	Width mm	Thickness mm		Cross Sectional Area cm^2	Unit Weight	Geometrical Moment of inertia cm^4		Radius of Gyration of Area cm		Modulus of Section cm^3	
		Web	Flange		kg/m	Ix	Iy	ix	iy	Zx	Zy
100	60	3.2	4.5	8.312	6.52	143	16.2	4.15	1.50	28.7	5.41
100	100	3.2	4.5	11.91	9.35	225	75.0	4.35	2.51	45.1	15.0
125	60	3.2	4.5	9.112	7.15	238	16.2	5.11	1.34	38.0	5.41
125	100	3.2	4.5	12.71	9.98	368	7500	5.38	2.43	59.0	15.0
125	125	3.2	4.5	14.96	11.7	450	14.7	5.50	3.13	72.0	23.4
150	75	3.2	4.5	11.26	8.84	432	31.7	6.19	1.68	57.6	8.45
		3.2	6.0	13.42	10.5	537	42.2	6.33	1.77	71.6	11.3
150	100	3.2	4.5	13.51	10.6	551	75.0	6.39	2.36	73.5	15.0
		3.2	6.0	16.42	12.9	693	100	6.50	2.47	92.3	20.0
150	150	3.2	4.5	18.01	14.1	789	25.3	6.62	3.75	105	33.8
		3.2	6.0	22.42	17.6	1000	338	6.69	3.88	134	45.0
175	90	3.2	4.5	13.41	10.5	711	54.7	7.28	2.02	81.2	12.2
		3.2	4.5	15.11	11.9	1050	75.1	8.32	2.23	105	15.0
200	100	3.2	6.0	18.02	14.1	1310	100	8.52	2.36	131	20.0
		4.5	6.0	20.46	16.1	1380	100	8.21	2.21	138	20.0
200	125	3.2	6.0	21.02	16.5	1590	195	8.70	3.05	159	31.3
200	150	3.2	4.5	19.61	15.4	1480	153	8.68	3.59	148	33.8
		3.2	6.0	24.02	18.9	1870	338	8.83	3.75	187	45.0
		4.5	6.0	26.46	20.8	1940	338	8.57	3.57	194	45.0
200	175	3.2	6.0	27.02	21.2	2150	536	8.93	4.45	215	61.3
200	200	6.0	9.0	46.92	36.8	3590	1200	8.74	5.06	359	120.0
		3.2	4.5	16.71	13.1	1730	75.1	10.2	2.12	138	15.0
250	100	4.5	9.0	28.44	22.3	3080	150	10.4	2.30	247	30.0
250	125	3.2	4.5	18.96	14.9	2070	147	10.4	2.78	166	23.5
		4.5	6.0	25.71	20.2	2740	195	10.3	2.76	219	31.3
		4.5	9.0	32.94	25.9	3740	293	10.7	2.98	299	46.9
250	150	3.2	4.5	21.21	16.6	2410	253	10.7	3.45	193	33.8
		4.5	6.0	28.71	22.5	3190	338	10.5	3.43	255	45.0
250	150	4.5	9.0	37.44	29.4	4390	506	10.8	3.68	351	67.5
250	175	6.0	9.0	45.42	35.7	5200	804	10.7	4.21	416	91.9
250	250	6.0	9.0	58.92	46.3	7160	2340	11.0	6.31	573	188
300	125	4.5	9.0	35.19	27.6	5610	293	12.6	2.89	374	46.9
300	150	3.2	4.5	22.81	17.9	3600	253	12.6	3.33	240	23.8
		4.5	6.0	30.96	24.3	4790	238	12.4	3.30	319	45.0
		4.5	9.0	39.69	31.2	6560	506	12.9	3.57	437	67.5
300	175	4.5	6.0	33.96	26.7	5430	536	12.5	3.97	362	61.3
		4.5	9.0	44.19	34.7	7510	804	13.0	4.27	501	91.9
350	175	4.5	6.0	36.21	28.4	7660	536	14.6	3.85	438	61.3
		4.5	9.0	46.44	36.5	10500	804	15.1	4.16	602	91.9
400	200	4.5	6.0	41.46	32.5	11500	800	16.7	4.39	575	80.0
		4.5	9.0	53.19	41.8	15900	1200	17.3	4.75	793	120
		6.0	9.0	58.92	46.3	16500	1200	16.8	4.51	827	120
		6.0	12.0	70.56	55.4	20700	1600	17.1	4.76	1040	160
450	200	4.5	9.0	55.44	43.5	20500	1200	19.2	4.65	912	120
		6.0	12.0	73.56	57.7	26900	1600	19.1	4.66	1200	160
450	250	6.0	12.0	85.56	67.2	32600	3130	19.5	6.04	1450	250

WIDE FLANGE Material Quality and Applicable Standards

Others available subject to negotiation.

Nippon Steel wide flange shapes are available to specifications as agreed on through negotiation.

They regularly come in sizes up to 1,010mm max. web and 450mm max. flange and in material qualities fit for general structures and welded structures, plus such special Nippon Steel grades as COR-TEN (atmospheric corrosion-resistant high-strength steel) and WEL-TEN (high-strength steel for welded structures).

Applicable Standards

JIS ..... G 3101, G 3106, G 3114, etc.
ASTM ..... A36, A441, A588, etc.
BS ..... BS 4360 GR 43A, 50B, etc.
DIN ..... 17100, etc.
CSA ..... G 40.21, etc.

Weldable high-strength steels and atmospheric corrosion-resistant high-strength steels are supplied under the tradenames of WEL-TEN and COR-TEN.

Other domestic and foreign specifications can be met on request.

Excerpts from JIS(Japanese Industrial Standards) are given below and on the following pages.

Rolled Steel for General Structures (JIS G 3101)

Chemical Composition

Classification	Notation	Chemical composition, %				Applications
		C	Mn	P	S	
Class 2	SS41	—	—	0.050 max.	0.050 max.	Steel plate, steel strip, flat steel and shape steel
Class 3	SS50					
Class 4	SS55	0.30 max.	1.60 max.	0.040 max.	0.040 max.	Steel plate, steel strip, flat steel, steel bar and shape steel of not more that 40mm in thickness, diameter, size or width across flats

Mechanical Properties

Classification	Notation	Tension test							Bending test		
		Yield point or yield strength, kg/mm²			Tensile strength, kg/mm²	Elongation			Angle of bend	Inside radius	Test piece
		Thickness, diameter, side or width across flats, mm				Dimension of steel, mm	Test piece	%			
		16 & under	Over 16 to 40 & under	Over 40							
Class 2	SS41	25 min.	24 min.	22 min.	41–52	5 & under in thickness of steel plate, strip, flat steel & shape steel	No.5	21 min.			
						Over 5 to 16 in thickness of steel plate, strip, flat steel end shape steel	No.1	18 min.	180°	1.5 times thickness	No.1
						Over 16 in thickness of steel plate, flat steel and shape steel	No.1	21 min.			
						Over 40 in thickness of steel plate, flat steel and shape steel	No.4	23 min.			
						25 & under in dia., of steel bar, side or width across flats	No.2	20 min.		1.5 times dia. or width across flats	No.2
						Over 25 in dia., of steel bar, side or width ecross flats	No.3	24 min.			
Class 3	SS50	29 min.	28 min.	26 min.	50–65	5 & under in thickness of steel plate, strip, flat steel and shape steel	No.5	19 min.	180°	2.0 times thickness	No.1
						Over 5 to 16 in thickness of steel plate, strip, flat steel & shape steel	No.1	16 min.			
						Over 16 in thickness of steel plate, strip, flat steel and shape steel	No.1	19 min.			
						Over 40 in thickness of steel plate, flat steel and shape steel	No.4	21 min.			
						25 & under in dia., side or width across flats of steel bar	No.2	18 min.	180°	2.0 times dia. or width across flats	No.2
						Over 25 in dia., side or width across flats of steel bar	No.3	21 min.			
Class 4	SS55	41 min.	40 min.	—	55 min.	5 & under in thickness of steel plate, strip, flat steel and shape steel	No.5	16 min.	180°	2.0 times thickness	No.1
						Over 5 to 16 in thickness of steel plate, strip, flat steel and shape steel	No.1	14 min.			
						Over 16 in thickness of steel plate, strip, flat steel and shape steel	No.1	17 min.			
						25 & under in dia., side or width across flats of steel bar	No.2	13 min.	180°	2.0 times dia. or width across flats	No.2
						Over 25 in dia., side or width across flats of steel bar	No.3	17 min.			

Rolled Steel for Welded Structures (JIS G 3106)

Chemical Composition

Classification		Notation	Chemical composition, %				
			C	Si	Mn	P	S
Class 1	A	SM41A	0.23max. for thicknesses 50mm & under; 0.25max. for thicknesses over 50mm to 100mm	—	2.5× C min.	0.040 min.	0.040 max.
	B	SM41B	0.20max. for thicknesses 50mm & under; 0.22max. for thicknesses over 50mm to 100mm	0.35 max.	0.60–1.20	0.040 max.	0.040 max.
Class 2	A	SM50A	0.20max. for thicknesses 50mm & under; 0.22max. for thicknesses over 50mm to 100mm	0.55 max.	1.50 max.	0.040 max.	0.040 max.
	B	SM50B	0.18max. for thicknesses 50mm & under; 0.20max. for thicknesses over 50mm to 100mm	0.55 max.	1.50 max.	0.040 max.	0.040 max.
Class 3	A	SM50YA	0.20max. for thicknesses 50mm & under	0.55 max.	1.50 max.	0.040 max.	0.040 max.
	B	SM50YB					
Class 4	B	SM53B	0.20max. for thicknesses 50mm & under	0.55 max.	1.50 max.	0.040 max.	0.040 max.

Mechanical Properties

Classification	Notation	Tension test							Bending test		
		Yield point or yield strength, kg/mm²			Tensile strength, kg/mm²	Elongation			Angle of bend	Inside radius	Test piece
		Thickness of steel, mm				Thickness of steel, mm	Test piece	%			
		16 and under	Over 16 to 40	Over 40							
Class 1	SM41	25 min.	24 min.	22 min.	41 – 52	5 & under Over 5 to 16 Over 16 Over 40	No.5 No.1 No.1 No.4	23 min. 19 min. 22 min. 24 min.	180°	1.0 times thickness	No.1
Class 2	SM50	33 min.	32 min.	30 min.	50 – 62	5 & under Over 5 to 16 Over 16 Over 40	No.5 No.1 No.1 No.4	22 min. 18 min. 21 min. 23 min.	180°	1.5 times thickness	No.1
Class 3	SM50Y	37 min.	36 min.	34 min.	50 – 62	5 & under Over 5 to 16 Over 16 Over 40	No.5 No.1 No.1 No.4	19 min. 16 min. 19 min. 21 min.	180°	1.5 times thickness	No.1
Class 4	SM53	37 min.	36 min.	34 min.	53 – 65	5 & under Over 5 to 16 Over 16 Over 40	No.5 No.1 No.1 No.4	19 min. 16 min. 19 min. 21 min.	180°	1.5 times thickness	No.1

Hot Rolled Atmospheric Corrosion-Resistant Steel for Welded Structure (JIS G 3114)

Chemical Composition

Classification	Notation	Chemical composition, %							Other elements
		C	Si	Mn	S	P	Cu	Cr	
Class 1	SMA41 A.B.C.	0.20 max.	0.35 max.	1.40 max.	0.040 max.	0.040 max.	0.20–0.60	0.20–0.65	—
Class 2	SMA50 A.B.C.	0.19 max.	0.75 max.	1.40 max.	0.040 max.	0.040 max.	0.20–0.70	0.30–1.20	One or more of the following elements Mo, Nb, Ni, Ti, V and Zr shall be added.
Class 3	SMA58	0.19 max.	0.75 max.	1.40 max.	0.040 max.	0.040 max.	0.20–0.70	0.30–1.20	One or more of the following elements Mo, Nb, Ni, Ti V and Zr shall be added.

Mechanical Properties

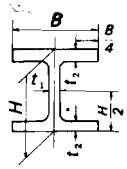
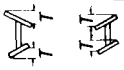
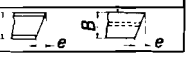
Classification	Tension test						
	Yield point or yield strength, kg/mm²			Tensile strength, kg/mm²	Elongation		
	Thickness of steel, mm				Thickness of steel, mm	Test piece	%
	16 & under	Over 16 to 40	Over 40				
Class 1	25 min.	24 min.	22 min.	41–52	16 & under Over 16 Over 40	No.1 No.1 No.4	19 min. 22 min. 24 min.
Class 2	37 min.	36 min.	34 min.	50–62	16 & under Over 16 Over 40	No.1 No.1 No.4	16 min. 19 min. 21 min.
Class 3	47 min.	46 min.	44 min.	58–73	16 & under Over 16 Over 20	No.5 No.5 No.4	19 min. 26 min. 20 min.

Classification	Bend test			Impact test			
	Bend angle	Inside radius	Test piece	Notation	Test temp. °C	Charpy absorbed energy, kg·m	Test piece
Class 1	180°	1.0 times thickness	No.1	A B C	0	2.8 min. 4.8 min.	No.4 in direction of rolling
Class 2	180°	1.5 times thickness	No.1	A B C	0	2.8 min. 4.8 min.	
Class 3	180°	1.5 times thickness	No.1	—	−5	4.8 min.	

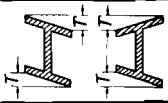
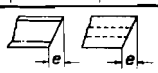
DIMENSIONAL TOLERANCES

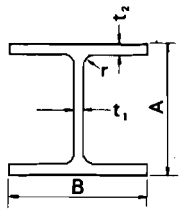
High precision means dependability in use.

Dimensional Tolerances of Hot Rolled Steel Sections (JIS G 9192-1966)

Division			Tolerances	Applications
Side (B)			±3.0mm	
Height (H)		Nominal height less than 400mm	±3.0mm	
		400mm to less than 600mm	±4.0mm	
		600mm & over	±5.0mm	
Thickness	(t_2)	Less than 16mm	±1.5mm	
		16mm to less than 25mm	±2.0mm	
		25mm to less than 40mm	±2.5mm	
		40mm & over	±3.0mm	
	(t_1)	Less than 16mm	±1.0mm	
		16mm to less than 25mm	±1.5mm	
		25mm to less than 40mm	±2.0mm	
		40mm & over	±2.5mm	
Length		7m & under	$+40\text{mm}_{0}$	
		Over 7m	Add 5mm to plus side tolerance above for every increment of 1m or fragment in length	
Out-of-square (T)		Nominal height 300mm & under	1.2% max. × side B, or 2.0mm at minimum	
		Nominal height in excess of 300mm	1.5% max. × side B, or 2.0mm at minimum	
Camber and sweep		Nominal height 300mm & under	0.2% max. × Length	Apply to major vertical and lateral bend
		Nominal height in excess of 300mm	0.1% max. × Length	
Web off center (S)		Nominal height 300mm & under	±3.0mm	$S=\frac{b_1-b_2}{2}$
		Nominal height in excess of 300mm	±4.5mm	
Ends out-of-square (e)			1.6% max. × (Side B or Height H), or 3.0mm at minimum	

Dimensional Tolerances of H Type steel Piles (JIS A 5526-1963)

Item	Dimensional tolerance	Remarks
Web height	±3.2mm	Measured over center of web
Flange width	$+\text{not specified}_{-5.0\text{mm}}$	Measured in parallel to flange
Thickness	not exceeding 13mm $+\text{not specified}_{-0.8\text{mm}}$	
	exceeding 13mm $+\text{not specified}_{-6\%}$	
Length	$+\text{not specified}_{-0}$	
Out-of-square	Out-of-square is measured by $T'+T'$ of section at the end, and the tolerance shall be under 6.5mm when the web height is 300mm or under, and under, 8.0mm when the web height is over 300mm.	
Ends out-of-square	Ends out-of-square measured by e, and the tolerance shall be 1.6mm or under per 100mm of web height or flange width.	



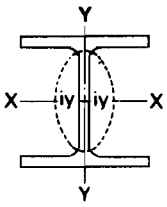
Sizes and Section Properties

Wide Flange Shapes

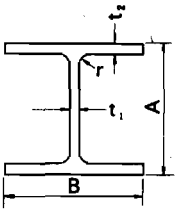
(Inch Series)

Section Index	Weight		Depth of Section (A)		Flange Width (B)		Web Thickness (t_1)		Flange Thickness (t_2)		Corner Radius		Sectional Area	
	lbs/ft	kg/m	in	mm	in	mm	in	mm	in	mm	in	mm	in²	cm²
36" WF 36×16-1/2	300	446.4	36.72	933	16.655	423	0.945	24.00	1.680	42.67	1.02	25.9	88.17	568.8
	280	416.7	36.50	927	16.595	422	0.885	22.48	1.570	39.88	1.02	25.9	82.32	531.1
	260	386.9	36.24	920	16.555	421	0.845	21.46	1.440	36.58	1.02	25.9	76.56	493.9
	245	364.6	36.06	916	16.512	419	0.802	20.37	1.350	34.29	1.02	25.9	72.03	467.7
	230	342.3	35.88	911	16.475	418	0.765	19.43	1.260	32.00	1.02	25.9	67.73	437.0
36" WF 36×12	194	288.7	36.48	927	12.117	308	0.770	19.56	1.260	32.00	0.80	20.3	57.11	368.5
	182	270.8	36.32	923	12.072	307	0.725	18.42	1.180	29.97	0.80	20.3	53.54	345.4
	170	253.0	36.16	918	12.027	305	0.680	17.27	1.100	27.94	0.80	20.3	49.98	322.5
	160	238.1	36.00	914	12.000	305	0.653	16.59	1.020	25.91	0.80	20.3	47.09	303.8
	150	223.2	35.84	910	11.972	304	0.625	15.88	0.940	23.88	0.80	20.3	44.16	284.9
	135	200.9	35.55	903	11.945	303	0.598	15.19	0.794	20.17	0.80	20.3	39.70	256.1
33" WF 33×15-3/4	240	357.2	33.50	851	15.865	403	0.830	21.08	1.400	35.56	0.96	24.4	70.52	455.0
	220	327.4	33.25	845	15.810	402	0.775	19.69	1.275	32.39	0.96	24.4	64.73	417.6
	200	297.6	33.00	838	15.750	400	0.715	18.16	1.150	29.21	0.96	24.4	58.79	379.3
33" WF 33×11-1/2	152	226.2	33.50	851	11.565	294	0.635	16.13	1.055	26.80	0.75	19.0	44.71	288.5
	141	209.8	33.31	846	11.535	293	0.605	15.37	0.960	24.38	0.75	19.0	41.51	267.8
	130	193.5	33.10	841	11.510	292	0.580	14.73	0.855	21.72	0.75	19.0	38.26	246.8
	118	175.6	32.86	835	11.484	292	0.554	14.07	0.738	18.74	0.75	19.0	34.71	223.9
30" WF 30×15	210	312.5	30.38	772	15.105	384	0.775	19.69	1.315	33.40	0.91	23.1	61.78	398.6
	190	282.8	30.12	765	15.040	382	0.710	18.03	1.185	30.10	0.91	23.1	55.90	360.6
	172	256.0	29.88	759	14.985	381	0.655	16.64	1.065	27.05	0.91	23.1	50.65	326.8
30" WF 30×10-1/2	132	196.4	30.30	770	10.551	268	0.615	15.62	1.000	25.40	0.70	17.8	38.83	250.5
	124	184.5	30.16	766	10.521	267	0.585	14.86	0.930	23.62	0.70	17.8	36.45	235.2
	116	172.6	30.00	762	10.500	267	0.564	14.33	0.850	21.59	0.70	17.8	34.13	220.2
	108	160.7	29.82	757	10.484	266	0.548	13.92	0.760	19.30	0.70	17.8	31.77	205.0
	99	147.3	29.64	753	10.458	266	0.522	13.26	0.670	17.02	0.70	17.8	29.11	187.8
27" WF 27×14	177	263.4	27.31	694	14.090	358	0.725	18.42	1.190	30.23	0.86	21.8	52.10	336.1
	160	238.1	27.08	688	14.023	356	0.658	16.71	1.075	27.31	0.86	21.8	47.04	303.5
	145	215.8	26.88	683	13.965	355	0.600	15.24	0.975	24.77	0.86	21.8	42.68	275.4
27" WF 27×10	114	169.7	27.28	693	10.070	256	0.570	14.48	0.932	23.67	0.64	16.2	33.53	216.3
	102	151.8	27.07	688	10.018	254	0.518	13.16	0.827	21.01	0.64	16.2	30.01	193.6
	94	139.9	26.91	684	9.990	254	0.490	12.45	0.747	18.97	0.64	16.2	27.65	178.4
	84	125.0	26.69	678	9.963	253	0.463	11.76	0.636	16.15	0.64	16.2	24.71	159.4

Note: Sizes indicated by blue letters are not included in regular rolling schedules.



Moment of Inertia				Radius of Gyration				Modulus of Section				Section Index
Jx		Jy		ix		iy		Zx		Zy		
in⁴	cm⁴	in⁴	cm⁴	in	cm	in	cm	in³	cm³	in³	cm³	
20,290.2	844,600	1,225.2	46,730	15.17	38.53	3.73	9.47	1,105.1	18,112.6	147.1	2,410.9	
18,819.3	783,400	1,127.5	46,320	15.12	38.40	3.70	9.40	1,031.2	16,901.4	135.9	2,227.4	36" WF
17,233.8	717,400	1,020.6	45,880	15.00	38.10	3.65	9.27	951.1	15,588.5	123.3	2,020.9	36 × 16-1/2
16,092.2	669,900	944.7	45,560	14.95	37.97	3.62	9.19	892.5	14,628.1	114.4	1,875.0	
14,988.4	623,900	870.9	45,250	14.88	37.80	3.59	9.12	835.5	13,693.8	105.7	1,732.4	
12,103.4	503,800	355.4	14,790	14.56	36.98	2.49	6.32	663.6	10,876.4	58.7	962.1	
11,281.5	469,600	327.7	13,640	14.52	36.88	2.47	6.27	621.2	10,181.5	54.3	890.0	
10,470.0	435,800	300.6	12,510	14.47	36.75	2.45	6.22	579.1	9,491.4	50.0	819.5	36" WF
9,738.8	405,400	275.4	11,460	14.38	36.52	2.42	6.15	541.0	8,867.0	45.9	752.3	36 × 12
9,012.1	375,200	250.4	10,420	14.29	36.30	2.38	6.04	502.9	8,242.5	41.8	685.1	
7,796.1	324,500	207.1	8,621	14.01	35.58	2.28	5.79	438.6	7,188.6	34.7	568.7	
13,585.1	565,500	874.3	36,400	13.88	35.26	3.52	8.94	811.1	13,293.9	110.2	1,806.2	
12,312.1	512,500	782.4	32,570	13.79	35.03	3.48	8.84	740.6	12,138.4	99.0	1,622.6	33" WF
11,048.2	459,900	691.7	28,790	13.71	34.82	3.43	8.71	669.6	10,974.7	87.8	1,439.0	33 × 15-3/4
8,147.6	339,200	256.1	10,660	13.50	34.29	2.39	6.07	486.4	7,972.1	44.3	726.1	
7,442.2	309,800	229.7	9,562	13.39	34.01	2.35	5.97	446.8	7,323.0	39.8	652.3	33" WF
6,699.0	278,900	201.4	8,384	13.23	33.60	2.29	5.82	404.8	6,634.7	35.0	573.7	33 × 11-1/2
5,886.9	245,100	170.3	7,089	13.02	33.07	2.22	5.64	358.3	5,872.5	29.7	486.8	
9,872.4	410,100	707.9	29,470	12.64	32.10	3.38	8.58	649.9	10,651.9	93.7	1,535.7	
8,825.9	367,400	624.6	26,000	12.57	31.93	3.34	8.48	586.1	9,606.2	83.1	1,362.0	30" WF
7,891.5	328,500	550.1	22,900	12.48	31.70	3.30	8.38	528.2	8,657.2	73.4	1,203.0	30 × 15
5,753.1	239,500	185.0	7,701	12.17	30.91	2.18	5.54	379.7	6,223.3	35.1	575.3	
5,347.1	222,600	189.7	7,064	12.11	30.76	2.16	5.49	354.6	5,811.9	32.3	529.4	
4,919.1	204,800	153.2	6,377	12.00	30.48	2.12	5.38	327.9	5,374.3	29.2	478.6	30" WF
4,461.0	185,700	135.1	5,624	11.85	30.10	2.06	5.23	299.2	4,903.9	25.8	422.9	30 × 10-1/2
3,988.6	166,000	116.9	4,866	11.70	29.72	2.00	5.08	269.1	4,410.5	22.4	367.1	
6,728.6	280,100	518.9	21,600	11.36	28.85	3.16	8.03	492.8	8,077.0	73.7	1,207.9	
6,018.6	250,500	458.0	19,060	11.31	28.73	3.12	7.92	444.5	7,285.4	65.3	1,070.3	27" WF
5,414.3	225,400	406.9	16,940	11.26	28.60	3.09	7.85	402.9	6,603.5	58.3	955.5	27 × 14
4,080.5	169,900	149.6	6,228	11.03	28.02	2.11	5.36	299.2	4,903.9	29.7	486.8	
3,604.1	150,000	129.5	5,391	10.96	27.83	2.08	5.28	266.3	4,364.7	25.9	424.5	27" WF
3,266.7	136,000	115.1	4,791	10.87	27.61	2.04	5.18	242.8	3,979.5	23.0	377.0	27 × 10
2,824.8	117,600	95.7	3,984	10.69	27.15	1.97	5.00	211.7	3,489.8	19.2	314.7	

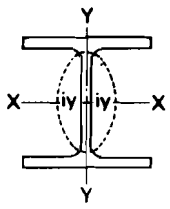


Wide Flange Shapes

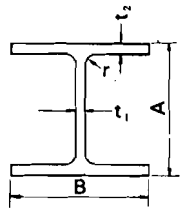
(Inch Series) - Continued

Section Index	Weight		Depth of Section (A)]		Flange Width (B)		Web Thickness (t_1)		Web Thickness (t_2)		Corner Redius		Sectional Area	
	lbs/ft	kg/m	in	mm	in	mm	in	mm	in	mm	in	mm	in^2	mm^2
24" WF	160	238.1	24.72	628	14.091	358	0.656	16.66	1.135	28.83	0.70	17.8	47.04	303.5
24 X 14	145	215.8	24.49	622	14.043	357	0.608	15.44	1.020	25.91	0.70	17.8	42.62	275.0
	130	193.5	24.25	616	14.000	356	0.565	14.35	0.900	22.86	0.70	17.8	38.21	246.5
24" WF	120	178.6	24.31	617	12.088	307	0.556	14.12	0.930	23.62	0.70	17.8	35.29	227.7
24 X 12	110	163.7	24.16	614	12.042	306	0.510	12.95	0.855	21.72	0.70	17.8	32.36	208.8
	100	148.8	24.00	610	12.000	305	0.468	11.89	0.775	19.69	0.70	17.8	29.43	189.9
	94	139.9	24.29	617	9.061	230	0.516	13.11	0.872	22.15	0.54	13.8	27.63	178.3
24" WF	84	125.0	24.09	612	9.015	229	0.470	11.94	0.772	19.61	0.54	13.8	24.71	159.4
24 X 9	76	113.1	23.91	607	8.985	228	0.440	11.18	0.682	17.32	0.54	13.8	22.37	144.3
	68	101.2	23.71	602	8.961	228	0.416	10.57	0.582	14.78	0.54	13.8	20.00	129.0
21" WF	142	211.3	21.46	545	13.132	334	0.659	16.74	1.095	27.81	0.65	16.5	41.76	269.4
21 X 13	127	189.0	21.24	539	13.061	332	0.588	14.94	0.985	25.02	0.65	16.5	37.34	240.9
	112	166.7	21.00	533	13.000	330	0.527	13.39	0.865	21.97	0.65	16.5	32.93	212.5
21" WF	96	142.9	21.14	537	9.038	230	0.575	14.61	0.935	23.75	0.65	16.5	28.21	182.0
21 X 9	82	122.0	20.86	530	8.962	228	0.499	12.67	0.795	20.19	0.65	16.5	24.10	155.5
	73	108.6	21.24	539	8.295	211	0.455	11.56	0.740	18.80	0.54	13.7	21.46	138.5
21" WF	68	101.2	21.13	537	8.270	210	0.430	10.92	0.685	17.40	0.54	13.7	20.02	129.2
21 X 8-1/4	62	92.27	20.99	533	8.240	209	0.400	10.16	0.615	15.62	0.54	13.7	18.23	117.6
	55	81.85	20.80	528	8.215	209	0.375	9.52	0.522	13.26	0.54	13.7	16.18	104.4
18" WF	114	169.7	18.48	469	11.833	301	0.595	15.11	0.991	25.17	0.60	15.2	33.51	216.2
18 X 11-3/4	105	156.3	18.32	465	11.792	300	0.554	14.07	0.911	23.14	0.60	15.2	30.86	199.1
	96	142.9	18.16	461	11.750	298	0.512	13.00	0.831	21.11	0.60	15.2	28.22	182.1
	85	126.5	18.32	465	8.838	224	0.526	13.36	0.911	23.14	0.60	15.2	24.97	161.1
18" WF	77	114.6	18.16	461	8.787	223	0.475	12.07	0.831	21.00	0.60	15.2	22.63	146.0
18 X 8-3/4	70	104.2	18.00	457	8.750	222	0.438	11.13	0.751	19.08	0.60	15.2	20.56	132.6
	64	95.24	17.87	454	8.715	221	0.403	10.24	0.686	17.42	0.60	15.2	18.80	121.3
	60	89.25	18.25	464	7.558	192	0.416	10.57	0.695	17.65	0.43	10.9	17.64	113.8
18" WF	55	81.89	18.12	460	7.532	191	0.390	9.91	0.630	16.00	0.43	10.9	16.19	104.5
18 X 7-1/2	50	74.41	18.00	457	7.500	191	0.358	9.09	0.570	14.48	0.43	10.9	14.71	94.9
	45	66.97	17.86	454	7.477	190	0.335	8.51	0.499	12.67	0.43	10.9	13.24	85.4

Note: Sizes indicated by blue letters are not included in regular rolling schedules.



Moment of Inertia				Radius of Gyration				Modulus of Section				Section Index
Jx		Jy		ix		iy		Zx		Zy		
in^4	cm^4	in^4	cm^4	in	cm	in	cm	in^3	cm^3	in^3	cm^3	
5,110.3	212,700	429.6	20,510	10.42	26.47	3.23	8.20	413.5	6,777.3	69.9	1,145.7	24" WF
4,561.0	189,900	434.3	18,080	10.34	26.26	3.19	8.10	372.5	6,105.3	61.8	1,012.9	24 X 14
4,009.5	166,900	375.2	15,620	10.24	26.01	3.13	7.95	330.7	5,420.2	53.6	878.5	
3,635.3	151,300	254.0	10,570	10.15	25.78	2.68	6.81	299.1	4,902.2	42.0	688.4	24" WF
3,315.0	138,000	229.1	9,537	10.12	25.70	2.66	6.76	274.4	4,497.4	38.0	622.8	24 X 12
2,987.3	124,400	203.5	8,471	10.08	25.60	2.63	6.68	248.9	4,079.5	33.9	555.6	
2,683.0	111,700	102.2	4,254	9.85	25.02	1.92	4.88	220.9	3,620.6	22.6	370.4	24" WF
2,364.3	98,420	88.3	3,676	9.78	24.84	1.89	4.80	196.3	3,217.4	19.6	321.2	24 X 9
2,096.4	87,270	76.5	3,184	9.68	24.59	1.85	4.70	175.4	2,874.8	17.0	278.6	
1,814.5	75,530	63.8	2,656	9.53	24.21	1.79	4.55	153.1	2,590.3	14.2	232.7	
3,403.1	141,700	385.9	16,060	9.03	22.94	3.04	7.72	317.2	5,198.9	58.8	963.7	21" WF
3,017.2	125,600	338.6	14,100	8.99	22.83	3.01	7.64	284.1	4,656.4	51.8	849.0	21 X 13
2,620.6	109,100	289.7	12,060	8.92	22.66	2.96	7.52	249.6	4,090.9	44.6	731.0	
2,088.9	86,960	109.3	4,550	8.60	21.84	1.97	5.00	197.6	3,238.7	24.2	396.6	21" WF
1,752.4	72,950	89.6	3,730	8.53	21.67	1.93	4.90	168.0	2,753.5	20.0	327.8	21 X 9
1,600.3	66,620	66.2	2,756	8.64	21.94	1.76	4.47	150.7	2,470.0	16.0	262.2	21" WF
1,478.3	61,540	60.4	2,514	8.59	21.82	1.74	4.42	139.9	2,293.0	14.6	239.3	21 X 8-1/4
1,326.8	55,230	53.1	2,210	8.53	21.67	1.71	4.34	126.4	2,071.7	12.9	211.4	
1,140.7	47,490	44.0	1,832	8.40	21.34	1.65	4.19	109.7	1,798.0	10.7	175.4	
2,033.8	84,660	255.6	10,640	7.79	19.79	2.76	7.10	220.1	3,607.4	43.2	708.0	18" WF
1,852.5	77,120	231.0	9,616	7.75	19.68	2.73	6.93	202.2	3,314.0	39.2	642.5	18 X 11-3/4
1,674.7	69,710	206.8	8,609	7.70	19.56	2.71	6.88	184.4	3,022.3	35.2	576.9	
1,429.9	59,520	99.4	4,138	7.57	19.23	2.00	5.08	156.1	2,558.5	22.5	368.8	18" WF
1,286.8	53,570	88.6	3,688	7.54	19.15	1.98	5.03	141.7	2,322.5	20.2	331.1	18 X 8-3/4
1,153.9	48,030	78.5	3,268	7.49	19.02	1.95	4.95	128.2	2,101.2	17.9	293.4	
1,045.8	43,530	70.3	2,926	7.46	18.95	1.93	4.90	117.0	1,917.6	16.1	263.9	
984.0	40,960	47.1	1,961	7.47	18.97	1.63	4.14	107.8	1,766.8	12.5	204.9	18" WF
889.9	37,040	42.0	1,748	7.41	18.82	1.16	4.09	98.2	1,609.5	11.1	181.9	18 X 7-1/2
800.6	33,330	37.2	1,548	7.38	18.74	1.59	4.04	89.0	1,458.7	9.9	162.3	
704.5	29,330	31.9	1,328	7.30	18.54	1.55	3.94	78.9	1,293.2	8.5	139.3	

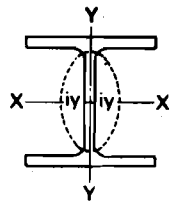


Wide Flange Shapes

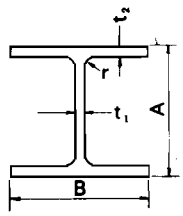
(Inch Series) - Continued

Section Index	Weight		Depth of Section (A)]		Flange Width (B)		Web Thickness (t_1)		Web Thickness (t_2)		Corner Radius		Sectional Area	
	lbs/ft	kg/m	in	mm	In	mm	in	mm	in	mm	in	mm	in^2	mm^2
18" WF	96	142.9	16.32	451	11.533	293	0.535	13.59	0.875	22.23	0.60	15.2	28.22	182.1
18 x 11-1/2	88	131.0	16.16	410	11.502	292	0.504	12.80	0.795	20.19	0.60	15.2	25.87	187.0
	78	118.1	16.32	415	8.586	218	0.529	13.44	0.875	22.23	0.60	15.2	22.92	147.9
18" WF	71	105.7	16.18	410	8.543	217	0.486	12.34	0.795	20.19	0.60	15.2	20.86	134.8
16 x 8 1/2	64	95.24	16.00	406	8.500	218	0.443	11.25	0.715	18.16	0.60	15.12	18.70	121.3
	58	86.31	15.86	403	8.464	215	0.407	10.34	0.645	16.38	0.60	15.2	17.04	109.09
	50	70.41	16.25	413	7.073	180	0.380	9.65	0.628	15.95	0.43	10.9	14.70	94.8
16" WF	45	66.97	16.12	409	7.039	179	0.348	8.79	0.563	14.30	0.43	10.9	13.24	85.4
16 x 7	40	59.53	16.00	406	7.000	178	0.307	7.80	0.503	12.78	0.43	10.9	11.77	75.9
	36	53.57	15.85	403	6.992	178	0.299	7.59	0.428	10.87	0.43	10.9	10.59	68.3
	426	634.0	18.69	475	16.695	424	1.875	47.63	3.033	77.04	0.60	15.2	152.25	808.1
	398	592.3	18.31	465	16.590	421	1.770	44.96	2.843	72.21	0.60	15.2	116.98	754.7
	370	550.6	15.94	456	16.475	418	1.655	42.04	2.658	67.51	0.60	15.2	108.78	701.8
	342	509.0	17.56	446	16.365	416	1.545	39.24	2.468	62.69	0.80	15.2	100.59	649.0
	*320	476.2	16.81	427	16.710	424	1.690	48.01	2.093	53.16	0.60	15.2	94.12	607.2
	314	467.3	17.19	437	16.235	412	1.415	35.94	2.283	57.99	0.80	15.2	92.30	595.5
	287	427.1	16.81	427	16.130	410	1.310	33.27	2.093	53.16	0.60	15.2	84.37	544.3
	264	392.9	16.50	419	16.025	407	1.205	30.61	1.938	49.23	0.60	15.2	77.63	500.8
	246	368.1	16.25	413	15.945	405	1.125	28.58	1.813	46.05	0.60	15.2	72.33	486.6
	237	352.7	16.12	409	15.910	404	1.090	27.69	1.748	44.40	0.60	15.2	69.69	449.6
14" WF	228	339.3	16.00	406	15.865	403	1.045	26.54	1.688	42.88	0.60	15.2	67.06	432.6
14 x 16	219	325.9	15.87	403	15.825	402	1.005	25.53	1.623	41.22	0.60	15.2	64.38	415.2
	211	314.0	15.75	400	15.800	401	0.980	24.89	1.563	39.70	0.60	15.2	62.07	400.5
	202	300.6	15.63	397	15.750	400	0.930	23.62	1.503	38.18	0.60	15.2	59.39	383.2
	193	287.2	15.50	394	15.710	399	0.890	22.61	1.438	36.53	0.60	15.2	56.73	366.0
	184	273.8	15.38	391	15.660	398	0.840	21.34	1.378	35.00	0.60	15.2	54.07	348.8
	176	261.9	15.25	387	15.640	397	0.820	20.83	1.313	33.35	0.83	15.2	51.73	333.7
	167	248.5	15.12	384	15.600	396	0.780	19.81	1.248	31.70	0.60	15.2	46.47	318.7
	158	235.1	15.00	381	15.550	395	0.730	18.54	1.188	30.18	0.60	15.2	46.47	299.8
	150	223.2	14.88	378	15.515	394	0.695	17.65	1.128	28.65	0.60	15.2	44.08	284.4
	142	211.3	14.75	375	15.500	394	0.680	17.27	1.063	27.00	0.60	15.2	41.85	270.0
	136	202.4	14.75	375	14.740	374	0.660	16.76	1.063	27.00	0.80	15.2	39.98	257.9
	127	189.0	14.62	371	14.890	373	0.610	15.49	0.998	25.35	0.60	15.2	37.33	240.8
	119	177.1	14.50	368	14.650	372	0.570	14.46	0.938	23.83	0.60	15.2	34.99	225.7
14" WF	111	165.2	14.37	365	14.620	371	0.540	13.72	0.873	22.17	0.60	15.2	32.65	210.6
14 x 14-1/2	103	153.3	14.25	362	14.575	370	0.495	12.57	0.813	20.65	0.60	15.2	30.28	195.2
	95	141.4	14.12	359	14.545	369	0.465	11.81	0.746	19.00	0.80	15.2	27.94	180.3
	87	129.5	14.00	356	14.500	366	0.420	10.67	0.688	17.48	0.60	15.2	25.58	164.9

*Note: * Column Core Section*



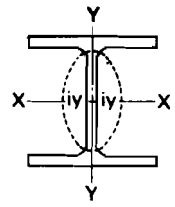
Moment of Inertia				Radius of Gyration				Modulus of Section				Section Index
Jx		Jy		Ix		Iy		Zx		Zy		
in^4	cm^4	in^4	cm^4	in	cm	in	cm	in^3	cm^3	in^3	cm^3	
1,355.1	56,410	207.0	8,625	6.93	17.60	2.71	6.88	166.1	2,722.4	35.9	588.4	16" WF
1,222.6	50,890	185.2	7,710	6.87	17.45	8.27	6.78	151.3	2,479.8	32.2	527.8	18 x 11-1/2
1,042.6	43,400	87.5	3,642	8.74	17.12	1.95	4.95	127.8	2,094.6	20.4	334.4	
936.9	39,000	77.9	3,243	6.70	17.01	1.93	4.90	115.9	1,899.8	18.2	298.3	16" WF
833.8	34,710	68.4	2,847	6.66	16.92	1.91	4.85	104.2	1,707.8	16.1	263.9	16 x 8-1/2
746.4	131,700	60.5	2,518	6.62	16.81	1.88	4.78	90.1	1,542.3	14.3	234.4	
855.4	27,280	34.8	1,449	6.88	18.97	1.54	3.91	80.7	1,322.7	9.8	160.8	
583.3	24,280	30.5	1,270	6.64	16.86	1.52	3.86	72.4	1,186.6	8.7	142.8	16" WF
515.5	21,460	26.5	1,103	6.62	16.81	1.50	3.81	64.4	1,055.5	7.6	124.8	16 x 7
46.3	18,580	22.1	920	6.49	16.48	1.45	3.68	56.3	922.8	6.3	103.2	
6,610.3	275,200	2,359.5	98,200	7.26	18.44	4.34	11.02	707.4	11,594.3	282.7	4,633.4	
6,013.7	250,300	2,169.7	90,320	7.17	18.21	4.31	10.95	656.9	10,766.6	261.6	4,287.6	
5,454.2	227,000	1,986.0	82,670	7.08	17.98	4.27	10.84	608.1	9,9668	241.1	3,951.6	
4,911.5	204,400	1,806.9	75,220	6.99	17.75	4.24	10.77	559.4	9,168.8	220.8	3,618.9	
4,141.7	172,400	1,635.1	68,070	6.63	16.84	4.17	10.59	493.8	8,077.0	195.7	3,207.5	
4,399.4	183,100	1,631.4	67,910	6.90	17.53	4.20	10.67	511.9	8,390.0	201.0	3,294.4	
3,912.1	162,800	1,466.5	61,050	6.81	17.30	4.17	10.59	465.5	7,629.5	181.6	2,979.7	
3,526.0	148,800	1,331.2	55,420	6.74	17.12	4.14	10.52	427.4	7,005.1	166.1	2,772.4	
3,228.9	134,400	1,226.6	51,060	6.68	16.97	4.12	10.46	397.4	6,513.4	153.9	2,522.4	
3,080.9	126,200	1,174.8	48,900	6.65	16.89	4.11	10.44	382.2	6,264.2	147.7	2,420.6	
2,942.4	122,500	1,124.8	46,820	6.62	16.81	4.10	10.41	387.87	6,028.2	141.6	2,324.1	14 " WF
2,796.2	116,500	1,073.2	44,680	6.59	16.74	4.08	10.36	352.6	5,779.1	135.6	2,222.5	14 x 16
2,671.4	111,200	1,028.6	42,820	6.56	16.66	4.07	10.34	339.2	5,559.5	130.2	2,134.0	
2,538.8	105,700	979.7	40,780	6.54	16.61	4.06	10.31	324.9	5,325.1	124.4	2,038.9	
2,402.4	100,000	930.1	38,720	6.51	16.54	4.05	10.29	310.0	5,080.9	118.4	1,940.8	
2,274.8	94,700	882.7	36,740	6.49	16.48	4.04	10.26	295.8	4,848.2	112.7	1,847.2	
2,149.8	89,480	837.9	34,680	6.45	16.38	4.02	10.21	281.9	4,620.3	107.1	1,755.4	
2,020.8	84,120	790.2	32,890	6.42	16.31	4.01	10.18	267.3	4,381.0	101.3	1,660.3	
1,900.8	79,120	745.0	31,010	6.40	16.26	4.20	10.16	253.4	4,153.2	95.6	1,570.2	
1,788.9	74,380	702.5	29,240	6.37	16.18	3.99	10.13	240.2	3,936.9	90.6	1,484.9	
1,672.2	69,610	660.1	27,480	6.32	16.05	3.97	10.08	22.8.7	3,715.8	85.2	1,396.4	
1,593.0	66,310	567.7	23,630	6.31	16.03	3.77	9.58	216.0	3,540.2	77.0	1,262.0	
1,476.1	61,470	527.6	21,960	6.29	15.98	3.76	9.55	202.0	3,310.7	71.8	1,178.6	
1,373.1	57,180	491.8	20,470	6.26	15.90	3.75	9.52	189.4	3,104.3	67.1	1,099.8	
1,266.5	52,720	454.9	18,940	6.23	15.82	3.73	9.47	176.3	2,889.6	62.2	1,019.4	14" WF
1,185.8	48,530	419.7	17,470	6.21	15.77	3.72	9.45	163.6	2,681.4	57.6	944.1	14 x 14-1/2
1,063.5	44,270	383.7	15,970	6.17	15.67	3.71	9.42	150.6	2,468.3	52.8	865.4	
966.9	40,250	349.7	14,560	6.15	15.62	3.70	9.40	138.1	2,263.4	48.2	790.0	



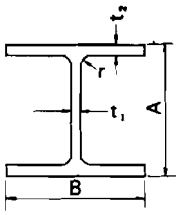
Wide Flange Shapes

(Inch Series) - Continued

Section Index	Weight		Depth of Section (A)]		Flange Width (B)		Web Thickness (t_1)		Web Thickness (t_2)		Corner Radius		Sectional Area	
	lbs/ft	kg/m	in	mm	in	mm	in	mm	in	mm	in	mm	in^2	mm^2
14" WF	84	125.0	14.18	360	12.023	305	0.451	11.46	0.778	19.76	0.60	15.2	24.71	159.4
14 X 12	78	118.1	14.06	357	12.000	305	0.428	11.87	0.718	18.24	0.60	15.2	22.94	148.0
14" WF	74	110.1	14.19	360	10.072	256	0.450	11.43	0.783	19.89	0.60	15.2	21.76	140.4
14 X 10	68	101.2	14.06	357	10.040	255	0.418	10.62	0.718	18.24	0.60	15.2	20.00	129.0
	81	90.78	13.91	353	10.000	254	0.378	9.60	0.643	16.33	0.60	15.2	17.94	115.7
14" WF	53	78.87	13.94	354	8.062	205	0.370	9.40	0.658	16.71	0.60	15.2	15.59	100.6
14 X 8	48	71.43	13.81	351	8.031	204	0.339	8.61	0.593	15.06	0.60	15.2	14.11	91.0
	43	63.99	13.68	347	8.000	203	0.308	7.82	0.528	13.41	0.60	15.2	12.65	81.6
14" WF	38	56.55	14.12	359	6.776	172	0.313	7.95	0.513	13.03	0.43	10.9	11.17	72.1
14 X 6-3/4	34	50.60	14.00	356	6.750	171	0.287	7.29	0.453	11.51	0.43	10.9	10.00	64.5
	30	44.46	13.86	352	6.733	171	0.270	6.86	0.383	9.73	0.43	10.9	8.81	56.8
	190	282.8	14.38	365	12.670	322	1.060	26.92	1.738	44.09	0.60	15.2	55.86	360.4
	161	239.6	13.88	353	12.515	318	0.905	22.99	1.486	37.74	0.60	15.2	47.38	305.7
	133	197.9	13.38	340	12.365	314	0.755	19.18	1.236	31.39	0.60	15.2	39.11	252.3
	120	178.6	13.12	333	12.320	311	0.710	18.03	1.106	28.09	0.60	15.2	35.31	227.8
12" WF	106	157.7	12.88	327	12.230	311	0.620	15.75	0.986	25.04	0.60	15.2	31.19	201.2
12 X 12	99	147.3	12.75	324	12.190	310	0.580	14.73	0.921	23.39	0.60	15.2	29.09	187.7
	92	136.9	12.62	321	12.155	309	0.545	13.84	0.856	21.74	0.60	15.2	27.06	174.6
	85	126.5	12.50	318	12.105	307	0.495	12.57	0.796	20.22	0.60	15.2	24.98	161.2
	79	117.6	12.38	314	12.060	307	0.470	11.94	0.736	18.69	0.60	15.2	23.22	149.8
	72	107.1	12.25	311	12.040	306	0.430	10.92	0.671	17.04	0.60	15.2	21.16	136.5
	65	96.73	12.12	308	12.000	305	0.390	9.91	0.606	15.39	0.60	15.2	19.11	123.3
12" WF	58	86.31	12.19	310	10.014	254	0.359	9.12	0.641	16.28	0.60	15.2	17.06	110.1
12 X 10	53	78.87	12.06	306	10.000	254	0.345	8.76	0.576	14.63	0.60	15.2	15.59	100.6
12" WF	50	74.41	12.91	310	8.077	205	0.371	9.42	0.641	16.28	0.60	15.2	14.71	94.9
12 X 8	45	66.97	12.06	306	8.042	204	0.336	8.53	0.576	14.63	0.60	15.2	13.24	85.4
	40	59.53	11.94	303	8.000	203	0.294	7.47	0.516	13.11	0.60	15.2	11.77	75.9
12" WF	36	53.57	12.24	311	6.565	167	0.305	7.75	0.540	13.72	0.37	9.40	10.59	68.3
12 X 6-1/2	31	46.13	12.09	307	6.525	166	0.265	6.73	0.465	11.81	0.37	9.40	9.12	58.8
	27	40.18	11.96	304	6.500	165	0.240	6.10	0.400	10.16	0.37	9.40	7.97	51.4



Moment of Inertia				Radius of Gyration				Modulus of Section				Section Index
Jx		Jy		ix		iy		Zx		Zy		
in^4	cm^4	in^4	cm^4	in	cm	in	cm	in^3	cm^3	in^3	cm^3	
928.4	38,650	225.5	9,387	6.13	15.57	3.02	7.67	130.9	2,145.4	37.5	614.6	14" WF
851.2	35,430	206.9	8,613	6.09	15.47	3.00	7.62	121.1	1,984.8	34.5	565.4	14 X 12
796.8	33,170	133.5	5,557	6.05	15.37	2.48	6.30	112.3	1,840.6	28.5	434.3	14" WF
724.1	30,140	121.2	5,045	6.02	15.29	2.46	6.25	103.0	1,688.1	24.1	395.0	14 X 10
641.5	26,700	107.3	4,467	5.98	15.19	2.45	6.22	92.2	1,511.2	21.5	352.4	
542.1	22,570	57.5	2,394	5.90	14.99	1.92	4.88	77.8	1,275.1	14.3	234.4	14" WF
484.9	20,180	51.3	2,136	5.88	14.88	1.91	4.85	70.2	1,150.6	12.8	209.8	14 X 8
429.0	17,860	45.1	1,877	5.82	14.78	1.89	4.80	62.7	1,027.8	11.3	185.2	
385.3	16,040	24.6	1,024	5.87	14.91	1.49	3.78	54.6	894.9	7.3	119.6	14" WF
339.2	14,120	21.3	886.8	5.83	14.81	1.46	3.71	48.5	794.9	6.3	103.2	14 X 6-3/4
289.6	12,060	17.5	728.5	5.73	14.55	1.41	3.58	41.8	685.1	5.2	85.2	
1,892.5	78,780	589.7	24,550	5.82	14.78	3.25	8.26	263.2	4,313.8	93.1	1,525.9	12" WF
1,541.8	64,180	486.2	20,240	5.70	14.46	3.20	8.13	222.2	3,641.8	77.7	1,273.5	12 X 12
1,221.2	50,840	389.9	16,230	5.59	14.20	3.18	8.03	182.5	2,991.2	63.1	1,034.2	
1,071.7	44,610	345.1	14,360	5.51	14.00	3.13	7.95	163.4	2,678.1	56.0	917.8	
930.7	38,740	300.9	12,520	5.46	13.87	3.11	7.90	144.5	2,368.4	49.2	806.4	
858.5	35,740	278.2	11,560	5.43	13.79	3.09	7.85	134.7	2,207.7	45.7	749.0	
788.9	32,840	256.4	10,670	5.40	13.72	3.08	7.82	125.0	2,048.8	42.2	691.6	
723.3	30,110	235.5	9,603	5.38	13.66	3.07	7.82	115.7	1,896.3	38.9	637.6	
663.0	27,800	216.4	9,008	5.34	13.56	3.05	7.75	107.1	1,755.4	35.8	586.6	
597.4	24,870	195.3	8,130	5.31	13.49	3.04	7.72	97.5	1,598.0	32.4	531.0	
533.4	22,200	174.6	7.268	5.28	13.41	3.02	7.67	88.0	1,442.3	29.1	476.9	
476.1	19,820	107.4	4,471	5.28	13.41	2.51	6.38	78.1	1,280.0	21.4	350.7	12" WF
426.2	17,740	96.1	4,000	5.23	13.26	2.46	6.30	70.7	1,158.8	19.2	314.7	12 X 10
394.5	16,420	56.4	2,348	5.18	13.16	1.96	4.96	64.7	1,060.4	14.0	229.5	12" WF
350.6	14,600	50.0	2,081	5.15	13.08	1.94	4.93	58.2	953.9	12.4	203.2	12 X 8
310.1	12,910	44.1	1,836	5.13	13.03	1.94	4.93	51.9	850.6	11.0	180.3	
280.8	11,690	23.7	986.6	5.15	13.08	1.50	3.81	45.9	752.3	7.2	118.0	12" WF
238.4	9,924	19.6	824.2	5.11	12.98	1.47	3.73	39.4	645.8	6.1	100.0	12 X 6-1/2
204.1	8,496	16.6	691.0	5.06	12.85	1.44	3.66	34.1	558.9	5.1	83.6	



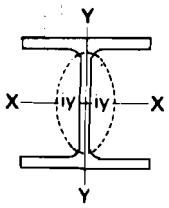
Wide Flange Shapes

(Inch Series)m - Continued

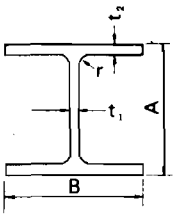
Wide Flange Shapes

(Inch Series) - Continued

Section Index	Weight		Depth of Section (A)]		Flange Width (B)		Web Thickness (t_1)		Web Thickness (t_2)		Corner Redius		Sectional Area	
	lbs/ft	kg/m	in	mm	in	mm	in	mm	in	mm	in	mm	in^2	mm^2
	112	168.7	11.38	289	10.415	265	0.755	19.18	1.248	31.70	0.50	12.7	32.92	212.4
	100	148.8	11.12	282	10.345	263	0.685	17.40	1.118	28.40	0.50	12.7	29.43	189.9
	89	132.4	10.88	276	10.275	261	0.615	15.62	0.998	25.35	0.50	12.7	26.19	169.0
10" WF	77	114.6	10.62	270	10.195	259	0.535	13.59	0.868	22.05	0.50	12.7	22.67	146.3
10 x 10	72	107.1	10.50	267	10.170	258	0.510	12.95	0.808	20.52	0.50	12.7	21.18	136.6
	66	98.22	10.38	264	10.117	257	0.457	11.61	0.748	19.00	0.50	12.7	19.41	125.5
	60	89.29	10.52	260	10.075	256	0.415	10.54	0.683	17.35	0.50	12.7	17.66	113.9
	54	80.36	10.12	257	10.028	255	0.368	9.35	0.618	15.70	0.50	12.7	15.88	102.5
	49	72.92	10.00	254	10.000	254	0.340	8.64	0.558	14.17	0.50	12.7	14.40	92.9
	45	66.97	10.12	257	8.002	204	0.350	8.89	0.618	15.70	0.50	12.7	13.24	85.4
10" WF	39	58.04	9.94	252	7.990	203	0.318	8.08	0.528	13.41	0.50	12.7	11.48	74.1
10 x 8	33	49.11	9.75	248	7.964	202	0.292	7.42	0.433	11.00	0.50	12.7	9.71	62.6
	29	43.16	10.22	260	5.799	147	0.289	7.34	0.500	12.70	0.32	8.12	8.53	55.0
10" WF	25	37.20	10.08	256	5.762	146	0.252	6.40	0.430	10.92	0.32	8.12	7.35	47.4
10 x 5-3/4	21	31.25	9.90	251	5.750	146	0.240	6.10	0.340	8.64	0.32	8.12	6.19	39.9
	67	99.71	9.00	229	8.287	210	0.575	14.61	0.933	23.70	0.40	10.2	19.70	127.1
	58	86.31	8.75	222	8.222	209	0.510	12.95	0.808	20.52	0.40	10.2	17.06	110.1
8" WF	48	71.43	8.50	216	8.117	206	0.405	10.29	0.683	17.35	0.40	10.2	14.11	91.0
8 x 8	40	59.53	8.25	210	8.077	205	0.365	9.27	0.558	14.17	0.40	10.2	11.76	75.9
	35	52.09	8.12	206	8.027	204	0.315	8.00	0.493	12.52	0.40	10.2	10.30	66.5
	31	46.13	8.00	203	8.000	203	0.288	7.32	0.433	11.00	0.40	10.2	9.12	58.8
8" WF	28	41.67	8.06	205	6.540	166	0.285	7.24	0.463	11.76	0.40	10.2	8.23	53.1
8 x 6-1/2	24	35.72	7.93	201	6.500	165	0.245	6.22	0.398	10.11	0.40	10.2	7.06	45.5
8" WF	20	29.76	8.14	207	5.268	134	0.248	6.30	0.378	9.60	0.32	8.12	5.86	37.9
8 x 5-1/4	17	25.30	6.00	203	5.250	133	0.230	5.84	0.308	7.82	0.32	8.12	5.00	32.3
6" WF	25	37.20	6.37	162	6.080	154	0.320	8.13	0.456	11.58	0.25	6.35	7.35	47.4
6 x 6	20	29.76	6.20	157	6.018	153	0.258	6.55	0.367	9.32	0.25	6.35	5.88	37.9
	15.5	23.07	6.00	152	6.000	152	0.240	6.10	0.269	6.83	0.25	6.35	4.59	29.6
5" WF	16.5	27.53	5.12	130	5.025	128	0.265	6.73	0.420	10.67	0.30	7.62	5.45	35.2
5 x 5	16	23.81	5.00	127	5.000	127	0.240	6.10	0.360	9.14	0.30	7.62	4.70	30.3
4" WF	13	19.35	4.16	106	4.060	103	0.280	7.11	0.345	8.30	0.313	7.95	3.62	25.1
4 x 4														



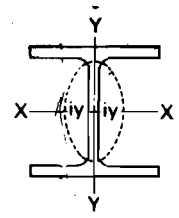
Moment of Inertia				Radius of Gyration				Modulus of Section				Section Index
Jx		Jy		Ix		Iy		Zx		Zy		
in^4	cm^4	in^4	cm^4	in	cm	in	cm	in^3	cm^3	in^3	cm^3	
718.7	29,920	235.4	9,799	4.67	11.89	2.67	8.78	126.3	2,070.0	45.2	740.8	
625.0	26,020	206.6	8,600	4.61	11.71	2.65	8.73	112.4	1,842.2	39.9	654.0	
542.4	22,580	180.6	1,518	4.55	11.56	2.63	8.68	99.7	1,634.1	35.2	576.9	
457.2	19,030	153.4	6,386	4.49	11.40	2.60	6.60	86.1	1,411.2	30.1	493.3	
420.7	17,510	141.8	5,903	4.46	11.33	2.59	6.58	80.1	1,312.8	27.9	457.3	10" WF
382.5	15,920	129.2	5,378	4.44	11.28	2.58	6.55	73.7	1,207.9	25.5	417.9	10 x 10
343.7	14,310	118.5	4,850	4.41	11.20	2.57	6.53	67.1	1,099.8	23.1	378.6	
305.7	12,720	103.9	4,325	4.39	11.15	2.56	6.50	60.4	990.0	20.7	339.3	
272.9	11,360	93.0	3,871	4.35	11.05	2.54	6.45	54.8	894.9	18.8	304.8	
248.6	10,350	53.2	2,215	4.33	11.00	2.00	5.08	49.1	804.7	13.3	218.0	10" WF
209.7	8,729	44.9	1,869	4.27	10.84	1.97	5.03	42.2	691.6	11.2	183.6	10 x 8
170.9	7,114	36.5	1,519	4.20	10.67	1.94	4.93	35.0	573.6	9.2	150.8	
157.3	6,548	15.2	632.8	4.29	10.90	1.34	3.40	30.8	504.8	5.2	85.2	
133.2	5,545	12.7	528.7	4.26	10.82	1.31	3.33	26.4	432.7	4.4	72.1	10" WF
106.3	4,425	9.7	403.8	4.14	10.52	1.25	3.18	21.5	352.4	3.4	55.7	10 x 5-3/4
271.8	11,310	88.6	3,688	3.71	9.42	2.12	5.38	60.4	990.0	21.4	350.7	
227.3	9,462	74.9	3,118	3.65	9.27	2.10	5.33	52.0	852.3	18.2	298.3	
183.7	7,647	60.9	2,535	3.61	9.17	2.08	5.28	43.2	708.0	15.0	248.8	8" WF
146.3	6,090	49.0	2,040	3.53	8.97	2.04	5.18	35.5	581.8	12.1	198.3	8 x 8
126.5	5,266	42.5	1,769	3.50	8.89	2.03	5.18	31.1	509.7	10.6	173.7	
109.7	4,567	37.0	1,540	3.47	8.81	2.01	5.10	27.4	449.1	9.2	150.8	
97.8	4,071	21.6	899.2	3.45	8.76	1.82	4.11	24.3	398.3	6.6	108.2	8" WF
82.5	3,434	18.2	757.6	3.42	8.69	1.61	4.09	20.8	340.9	5.8	91.8	8 x 6-1/2
69.2	2,881	8.50	353.8	3.43	8.71	1.20	3.05	17.0	278.6	3.2	52.4	8" WF
56.4	2,348	6.72	279.7	3.36	8.53	1.16	2.95	14.1	231.1	2.6	42.6	8 x 5-1/4
53.5	2,227	17.1	711.8	2.69	6.83	1.52	3.86	16.8	275.4	5.6	91.8	
41.7	1,736	13.3	553.6	2.66	6.76	1.50	3.81	13.4	219.6	4.4	72.1	6" WF
30.3	1,261	9.69	403.4	2.56	6.50	1.45	3.68	10.1	165.5	3.2	52.4	6 x 6
25.4	1,057	8.69	370.0	2.18	5.49	1.28	3.25	9.94	162.9	3.54	58.0	5" WF
21.3	886.7	7.51	312.6	2.13	5.41	1.26	3.20	8.53	139.8	3.00	49.2	5 x 5
11.3	470.3	3.76	156.5	1.72	4.37	0.99	2.51	5.45	89.3	1.9	31.1	4" WF 4 x 4



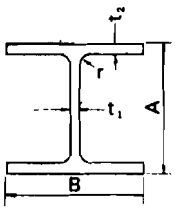
Wide Flange Shapes

(Metric Series)

Section Index	Weight	Depth of Section (A)]	Flange Width (B)	Thickness		Corner Radius (r)	Sectional Area	Moment of Inertia		Radius of Gyration		Modulus of Section	
				Web (t_1)	Flange (t_2)			Jx	Jy	ix	iy	Zx	Zy
mm	kg/m	mm	mm	mm	mm	mm	cm^2	cm^4	cm^4	mm	cm	cm^3	cm^3
	286	912	302	18	34	28	364.0	498,000	15,700	37.0	6.56	10,900	1,040
900 x 300	243	900	300	16	28	28	390.8	411,000	12,600	36.4	6.39	9,140	843
	213	890	299	15	23	28	270.9	345,000	10,300	35.7	6.16	7,760	688
	241	808	302	16	30	28	307.6	339,000	13,800	33.2	6.70	8,400	915
800 x 300	210	800	300	14	26	28	267.4	292,000	11,700	33.0	6.62	7,290	782
	191	792	300	14	22	28	243.4	254,000	9,930	32.3	6.39	6,410	662
	215	708	302	15	28	28	273.6	237,000	12,900	29.4	6.86	6,700	853
700 x 300	185	700	300	13	24	28	235.5	201,000	10,800	29.3	6.78	5,760	722
	166	692	300	13	20	28	211.5	172,000	9,020	28.6	6.53	4,980	602
	175	594	302	14	23	28	222.4	137,000	10,000	24.9	6.90	4,620	701
600 x 300	151	588	300	12	20	28	192.5	118,000	9,020	24.8	6.85	4,020	601
	137	582	300	12	17	28	174.5	103,000	7,670	24.3	6.63	3,530	511
	134	612	202	13	23	22	107.7	103,000	3,180	24.6	4.31	3,380	314
	120	606	201	12	20	22	152.5	90,400	2,720	24.3	4.22	2,980	271
600 x 200	106	600	200	11	17	22	134.4	77,600	2,280	24.0	4.12	2,590	228
	94.6	596	199	10	15	22	120.5	68,700	7,980	23.9	4.05	2,310	199
500 x 300	128	488	300	11	18	20	163.5	71,000	8,110	20.8	7.04	2,910	541
	114	482	300	11	15	26	145.5	60,400	6,760	20.4	6.82	2,500	451
	103	506	201	11	19	20	131.3	56,500	2,580	20.7	4.43	2,230	257
500 x 200	59.6	500	200	10	16	20	114.2	47,800	2,140	20.5	4.33	1,910	214
	79.5	496	199	9	14	20	101.3	41,900	1,840	20.3	4.27	1,690	185
450 x 300	124	440	300	11	18	24	157.4	56,100	8,110	18.9	7.18	2,550	541
	106	434	299	10	15	24	135.0	46,800	6,690	118.6	7.04	2,160	448
450 x 200	78.0	450	200	9	14	18	96.76	33,500	1,870	18.6	4.40	1,490	187
	66.2	446	199	8	12	18	84.30	28,700	1,580	18.5	4.33	1,290	159
	605	498	432	45	70	22	770.1	298,000	94,400	19.7	11.1	12,000	4,370
	415	458	417	30	50	22	528.8	187,700	60,500	18.8	10.7	8,170	2,900
400 x 400	283	428	407	20	35	22	360.7	119,000	39,400	18.2	10.4	5,570	1,930
	232	414	405	18	28	22	295.4	92,800	31,000	17.7	10.2	4,480	1,530



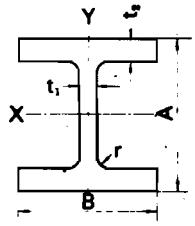
Section Index	Weight	Depth of Section (A)]	Flange Width (B)	Thickness		Corner Radius (r)	Sectional Area	Moment of Inertia		Radius of Gyration		Modulus of Section	
				Web (t_1)	Flange (t_2)			Jx	Jy	ix	iy	Zx	Zy
mm	kg/m	mm	mm	mm	mm	mm	cm^2	cm^4	cm^4	mm	cm	cm^3	cm^3
	200	406	403	16	24	22	254.9	78,000	26,200	17.5	10.1	3,840	1,300
	197	400	408	21	21	22	250.7	70,900	23,800	16.8	9.75	3,540	1,170
400 x 400	172	400	400	13	21	22	218.7	66,600	22,400	17.5	10.1	3,330	1,120
	168	394	405	18	18	22	214.4	59,700	20,000	16.7	9.65	3,030	985
	147	394	398	11	18	22	186.8	56,100	18,900	17.3	10.1	2,850	951
	140	388	402	15	15	22	178.5	49,400	16,300	16.6	9.54	2,520	809
400 x 300	107	390	300	10	16	22	136.0	38,700	7,210	16.9	7.28	1,980	481
	94.3	386	299	9	14	22	120.1	33,700	6,240	16.7	7.21	1,740	418
400 x 200	66.0	400	200	8	13	16	84.12	23,700	1,740	18.8	4.54	1,190	174
	56.6	396	199	7	11	16	72.16	20,000	1,450	16.7	4.48	1,010	145
	159	356	352	14	22	20	202.0	47,600	16,000	15.3	8.90	2,670	909
	156	350	357	19	19	20	198.4	42,800	14,400	14.7	8.53	2,450	809
350 x 350	137	350	350	12	19	20	173.9	40,300	13,600	15.2	8.84	2,300	776
	131	344	354	16	16	20	166.6	35,300	11,800	14.6	8.43	2,050	669
	115	344	348	10	16	20	146.0	33,300	11,200	15.1	8.78	1,9-40	,646
	106	338	351	13	13	20	135.3	28,200	9,380	14.4	8.33	1,670	534
350 x 250	79.7	340	250	9	14	20	101.5	21,700	3,650	14.6	6.00	1,280	292
	69.2	33.6	249	8	12	20	88.15	18,500	3,090	14.5	5.92	1,100	248
350 x 175	49.6	350	175	7	11	14	63.14	13,600	984	14.7	3.95	775	112
	41.4	346	174	6	9	14	52.68	11,100	792	14.5	3.88	641	91.0
	106	304	301	11	17	18	134.8	23,400	7,730	13.2	7.57	1,540	514
	106	300	305	15	15	18	134.8	21,500	7,100	12.6	7.26	1,440	466
300 x 300	94.0	300	300	10	15	18	119.8	20,400	6,750	13.1	7.51	1,360	450
	87.0	298	299	9	14	18	110.8	18,800	6,240	13.0	7.51	1,270	417
	84.5	294	302	12	12	18	107.7	16,900	5,520	12.5	7.16	1,150	365
300 x 200	65.4	298	201	9	14	18	83.36	13,300	1,900	12.6	4.77	893	189
	56.8	294	200	8	12	18	72.38	11,300	1,600	12.5	4.71	771	160
300 x 150	36.7	300	150	6.5	9	13	46.78	7,210	508	12.4	3.29	481	67.7
	32.0	298	149	5.5	8	13	40.80	6,320	442	12.4	3.29	424	59.3



Flange Shapes

(Metric Series)-Continued

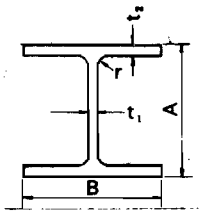
Section Index	Weight	Depth of Section (A)]	Flange Width (B)	Thickness		Corner Radius (r)	Sectional Area	Moment of Inertia		Radius of Gyration		Modulus of Section	
				Web (t_1)	Flange (t_2)			Jx	Jy	ix	iy	Zx	Zy
mm	kg/m	mm	mm	mm	mm	mm	cm^2	cm^4	cm^4	mm	cm	cm^3	cm^3
	82.2	250	255	14	14	16	104.7	11,500	3,880	10.5	16.09	919	304
250 x 250	72.4	250	250	9	14	18	92.18	10,800	3,650	10.8	6.29	867	292
	66.5	248	249	8	13	16	84.70	9,930	3,350	10.8	6.29	801	269
	64.4	244	252	11	11	16	82.06	8,790	2,940	10.3	5.98	720	233
250 x 175	44.1	244	175	7	11	16	56.24	6,120	984	10.4	4.18	502	113
250 x 125	29.6	250	125	6	9	12	37.66	4,050	294	10.4	2.79	324	47.0
	25.7	248	124	5	8	12	32.68	3,540	255	10.4	2.79	285	41.1
	65.7	208	202	10	16	13	83.69	6,530	2,200	8.83	5.13	628	218
200 x 200	56.2	200	204	12	12	13	71.53	4,980	1,700	8.35	4.88	498	167
	49.9	200	200	8	12	13	63.53	4,720	1,600	8.62	5.02	472	160
200 x 150	30.6	194	150	6	9	13	39.01	2,690	507	8.63	3.61	277	67.6
200 x 100	21.3	200	100	5.5	8	11	27.16	1,840	134	8.24	2.22	184	26.8
	18.2	198	99	4.5	7	11	23.18	1,580	114	8.26	2.21	160	23.0
175 x 175	40.2	175	175	7.5	11	12	51.21	2,880	984	7.50	4.38	330	112
175 x 125	23.3	169	125	5.5	8	12	29.65	1,530	261	7.18	2.97	181	41.8
175 x 90	18.1	175	90	5	8	9	23.04	1,210	97.5	7.26	2.06	139	21.7
150 x 150	131.5	150	150	7	10	11	40.14	1,640	563	6.39	3.75	219	75.1
150 x 100	21.1	148	100	6	9	11	28.84	1,020	151	6.17	2.37	138	30.1
150 x 75	14.0	150	75	5	7	8	17.85	666	49.5	6.11	1.66	88.8	13.2
125 x 125	23.8	125	125	6.5	9	10	30.31	847	293	5.29	3.11	136	47.0
125 x 60	13.2	125	26	6	8	9	16.84	413	29.6	4.95	1.32	66.1	9.73
100 x 100	17.2	100	100	6	8	10	21.90	383	134	4.18	2.47	76.5	26.7
100 x 50	9.30	100	50	5	7	8	11.85	187	14.8	3.98	1.12	37.5	5.91



Heavy Column Sections

(Metric Series)

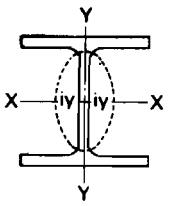
Section Index	Weight	Depth of Section (A)]	Flange Width (B)	Thickness		Corner Radius (r)	Sectional Area	Moment of Inertia		Radius of Gyration		Modulus of Section	
				Web (t_1)	Flange (t_2)			Jx	Jy	Ix	Iy	Zx	Zy
mm	kg/m	mm	mm	mm	mm	mm	cm^2	cm^4	cm^4	mm	cm	cm^3	cm^3
90	930	538	477	90	90	22	1,185	472,000	165,000	20.0	11.8	17,600	6,920
85	1,170	608	472	85	125	22	1,488	737,000	221,000	22.3	12.2	24,300	9,360
75	758	508	462	75	75	22	965.7	358,000	125,000	19.3	11.4	14,100	5,390
70	953	568	457	70	105	22	1,214	551,000	168,000	21.3	11.8	19,400	7,360
60	804	538	447	60	90	22	1,024	433,000	135,000	20.6	11.5	16,100	6,030
	593	478	447	60	90	22	755.4	260,000	90,000	18.6	10.9	10,900	4,030
50	658	508	437	50	75	22	838.7	331,000	105,000	19.9	11.2	13,000	4,790
	740	538	432	45	90	22	942.9	414,000	121,000	21.0	11.3	15,400	5,610
45	605	498	432	45	70	22	770.1	298,000	94,000	19.7	11.1	12,000	4,370
	435	448	432	45	45	22	554.1	177,000	60,800	17.9	10.5	7,900	2,810
40	516	478	427	40	60	22	659.8	242,000	78,100	19.1	10.9	10,100	3,660
	364	438	427	40	40	22	489.0	152,000	52,100	17.6	10.3	6,950	2,440
35	466	468	422	35	55	22	593.7	214,000	69,000	19.0	10.8	9,130	3,270
	334	428	422	35	35	22	424.9	129,000	44,000	17.4	10.2	6,030	2,080
	480	478	417	30	60	22	612.0	233,000	72,600	19.5	10.9	9,740	3,480
30	514	458	417	30	50	22	528.6	187,000	60,500	18.8	10.7	8,170	2,900
	284	418	417	30	30	22	361.6	107,000	36,400	17.2	10.0	5,120	1,740
25	332	438	412	25	40	22	423.3	142,000	46,700	18.3	10.5	6,470	2,270
20	286	428	407	20	35	22	360.7	119,000	39,400	18.2	10.4	5,570	1,930



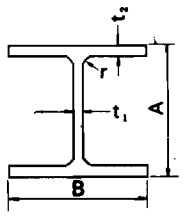
(Inch Series)

Section Index	Weight		Depth of Section (A)		Flange Width (B)		Web Thickness (t_1)		Flange Thickness (t_2)		Corner Radius		Sectional Area	
	lbs/ft	kg/m	in	mm	in	mm	in	mm	in	mm	in	mm	in²	cm²
L 24×7	61	90.78	23.72	602	7.023	178	0.419	10.64	0.591	15.01	0.54	13.7	18.0	116.1
	55	81.85	23.55	598	7.000	178	0.396	10.06	0.503	12.78	0.54	13.7	16.2	104.5
L 21×6-1/2	49	72.92	20.82	529	6.520	166	0.368	9.35	0.532	13.51	0.54	13.7	14.4	92.9
	44	65.48	20.66	525	6.500	165	0.348	8.84	0.451	11.46	0.54	13.7	13.0	83.9
L 18×6	40	59.53	17.90	455	6.018	153	0.316	8.03	0.524	13.31	0.43	10.9	11.8	76.1
	35	52.09	17.71	500	6.000	152	0.298	7.57	0.429	10.90	0.43	10.9	10.3	66.5
L 16×5-1/2	31	46.13	15.84	402	5.525	140	0.275	6.99	0.442	11.23	0.43	10.9	9.12	58.8
	26	38.69	15.65	398	5.500	140	0.250	6.35	0.345	8.76	0.43	10.9	7.65	49.4
L 14×5	26	38.69	13.89	353	5.025	128	0.255	6.48	0.418	10.62	0.43	10.9	7.65	49.4
	22	32.74	13.72	348	5.000	127	0.230	5.84	0.335	8.51	0.43	10.9	6.47	41.7
L 12×4	22	32.74	12.31	313	4.030	102	0.260	6.60	0.424	10.77	0.30	7.62	6.47	41.7
	19	28.28	12.16	309	4.010	102	0.240	6.10	0.349	8.86	0.30	7.62	5.62	36.3
	16.5	24.55	12.00	305	4.000	102	0.230	5.84	0.269	6.83	0.30	7.62	4.86	31.4
J 12×4	14	20.83	11.91	303	3.970	101	0.200	5.08	0.224	5.69	0.30	7.62	4.14	26.7
L 10×4	19	28.28	10.25	260	4.020	102	0.250	6.35	0.394	10.01	0.30	7.62	5.61	36.2
	17	25.30	10.12	257	4.010	102	0.240	6.10	0.329	8.36	0.30	7.62	4.98	32.1
	15	22.32	10.00	254	4.000	102	0.230	5.84	0.269	6.83	0.30	7.62	4.40	28.4
J 10×4	11.5	17.11	9.87	251	3.950	100	0.180	4.57	0.204	5.18	0.30	7.62	3.39	21.9
L 8×4	15	22.32	8.12	206	4.015	102	0.245	6.22	0.314	7.98	0.30	7.62	4.43	28.6
	13	19.35	8.00	203	4.000	102	0.230	5.84	0.254	6.45	0.30	7.62	3.83	24.7
J 8×4	10	14.88	7.90	201	3.940	100	0.170	4.32	0.204	5.18	0.30	7.62	2.95	19.0
L 6×4	16	23.81	6.25	159	4.030	102	0.260	6.60	0.404	10.26	0.25	6.35	4.72	30.5
	12	17.86	6.00	152	4.000	102	0.230	5.84	0.279	7.09	0.25	6.35	3.53	22.8
J 6×4	8.5	12.65	5.83	148	3.940	100	0.170	4.32	0.194	4.93	0.25	6.35	2.50	16.1

Note: Sizes indicated by blue letters are not included in regular rolling schedules, rolling month will be decided subject to order quantities and mill conditions.

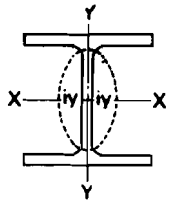


Moment of Inertia				Radius of Gyration				Modulus of Section				Section Index
Jx		Jy		ix		iy		Zx		Zy		
in⁴	cm⁴	in⁴	cm⁴	in	cm	in	cm	in³	cm³	in³	cm³	
1,540	64,100	34.3	1,428	9.25	23.50	1.38	3.51	130.0	2,130.3	9.76	159.9	L 24×7
1,340	55,780	28.9	1,203	9.10	23.11	1.34	3.40	114.0	1,868.1	8.25	135.2	
971	40,420	24.7	1,028	8.21	20.85	1.31	3.33	93.3	1,528.9	7.57	124.0	L 21×6-1/2
843	35,090	20.7	861.6	8.07	20.50	1.27	3.23	81.6	1,337.2	6.38	104.5	
612	25,470	19.1	795.0	7.21	18.31	1.27	3.23	68.4	1,120.9	6.34	103.9	L 18×6
513	21,350	15.5	645.2	7.05	17.91	1.23	3.12	57.9	948.8	5.16	84.6	
372.5	15,500	11.57	481.5	6.39	16.23	1.13	2.87	47.0	770.3	4.19	68.67	L 16×5-1/2
298.1	12,410	8.71	362.5	6.24	15.85	1.07	2.72	38.1	624.5	3.17	51.96	
242.8	10,100	8.26	343.8	5.63	14.30	1.04	2.64	34.9	572.0	3.29	53.92	L 14×5
197.4	8,212	6.40	266.4	5.52	14.02	0.99	2.51	28.8	472.0	2.56	41.96	
155.7	6,482	4.55	189.4	4.91	12.47	0.84	2.13	25.3	414.7	2.26	37.04	
130.1	5,416	3.67	152.8	4.81	12.22	0.81	2.06	21.4	350.7	1.83	29.99	L 12×4
105.3	4,383	2.79	116.1	4.65	11.81	0.76	1.93	17.5	286.8	1.39	22.78	
88.2	3,671	2.25	93.65	4.61	11.71	0.74	1.88	14.8	242.5	1.13	18.52	J 12×4
96.2	4,005	4.19	174.4	4.14	10.52	0.86	2.18	18.8	308.1	2.08	34.09	
81.8	3,405	3.45	143.6	4.05	10.29	0.83	2.11	16.2	265.5	1.72	28.19	L 10×4
68.8	2,864	2.79	116.1	3.95	10.03	0.80	2.03	13.8	226.2	1.39	22.78	
51.9	2,160	2.01	83.66	3.92	9.96	0.77	1.96	10.5	172.1	1.02	16.72	J 10×4
48.0	1,994	3.30	137.4	3.29	8.36	0.86	2.18	11.8	193.4	1.65	27.04	L 8×4
39.5	1,644	2.62	109.1	3.21	8.15	0.83	2.11	9.88	161.9	1.31	21.47	
30.8	1,282	1.99	82.82	3.23	8.20	0.82	2.08	7.79	127.7	1.01	16.55	J 8×4
31.7	1,320	4.32	179.8	2.59	6.58	0.96	2.44	10.1	165.5	2.14	35.07	L 6×4
21.7	903.3	2.89	120.3	2.48	6.30	0.90	2.29	7.24	118.7	1.44	23.60	
14.8	616.0	1.89	78.66	2.43	6.17	0.87	2.21	5.07	83.10	0.96	15.73	J 6×4



(Inch Series)

Section Index	Weight		Depth of Section (A)		Flange Width (B)		Web Thickness (t_1)		Flange Thickness (t_2)		Corner Radius		Sectional Area	
	lbs/ft	kg/m	in	mm	in	mm	in	mm	in	mm	in	mm	in²	cm²
14×14-1/2	117	174.1	14.234	362	14.885	378	0.805	20.45	0.805	20.45	0.60	15.2	34.44	222.2
	102	151.8	14.032	356	14.784	376	0.704	17.88	0.704	17.88	0.60	15.2	30.01	193.6
	89	132.4	13.856	352	14.696	373	0.616	15.65	0.616	15.65	0.60	15.2	26.19	169.0
	73	108.6	13.636	346	14.586	370	0.506	12.85	0.506	12.85	0.60	15.2	21.46	138.5
12×12	74	110.1	12.122	308	12.217	310	0.607	15.42	0.607	15.42	0.60	15.2	21.76	140.4
	53	78.87	11.780	299	12.046	306	0.436	11.07	0.436	11.07	0.60	15.2	15.58	100.5
10×10	57	84.83	10.012	254	10.224	260	0.564	14.33	0.564	14.33	0.50	12.7	16.76	108.1
	42	62.50	9.720	247	10.078	256	0.418	10.62	0.418	10.62	0.50	12.7	12.35	79.7
8×8	36	53.57	8.026	204	8.158	207	0.446	11.33	0.446	11.33	0.40	10.2	10.60	68.4



Moment of Inertia				Radius of Gyration				Modulus of Section				Section Index
Jx		Jy		ix		iy		Zx		Zy		
in^4	cm^4	in^4	cm^4	in	cm	in	cm	in^3	cm^3	in^3	cm^3	
1,228.5	51,140	443.1	18,440	5.97	15.16	3.59	9.12	172.6	2,828.9	59.5	975.2	
1,055.1	43,920	379.6	15,800	5.93	15.06	3.56	9.04	150.4	2,465.0	51.3	840.8	14×14-1/2
909.1	37,840	326.2	13,580	5.89	14.96	3.53	8.94	131.2	2,150.4	44.4	727.7	
733.1	30,520	261.9	10,900	5.85	14.86	3.49	8.86	107.5	1,761.9	35.9	588.4	
566.5	23,580	184.7	7,689	5.10	12.95	2.91	7.39	93.5	1,532.5	30.2	495.0	12×12
394.8	16,430	127.3	5,299	5.03	12.78	2.86	7.26	67.0	1,098.1	21.2	347.5	
294.7	12,270	100.6	4,188	4.19	10.64	2.45	6.22	58.9	965.4	19.7	322.9	10×10
210.8	8,775	71.4	2,972	4.13	10.49	2.40	6.09	43.4	711.3	14.2	232.7	
119.8	4,987	40.4	1,682	3.36	8.53	1.95	4.95	29.9	490.0	9.9	162.2	8×8

(Inch Series)

Section Index	Weight		Depth of Tee		Area of Section		Flange				Stem Thickness	
							Width		Thickness			
	lbs/ft	kg/m	in	mm	in^2	cm^2	in	mm	in	mm	in	mm
	150	223.2	18.36	466	44.09	284.5	16.655	423	1.680	42.87	0.945	24.00
ST 18a	140	208.3	18.25	464	41.16	265.5	16.595	422	1.570	39.88	0.885	22.48
18 x 16-1/2	130	193.5	18.12	460	38.28	247.0	16.555	421	1.440	36.58	0.845	21.46
	122.5	182.3	18.03	548	36.01	232.3	16.512	419	1.350	34.29	0.820	20.37
	115	171.1	17.94	156	33.86	218.5	16.475	418	1.260	32.00	0.765	19.43
	97	144.4	18.24	463	28.56	184.3	12.117	308	1.260	32.00	0.770	19.56
	91	135.4	18.18	461	26.77	172.7	12.072	307	1.180	29.97	0.725	18.42
ST 18b	83	126.5	18.08	459	24.99	161.2	12.027	305	1.100	27.94	0.680	17.27
18 x 12	80	119.1	18.00	457	23.54	151.9	12.00	305	1.020	25.91	0.653	16.59
	75	111.6	17.92	455	22.06	142.5	11.972	304	0.940	23.88	0.625	15.86
	67.5	100.5	17.78	452	19.85	128.1	11.945	305	0.794	20.17	0.598	15.19
ST 16a	120	178.6	16.75	425	35.26	227.5	15.865	403	1.400	35.56	0.830	21.08
16-1/2 x 15-3/4	110	163.7	16.63	422	32.36	208.8	15.610	402	1.275	32.39	0.775	19.69
	100	148.8	16.50	419	29.40	189.7	15.750	400	1.150	29.21	0.715	18.16
	76	113.1	16.75	425	22.35	144.2	11.565	294	1.055	26.680	0.635	16.13
ST 16b	70.5	104.9	16.66	423	20.76	133.9	11.535	293	0.960	24.38	0.605	15.37
16-1/2 x 11-1/2	65	96.73	16.55	420	19.13	123.4	11.510	292	0.855	21.72	0.580	14.73
	59	87.80	16.43	417	17.36	112.0	11.464	292	0.738	18.74	0.554	14.07
ST 15a	105	156.3	15.19	386	30.69	199.3	15.105	384	1.315	33.40	0.775	16.69
15 x 15	95	141.4	15.06	383	27.95	180.3	15.040	382	1.185	30.10	0.710	18.03
	86	128.0	14.94	379	25.32	163.4	14.985	381	1.065	27.05	0.655	16.84
	86	98.02	15.15	385	19.41	125.2	10.551	268	1.000	25.40	0.615	18.62
ST 15b	62	92.27	15.08	383	18.22	117.5	10.521	267	0.930	23.62	0.585	14.86
15 x 10-1/2	58	86.31	15.00	381	17.07	110.1	10.500	267	0.850	21.59	0.564	14.33
	54	80.36	14.91	379	15.86	102.5	10.464	266	0.760	19.30	0.548	13.92
	49.5	73.86	14.82	376	14.56	93.9	10.458	266	0.670	17.02	0.522	13.26
ST 13a	86.5	131.7	13.655	347	26.05	168.1	14.090	358	1.190	30.23	0.725	18.42
13-1/2 x 14	80	119.1	13.54	344	23.52	151.7	14.023	358	1.075	27.31	0.656	16.71
	72.5	107.9	13.44	341	21.34	137.7	13.965	355	0.975	24.77	0.600	15.24
	57	84.83	13.64	346	16.77	108.2	10.070	256	0.932	23.67	0.570	14.48
ST 13b	51	75.90	13.535	344	15.01	96.8	10.018	254	0.827	21.01	0.518	13.16
13-1/2 x 10	47	69.94	13.455	342	13.83	89.2	9.990	254	0.747	18.97	0.490	12.45
	42	62.50	13.35	339	12.36	79.7	9.963	253	0.638	16.15	0.463	11.76

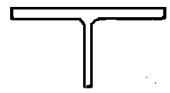
Note: Sizes indicated by blue letters are not included in regular rolling schedules.

Section Index	Weight		Depth of Tee		Area of Section		Flange				Stem Thickness	
							Width		Thickness			
	lbs/ft	kg/m	in	mm	in^2	cm^2	in	mm	in	mm	in	mm
ST 12a	80	119.1	12.36	314	23.52	151.8	14.091	358	1.135	28.83	0.656	16.66
12 x 14	72.5	107.9	12.245	311	21.31	137.5	14.043	357	1.020	25.91	0.608	15.44
	65	96.73	12.13	308	19.11	123.3	14.000	356	0.900	22.86	0.565	14.35
ST 12b	60	89.29	12.155	309	17.64	113.8	12.088	307	0.930	23.62	0.556	14.12
12 x 12	55	81.85	12.08	307	16.18	104.4	12.042	306	0.855	21.72	0.510	12.95
	50	74.41	12.00	305	14.71	94.9	12.000	305	3.775	19.69	0.468	11.89
	47	69.94	12.145	308	13.81	89.1	9.061	230	0.872	22.15	0.516	13.11
ST 12c	42	62.50	12.045	306	12.35	79.7	9.015	229	0.772	19.61	0.470	11.94
12 x 9	38	56.55	11.955	304	11.18	72.1	8.985	228	0.682	17.32	0.440	11.18
	34	50.60	11.86	301	10.00	60.5	8.961	228	0.562	14.78	0.416	10.57
ST 10a	71	105.7	10.73	273	20.89	134.8	13.132	334	1.095	27.81	0.659	16.74
10-1/2 x 13	63.5	94.50	10.62	270	18.67	120.5	13.061	332	0.985	25.02	0.568	14.94
	56	83.34	10.50	267	16.48	106.3	13.000	330	0.865	21.97	0.527	13.39
ST 10b	48	71.43	10.57	268	14.11	91.0	9.038	230	0.935	23.75	0.575	14.61
10-1/2 x 9	41	61.01	10.43	265	12.05	77.7	8.962	228	0.795	20.19	0.499	12.87
	36.5	54.32	10.62	270	10.73	69.2	8.295	211	0.740	18.60	0.455	11.56
ST 10c	34	50.60	10.57	268	10.01	64.6	8.270	210	0.685	17.40	0.430	10.92
10-1/2 x 8-1/4	31	46.13	10.495	267	9.12	58.9	8.240	209	0.615	15.62	0.400	10.16
	27.5	40.92	10.40	264	8.09	52.2	8.215	209	0.522	13.26	0.375	9.52
ST 9a	57	84.83	9.24	235	16.77	108.2	11.833	301	0.991	25.17	0.595	15.11
9 x 11-3/4	52.5	78.13	9.16	233	15.43	99.6	11.792	300	0.911	23.14	0.554	14.07
	48	71.43	9.08	231	14.11	91.0	11.750	298	0.831	21.11	0.512	13.00
	42.5	63.25	9.16	233	12.49	60.6	8.838	224	0.911	23.14	0.526	13.36
ST 9b	38.5	57.29	9.08	231	11.32	73.0	8.787	223	0.831	21.11	0.475	12.07
9 x 8-3/4	35	52.09	9.00	229	10.28	66.3	8.750	222	0.751	19.08	0.438	11.13
	32	47.62	8.935	227	9.40	60.6	8.715	221	0.686	17.42	0.403	10.24
	30	44.64	9.125	232	8.82	56.9	7.558	192	0.695	17.65	0.416	10.57
ST 9c	27.5	40.92	9.06	230	8.09	52.2	7.532	191	0.630	16.00	0.390	9.91
9 x 7-1/2	25	37.20	9.00	229	7.35	47.4	7.500	191	0.570	14.48	0.358	9.09
	22.5	33.48	8.93	227	8.621	42.7	7.477	190	0.499	12.67	0.335	8.51
ST 8a	48	71.43	8.16	233	14.11	91.0	11.533	293	0.875	22.23	0.535	13.59
8 x 11-1/2	44	65.48	8.08	231	12.95	83.5	11.502	292	0.795	20.19	0.504	12.80

(Inch Series)-Continued

Section Index	Weight		Depth of Tee		Area of Section		Flange				Stem Thickness	
							Width		Thickness			
	lbs/ft	kg/m	in	mm	in²	cm²	in	mm	in	mm	in	mm
	39	58.04	8.16	233	11.46	73.9	8.586	218	0.875	22.23	0.529	13.44
ST8b	35.5	52.83	8.08	231	10.43	67.3	8.543	217	0.795	20.19	0.486	12.34
8×8-1/2	32	47.62	8.00	203	9.40	60.6	8.500	216	0.715	18.16	0.443	11.25
	29	43.16	7.93	201	8.52	55.0	8.464	215	0.645	16.38	0.407	10.34
	25	37.20	8.125	206	7.35	47.4	7.073	180	0.628	15.95	0.380	9.65
ST8c	22.5	33.48	8.06	205	6.62	42.7	7.039	179	0.563	14.30	0.346	8.79
8×7	20	29.76	8.00	203	5.88	37.9	7.000	178	0.503	12.78	0.307	7.80
	18	26.79	7.93	201	5.30	34.2	6.992	178	0.428	10.87	0.299	7.59
ST8d	15.5	23.07	7.92	201	4.56	29.4	5.525	140	0.442	11.23	0.275	6.99
8×5-1/2B	13	19.35	7.83	199	3.83	24.7	5.500	140	0.345	8.76	0.250	6.35
	105.5	157.0	7.875	200	31.04	200.3	15.800	401	1.563	39.70	0.980	24.89
	101	150.3	7.815	199	29.70	191.6	15.750	400	1.503	38.18	0.930	23.62
	96.5	143.6	7.75	197	28.36	183.0	15.710	399	1.438	36.53	0.890	22.61
	92	136.9	7.69	195	27.04	174.5	15.660	398	1.378	35.00	0.840	21.34
ST7a	88	131.0	7.625	194	25.87	166.9	15.640	397	1.313	33.35	0.820	20.83
7×16	83.5	124.3	7.56	192	24.55	158.4	15.600	396	1.248	31.70	0.780	19.81
	79	117.6	7.50	191	23.24	149.9	15.550	395	1.188	30.18	0.730	18.54
	75	111.6	7.44	189	22.04	142.2	15.515	394	1.128	28.65	0.695	17.65
	71	105.7	7.375	187	20.92	135.0	15.500	394	1.063	27.00	0.680	17.27
	68	101.2	7.375	187	19.99	129.0	14.740	374	1.063	27.00	0.660	16.76
	63.5	94.50	7.31	186	18.67	125.0	14.690	373	0.998	25.35	0.610	15.49
	59.5	88.55	7.25	184	17.49	112.8	14.650	372	0.938	23.83	0.570	14.48
ST7b	55.5	82.59	7.185	182	16.33	105.4	14.620	371	0.873	22.17	0.540	13.72
7×14-1/2	51.5	76.64	7.125	181	15.13	97.6	14.575	370	0.813	20.65	0.495	12.57
	47.5	70.69	7.06	179	13.97	90.1	14.545	369	0.748	19.00	0.465	11.81
	43.5	64.74	7.00	178	12.78	82.5	14.500	368	0.688	17.48	0.420	10.67
ST7c	42	62.50	7.09	180	12.36	79.7	12.023	305	0.778	19.76	0.451	11.46
7×12	39	58.04	7.03	179	11.47	74.0	12.000	305	0.718	18.24	0.428	10.87
	37	55.06	7.095	180	10.88	70.2	10.072	256	0.783	19.89	0.450	11.43
ST7d	34	50.60	7.03	179	10.00	64.5	10.040	255	0.718	18.24	0.418	10.62
7×10	30.5	45.39	6.955	177	8.97	57.9	10.000	254	0.643	16.33	0.378	9.60

Note: Sizes indicated by blue letters are not included in regular rolling schedules.

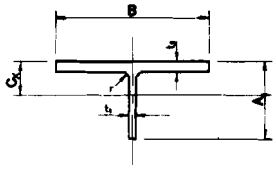


Section Index	Weight		Depth of Tee		Area of Section		Flange				Stem Thickness	
							Width		Thickness			
	lbs/ft	kg/m	in	mm	in²	cm²	in	mm	in	mm	in	mm
ST7e 7×8	26.5	39.44	6.97	177	7.79	50.3	8.062	205	0.658	16.71	0.370	9.40
	24	35.72	6.905	175	7.06	45.5	8.031	204	0.593	15.06	0.339	8.61
	21.5	32.00	6.84	174	6.32	40.8	8.000	203	0.528	13.41	0.308	7.82
ST7f 7×6-3/4	19	28.28	7.06	179	5.59	36.1	8.776	172	0.513	13.03	0.313	7.95
	17	25.30	7.00	178	5.00	32.3	6.750	171	0.453	11.51	0.287	7.29
	15	22.32	6.93	176	4.41	28.5	6.733	171	0.383	9.73	0.270	6.86
ST7g 7×5B	13	19.35	6.95	177	3.83	24.7	5.025	128	0.418	10.62	0.255	6.48
	11	16.37	6.86	174	3.24	20.9	5.000	127	0.335	8.51	0.230	5.84
ST7h 7×4B	8.6	12.80	7.00	178	2.53	16.3	4.000	102	0.272	6.91	0.210	5.33
ST6a 6×12	95	141.4	7.19	183	27.93	180.2	12.670	322	1.736	44.09	1.060	26.92
	80.5	119.8	6.94	176	23.69	152.8	12.515	318	1.486	37.74	0.905	22.99
	66.5	98.96	6.69	170	19.56	126.2	12.365	314	1.236	31.39	0.755	19.18
	60	89.29	6.56	167	17.65	113.9	12.320	313	1.106	28.09	0.710	18.03
	53	78.87	6.44	164	15.59	100.6	12.230	311	0.986	25.04	0.620	15.75
	49.5	73.66	6.375	162	14.54	93.8	12.190	310	0.921	23.39	0.580	14.73
	46	68.46	6.31	160	13.53	87.3	12.155	309	0.856	21.74	0.545	13.84
	42.5	63.25	6.25	159	12.49	80.6	12.105	307	0.796	20.22	0.495	12.57
	39.5	58.78	6.19	157	11.61	74.9	12.080	307	0.736	18.69	0.470	11.94
	36	53.57	6.125	156	10.58	68.3	12.040	306	0.671	17.04	0.430	10.92
	32.5	48.37	6.06	154	9.55	61.6	12.000	305	0.606	15.39	0.390	9.91
ST6b 6×10	29	43.16	6.095	155	8.53	55.0	10.014	254	0.641	16.28	0.359	9.12
	26.5	39.44	6.03	153	7.80	50.3	10.000	254	0.576	14.63	0.345	8.76
ST6c 6×8	25	37.20	6.095	155	7.36	47.5	8.077	205	0.641	16.28	0.371	9.42
	22.5	33.48	6.03	153	6.62	42.7	8.042	204	0.576	14.63	0.336	8.53
	20	29.76	5.97	152	5.89	38.0	8.000	203	0.516	13.11	0.294	7.47
ST6d 6×6-1/2	18	26.79	6.12	155	5.29	34.1	6.565	167	0.540	13.72	0.305	7.75
	15.5	23.07	6.045	154	4.56	29.4	6.525	166	0.465	11.81	0.265	6.73
	13.5	20.09	5.98	152	3.99	25.7	6.500	165	0.400	10.16	0.240	6.10
ST6e 6×4B	11	16.37	6.16	156	3.24	20.9	4.030	102	0.424	10.77	0.260	6.60
	9.5	14.14	6.08	154	2.81	18.1	4.010	102	0.349	8.86	0.240	6.10
	8.25	12.28	6.00	152	2.43	15.7	4.000	102	0.269	6.83	0.230	5.84
ST6f 6×4J	7.00	10.42	5.96	151	2.07	13.4	3.970	101	0.224	5.69	0.200	5.84

Structural Tees

(Inch Series)-Continued

Section Index	Weight		Depth of Tee		Area of Section		Flange				Stem Thickness	
							Width		Thickness			
	lbs/ft	kg/m	in	mm	in²	cm²	in	mm	in	mm	in	mm
ST5a 5×10	56	83.34	5.69	145	16.46	106.2	10.415	265	1.248	31.70	0.755	19.18
	50	74.41	5.56	141	14.72	95.0	10.345	263	1.118	28.40	0.685	17.40
	44.5	66.22	5.44	138	13.09	84.5	10.275	261	0.998	25.35	0.615	15.62
	38.5	57.29	5.31	135	11.33	73.1	10.195	259	0.868	22.05	0.535	13.59
	36	53.57	5.25	133	10.59	68.3	10.170	258	0.808	20.52	0.510	12.95
	33	49.11	5.19	132	9.70	62.6	10.117	257	0.748	19.00	0.457	11.61
	30	44.64	5.125	130	8.83	57.0	10.075	256	0.683	17.35	0.415	10.54
	27	40.18	5.06	129	7.94	51.2	10.028	255	0.618	15.70	0.368	9.35
	24.5	36.46	5.00	127	7.20	46.5	10.000	245	0.558	14.17	0.340	8.64
ST5b 5×8	22.5	33.48	5.06	129	6.62	42.7	8.022	204	0.618	15.70	0.350	8.89
	19.5	29.02	4.97	126	5.74	37.0	7.990	203	0.528	13.41	0.318	8.08
	16.5	24.55	4.875	124	4.85	31.3	7.964	202	0.433	11.00	0.292	7.42
ST5c 5×5-3/4	14.5	21.58	5.11	130	4.27	27.5	5.799	147	0.500	12.70	0.289	7.34
	12.5	18.60	5.04	128	3.67	23.7	5.762	146	0.430	10.92	0.252	6.40
	10.5	15.63	4.95	126	3.10	20.0	5.750	146	0.340	8.64	0.240	6.10
ST5d 5×4B	9.50	14.14	5.13	130	2.80	18.1	4.020	102	0.394	10.01	0.250	6.35
	8.50	12.65	5.06	129	2.49	16.1	4.010	102	0.329	8.36	0.240	6.10
	7.50	11.16	5.00	127	2.20	14.2	4.000	102	0.269	6.83	0.230	5.84
ST5e 5×4J	5.75	8.557	4.94	125	1.69	10.9	3.950	100	0.204	5.18	0.180	4.57
ST4a 4×8	33.5	49.85	4.50	114	9.85	63.5	8.287	210	0.933	23.70	0.575	14.61
	29	43.16	4.375	111	8.53	55.0	8.222	209	0.808	20.52	0.510	12.95
	24	35.72	4.25	108	7.06	45.5	8.117	206	0.683	17.35	0.405	10.29
	20	29.76	4.125	105	5.88	37.9	8.077	205	0.558	14.17	0.365	9.27
	17.5	26.04	4.06	103	5.15	33.2	8.027	204	0.493	12.52	0.315	8.00
	15.5	23.07	4.00	102	4.56	29.4	8.000	203	0.433	11.00	0.288	7.32
ST4b 4×6-1/2	14	20.83	4.03	102	4.11	26.5	6.540	166	0.463	11.76	0.285	7.24
	12	17.86	3.965	101	3.53	22.8	6.500	165	0.398	10.11	0.245	6.22
ST4c 4×5-1/4	10	14.88	4.07	103	2.94	19.0	5.268	134	0.378	9.60	0.248	6.30
	8.5	12.65	4.00	102	2.50	16.1	5.250	133	0.308	7.82	0.230	5.84
ST4d 4×4B	7.50	11.16	4.06	103	2.22	14.3	4.015	102	0.314	7.98	0.245	6.22
	6.50	9.673	4.00	102	1.91	12.3	4.000	102	0.254	6.45	0.230	5.84
ST4e 4×4J	5.00	7.441	3.95	100	1.48	9.5	3.940	100	0.204	5.18	0.170	4.32
ST3a 3×4B	8.00	11.91	3.13	80	2.36	15.2	4.030	102	0.404	10.26	0.260	6.60
	6.00	8.929	3.00	76	1.77	11.4	4.000	102	0.279	7.09	0.230	5.84
ST3b 3×4J	4.25	6.325	2.92	74	1.25	8.1	3.940	100	0.194	4.93	0.170	4.32

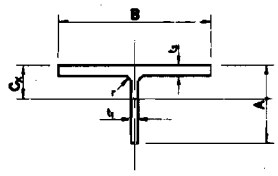


(Metric Series)

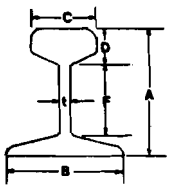
Section Index	Weight	Depth of Section (A)	Flange Width (B)	Thickness		Corner Radius (r)	Sectional Area	Moment of Inertia		Radius of Gyration		Modulus of Section		Centre of Gravity
				Web (t_1)	Flange (t_2)			Jx	Jy	ix	iy	Zx	Zy	Cx
mm	kg/m	mm	mm	mm	mm	mm	cm^2	cm^4	cm^4	cm	cm	cm^3	cm^3	cm
900×300	143	456	302	18	34	28	182.0	34,200	7,820	13.7	6.56	997	518	11.3
	122	450	300	16	28	28	154.9	29,200	6,310	13.7	6.39	866	421	11.3
	106	445	299	15	23	28	135.4	26,000	5,140	13.9	6.16	790	344	11.6
800×300	121	404	302	16	30	22	153.8	21,900	6,900	11.9	6.70	705	457	9.41
	105	400	300	14	26	28	133.7	18,800	5,860	11.9	6.62	610	391	9.18
	95.6	396	300	14	22	28	121.7	17,700	4,960	12.1	6.38	593	331	9.66
700×300	107	354	302	15	28	28	136.8	14,200	6,440	10.2	6.86	513	426	7.78
	92.4	350	300	13	24	28	117.7	12,000	5,410	10.1	6.78	438	361	7.55
	83.0	346	300	13	20	28	105.7	11,300	4,510	10.3	6.53	425	301	7.99
600×300	87.3	297	302	14	23	28	111.2	7,920	5,290	8.44	6.90	339	350	6.33
	75.6	294	300	12	20	28	96.24	6,710	4,510	8.35	6.85	288	301	6.08
	68.5	291	300	12	17	28	87.24	6,360	3,830	8.54	6.63	280	256	6.39
600×300	67.0	306	202	13	23	22	85.33	7,340	1,590	9.27	4.31	322	157	7.79
	59.8	303	201	12	20	22	76.24	6,570	1,360	9.28	4.22	292	135	7.79
	52.8	300	200	11	17	22	67.21	5,810	1,140	9.30	4.12	262	114	7.84
	47.3	298	199	10	15	22	60.23	5,190	989	9.29	4.05	236	99.4	7.79
500×300	64.2	244	300	11	18	26	81.76	3,620	4,060	6.66	7.07	184	270	4.66
	57.1	241	300	11	15	26	72.76	3,420	3,380	6.85	6.82	178	225	4.92
500×200	51.5	253	201	11	19	20	65.65	3,670	1,290	7.48	4.43	190	128	5.95
	44.8	250	200	10	16	20	57.12	3,210	1,070	7.50	4.33	169	107	5.96
	39.7	248	199	9	14	20	50.64	2,840	922	7.49	4.27	150	92.6	5.90
450×300	61.8	220	300	11	18	24	78.69	2,680	4,060	5.84	7.68	149	270	4.05
	53.0	217	299	10	15	24	67.52	2,350	3,350	5.89	7.04	133	224	4.04
450×200	38.0	225	200	9	14	18	48.38	2,160	936	6.68	4.40	124	93.6	5.15
	33.1	223	199	8	12	18	42.15	1,880	790	6.67	4.33	109	79.4	5.10
400×400	302	249	432	45	70	22	385.0	13,200	47,100	5.87	11.1	706	2,180	6.13
	207	229	417	30	50	22	264.3	7,470	30,200	5.32	10.7	414	1,450	4.85
	142	214	407	20	35	22	180.3	4,380	19,700	4.93	10.4	250	967	3.90
	116	207	405	18	28	22	147.7	3,620	15,500	4.95	10.2	213	766	3.68

(Metric Series)-Continued

Section Index	Weight	Depth of Section (A)	Flange Width (B)	Thickness		Corner Radius	Sectional Area	Moment of Inertia		Radius of Gyration		Modulus of Section		Centre of Gravity
				Web (t_1)	Flange (t_2)	(r)		Jx	Jy	ix	iy	Zx	Zy	Cx
mm	kg/m	mm	mm	mm	mm	mm	cm^2	cm^4	cm^4	cm	cm	cm^3	cm^3	cm
400×400	100	203	403	16	24	22	127.4	3,090	13,100	4.92	10.0	184	650	3.51
	98.4	200	408	21	21	22	125.3	3,650	11,900	5.40	9.75	229	584	4.07
	85.8	200	400	13	21	22	109.3	2,480	11,200	4.76	10.1	147	560	3.21
	84.1	197	405	18	18	22	107.2	3,050	9,980	5.34	9.65	193	493	3.89
	73.3	197	398	11	18	22	93.41	2,050	9,460	4.68	10.1	123	475	3.01
	70.0	194	402	15	15	22	89.23	2,480	8,130	5.27	9.54	158	404	3.70
400×300	53.4	195	300	10	16	22	67.98	1,730	3,600	5.05	7.28	108	240	3.41
	47.1	193	299	9	14	22	60.05	1,530	3,120	5.04	7.21	95.5	209	3.33
400×200	33.0	200	200	8	13	16	42.06	1,400	868	5.76	4.54	88.6	86.8	4.23
	28.3	198	199	7	11	16	36.08	1,190	723	5.76	4.48	76.4	72.7	4.17
350×350	79.3	178	352	14	22	20	101.0	1,820	8,000	4.25	8.90	124	455	3.05
	77.9	175	357	19	19	20	99.19	2,200	7,220	4.71	8.53	158	404	3.59
	68.2	175	350	12	19	20	86.94	1,520	6,790	4.18	8.84	104	388	2.86
	65.4	172	354	16	16	20	83.32	1,800	5,920	4.65	8.43	131	335	3.40
	57.3	172	348	10	16	20	73.00	1,230	5,620	4.11	8.78	84.7	323	2.67
	53.1	169	351	13	13	20	67.63	1,420	4,690	4.59	8.33	104	267	3.21
350×250	39.8	170	250	9	14	20	50.76	1,020	1,830	4.48	6.00	73.1	146	3.09
	34.6	168	249	8	12	20	44.08	881	1,540	4.47	5.92	64.0	124	3.02
350×175	24.8	175	175	7	11	14	31.57	815	492	5.08	3.95	59.3	56.2	3.75
	20.7	173	174	6	9	14	26.34	679	396	5.08	3.88	50.0	45.5	3.71
300×300	52.9	152	301	11	17	18	67.41	903	3,870	3.66	7.57	71.4	257	2.55
	52.9	150	305	15	15	18	67.39	4,110	3,550	4.05	7.26	92.5	233	3.03
	47.0	150	300	10	15	18	59.89	798	3,380	3.65	7.51	63.7	225	2.47
	43.5	149	299	9	14	18	55.40	715	3,120	3.59	7.51	57.0	209	2.36
	42.3	147	302	12	12	18	53.83	858	2,760	3.99	7.16	72.3	183	2.84
300×200	32.7	149	201	9	14	18	41.68	662	949	3.99	4.77	55.2	94.4	2.91
	28.4	147	200	8	12	18	36.19	572	802	3.97	4.71	48.2	80.2	2.83
300×150	18.4	150	150	6.5	9	13	23.39	464	254	4.45	3.29	40.0	33.8	3.41
	16.0	149	149	5.5	8	13	20.40	393	221	4.39	3.29	33.8	29.7	3.26



Section Index	Weight	Depth of Section (A)	Flange Width (B)	Thickness		Corner Radius	Sectional Area	Moment of Inertia		Radius of Gyration		Modulus of Section		Centre of Gravity
				Web (t_1)	Flange (t_2)	(r)		Jx	Jy	ix	iy	Zx	Zy	Cx
mm	kg/m	mm	mm	mm	mm	mm	cm^2	cm^4	cm^4	cm	cm	cm^3	cm^3	cm
250×250	41.1	125	255	14	14	16	52.34	589	1,940	3.36	6.09	59.4	152	2.58
	36.2	125	250	9	14	16	46.09	412	1,820	2.99	6.29	39.5	146	2.08
	33.2	124	249	8	13	16	42.35	364	1,670	2.93	6.29	34.9	134	1.98
	32.2	122	252	11	11	16	41.03	445	1,470	3.29	5.98	45.3	117	2.39
250×175	22.1	122	175	7	11	16	28.12	289	492	3.20	4.18	29.1	56.3	2.27
250×125	14.8	125	125	6	9	12	18.83	248	147	3.63	2.79	25.6	23.5	2.78
	12.8	124	124	5	8	12	16.34	208	127	3.57	2.79	21.3	20.5	2.63
200×200	32.8	104	202	10	16	13	41.85	251	1,100	2.45	5.13	29.5	109	1.91
	28.1	100	204	12	12	13	35.77	256	851	2.67	4.88	32.4	83.4	2.09
	24.9	100	200	8	12	13	31.77	184	801	2.41	5.02	22.3	80.1	1.73
200×150	15.3	97	150	6	9	13	19.51	125	254	2.53	3.61	15.8	33.8	1.79
200×100	10.7	100	100	5.5	8	11	13.58	114	67.0	2.90	2.22	14.8	13.4	2.29
	9.10	99	99	4.5	7	11	11.59	93.8	56.8	2.84	2.21	12.1	11.5	2.14
175×175	20.1	87.5	175	7.5	11	12	25.61	115	492	2.12	4.38	15.9	56.2	1.55
175×125	11.6	84.5	125	5.5	8	12	14.83	74.1	131	2.24	2.97	10.9	20.9	1.63
175× 90	9.05	87.5	90	5	8	9	11.52	70.7	48.7	2.48	2.06	10.4	10.8	1.93
150×150	15.8	75	150	7	10	11	20.07	66.4	282	1.82	3.75	10.8	37.6	1.37
150×100	10.5	74	100	6	9	11	13.42	51.7	75.3	1.96	2.37	8.84	15.1	1.55
150× 75	7.01	75	75	5	7	8	8.925	42.6	24.7	2.18	1.66	7.46	6.59	1.79
125×125	11.9	62.5	125	6.5	9	10	15.16	35.0	147	1.52	3.11	6.91	23.5	1.19
125× 60	6.61	62.5	60	6	8	9	8.418	27.5	14.6	1.81	1.32	5.96	4.86	1.64
100×100	8.60	50	100	6	8	10	10.95	16.1	66.9	1.21	2.47	4.03	13.4	1.00
100× 50	4.65	50	50	5	7	8	5.925	11.8	7.39	1.41	1.12	3.18	2.96	1.28



STANDARD SECTION RAILS

HEAVY RAILS

Rail Section		Weight			Rail Height		Base Width		Head Width		HeadHeight	
		kg/m	kg/ft	lb/yd	A		B		C		D	
					mm	in	mm	in	mm	in	mm	in
P.S	50 kg	50.4	15.361	101.59	144 46	5.687	127.0	5.000	67.87	2.672	46.04	1.813
A.S	37 kg	37.2	11.325	74.900	122.24	4.813	122.24	4.813	62.71	2.469	36.12	1.422
A.S	50 kg	30.1	9.169	60.640	107.95	4.250	60.33	2.375	30.95	1.219	30.99	1.219
ARA-A	1001 b	49.91	15.212	100.615	152.40	6.000	139.70	5 1/2	69.85	2 3/4	39.69	1 8/16
B.S.	901 b	44.62	13.600	89.94	142.88	5 5/8	136.53	5 3/8	66.68	2 5/8	43.66	1 22/35
B.S.	751 b	37.14	11.320	74.87	128.59	5 1/16	122.24	4 13/16	61.91	2 7/16	39.69	1 9/16
B.S.	701 b	34.76	10.595	70.07	128.83	4 7/8	117.48	4 5/8	60.33	2 3/8	38.10	1 1/2
B.S.	601 b	29.77	9.074	60.01	114.30	4 1/2	109.54	4 5/16	57.15	2 1/4	35.72	1 12/32
B.S.	501 b	24.61	7.559	49.99	104.78	4 1/8	100.01	3 12/16	52.39	2 1/16	32.94	1 16/64
J.H.R..	50 kg T	53.3	16.246	106.84	160.00	6.300	136.00	5.355	65.00	2.559	46.00	1.811
JIS	50 kg N	50.4	15.361	101.59	153.00	6.025	127.00	5.000	65.00	2.559	40.00	1.929
JIS	40 kg N	40.9	12.466	82.45	140.00	5.513	122.00	4.804	64.00	2.520	41.00	1.614
E.R..	52 kg	51.68	15.773	104.32	155.00	6.102	141.00	5.551	69.00	2.717	49.00	1.929
D.K.A.	41.5 kg	41.52	12.655	83.70	138.00	5.433	110.00	4.331	71.00	2.795	40.50	1.594

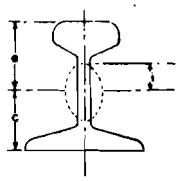
LIGHT RAILS

Rail Section		Weight			Rail Height		Base Width		Head Width		Head Height	
		kg/m	kg/ft	lb/yd	A		B		C		D	
					mm	in	mm	in	mm	in	mm	in
A.S.	22 kg	22.3	6.794	44.934	93.66	3.687	93.66	3.687	50.80	2.000	26.99	1.051
A.S.	15 kg	15.17	4.624	30.581	79.37	3.129	79.37	3.129	42.86	1.687	22.22	.875
A.S.	12 kg	12.17	3.709	24.534	69.85	2.750	69.85	2.750	38.10	1.500	19.85	.781
A.S.	10 kg	10.08	3.072	20.320	66.67	2.625	66.67	2.625	34.13	1.344	18.26	.719
A.S.	9 kg	8.94	2.725	18.022	63.50	2.500	63.50	2.500	32.10	1.264	17.48	.688
A.S.	6 kg	5.98	1.823	12.055	50.60	2.000	50.80	2.000	25.40	1.000	14.29	.563

The rails are cut length in the following ranges.
Heavy Rails 10 m to 25 m
Light Rails 5.5 m to 10 m

P.S. Pennsylvania Railroad
A.S. American Society of Civil Engineers
ARA American Railroad Association

B.S. Britain Standards
J.H.R. Japan National Railway
E.R. Egyptian Railway
D.K.A. Djavatan Kereta API



Web Thickness		Web Height		Sectional Area				Moment of Inertia	Radius of Gyration	Modulus of Section	Rail Section	
t		F				c	e	I	i	s		
mm		mm	in	cm^2	in^2	in		in^4	in	in^3		
14.29	.563	70.64	2.781	64.3	9.966	2.709	3.059	41.801	2.071	13.730	P.S.	50 kg
				47.3								
13.49	.531	64.69	2.517	47.3	7.331	2.299	2.512	22.870	1.768	9.092	A.S.	37 kg
12.30	.484	57.55	2.266	38.3	5.936	2.051	2.201	14.558	1.567	6.590	A.S.	30 kg
14.29	9/16	85.72	3.3/8	63.56	9.855	2.752	3.248		2.210		ARA-A	1001 b
13.89	35/64	78.58	3 7/32	56.95	8.828	2.769	2.946	38.45	2.087	13.05	B.S.	901 b
13.10	33/64	70.25	219/64	47.41	7.349	2.454	2.609	25.36	1.853	9.72	B.S.	751 b
12.70	1/2	64.47	221/32	44.37	6.878	2.325	2.540	22.17	1.794	8.73	B.S.	701 b
11.11	7/16	61.91	27/16	38.00	5.890	2.190	2.310	16.26	1.661	7.04	B.S.	601 b
9.92	25/64	56.76	218/64	31.68	4.910	2.051	2.110	11.44	1.526	5.43	B.S	501 b
16.00	.630	87.50	3.445	67.9	10.525	29.9	3.390		2.291		J.M.R.	50 kg T
15.00	.591	74.00	2.913	64.2	9.951	2.827	3.197		2.177		JIS	50 kg N
14.00	.551	73.50	2.894	54.0	8.060	2.634	2.878		2.012		JIS	40 kg N
15.00	.591	78.00	3.071	65.92	10.218	2.874	3.228	50.00	2.217	15.56	E.R.	52 kg
13.50	.531	74.00	2.913	53.1	8.231	2.736	2.697	32.50	1.957	11.90	D.K.A.	41.5 kg

Web Thickness		Web Height		Sectional Area				Moment of Inertia	Radius of Gyration	Modulus of Section	Rail Section	
t		F				c	e	I	i	s		
mm		mm	in	cm^2	in^2	in		in^4	in	in^3		
10.72	.422	50.50	19.69	28.4	4.402	1.780	1.909	8.144	1.358	4.247	A.S.	22 kg
8.33	.328	43.85	1.719	19.3	2.991	1.532	1.593	3.750	1.114	2.355	A.S.	15 kg
7.54	.297	37.70	1.484	15.8	2.449	1.340	1.410	2.374	.989	1.683	A.S.	12 kg
6.35	.250	37.30	1.469	12.8	1.953	1.268	1.361	1.613	.904	1.185	A.S.	10 kg
5.90	.232	35.72	1.406	11.4	1.787	1.215	1.285	1.499	.917	1.167	A.S.	9 kg
4.76	.188	27.78	1.094	7.6	1.178	.958	1.042	.744	.795	.715	A.S.	6 kg

STANDARD RAIL SPECIFICATION

QUALITY

JIS E 1101-1963 and Japanese National Railways Specification

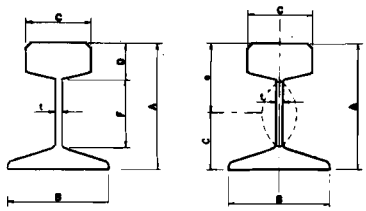
Spec.	Rail type	Chemical Compostion (%)					Tensile Property		Falling Weight Test		
		C	S	Mn	P	S	Tensile Strength	Elongation	Falling distance	Space between Supports	Condition
JIS	30kg	0.55 ~0.70	0.07 ~0.35	0.60 ~0.95	0.045 max	0.050 max	70 kg/mm^2 min.	9% min	4.0 m	0.914 m	head upward
	37 kg								5.0m	0.914 m	head upward
	40 kg N						75 kg.mm^2 min.	8% min	5.1 m	0.914 m	head downward
	50 kg	0.60 ~0.75							5.3 m	0.914 m	head downward
	50 kg N								7.0 m	0.914 m	head downward
JNR.S	50 T	0.60 ~0.75	0.40 max.	0.60 ~1.10	0.045 max	0.045 max	80kg mm^2 min	10% min	8.5 m	0.914 m	head downward

Note : JNR-S = Standard Japan National Railway

Major Standard of Several Selected Countries

Standard	Rail type and Precess	Chemical Compostion (%)					Tensile Property		Falling Weight Test			
		C	S	Mn	P	S	Tensile Strength	Elongation	Height of Drop	Distant between Supports	Condition	Weight
ASTM A1-64	61~80 lbs/yd	0.55 ~0.68	0.10 ~0.23	0.60 ~0.90	0.04 max.	--	--	--	17 ft (5.18m)	Under 106 lbs/yd 3 ft (0.914m)	head upward	2,000 lb (907 kg)
	81~90 lbs/yd	0.64 ~0.77		0.60 ~0.90					18 ft (5.49m) 91~100 lbs/yd 19 ft (5.79m) 101~120 lbs/yd 20 ft (6.10m)	106 lbs/yd and over; up toand incl. 140 lbs/yd 4 ft (1.219m)		
	91~120 lbs/yd	0.67 ~0.60		0.70 ~1.00								
	121 lbs/yd and over	0.69 ~0.82		0.70 ~1.00					22 ft (6.71m)	over 140 lbs/yd 4 ft 6 in (1.422m)		
B.S. 11 -1959-	Open hearth	0.50 ~0.60	0.08 ~0.20	0.95 ~1.25	0.060 max.	0.060 max.	72 kg/mm2 (46t/in2) min.	11% min.	example 90A 23 1/2 ft (7.18m)	3 1/2 ft (1.0/m)	head upward	206 WT (1,016 kg)
U.I.C. 860-0 -1963-	Basic open hearth	0.40 ~0.55	0.35 max.	0.60 ~1.20	0.05 max.	0.05 max.	70~85 kg/mm2	14% min.	one fall H=0.15P two falls H= 0.105P Note: H: Height P: Rail Weight	1,000m	head upward	1,000 kg
	Basic oxygen	0.40 ~0.60										
860-0 -1961-	Basic open hearth	0.40 ~0.55	0.07 ~0.35	0.60 ~1.20	0.05 max.	0.05 max.	70kg/m min.	12% min.	Tender by client Administration	1m	head upward	1,000 kg

SPECIAL RAILS



SECTIONS

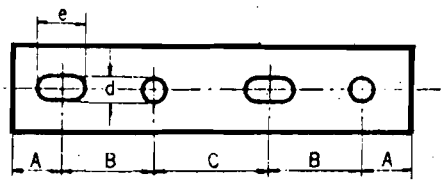
Classification		Dimensions				Sectional Area	Weight	Moment of Inertia	Radius of Gyration	Section Modulus
		A	B	C	t	A	W	I	i	Z
		mm	mm	mm	mm	cm^2	kg/m	cm^4	cm	cm^2
P.R.	70 S	148.0	140.0	65.3	35.0	88.5	69.5	2,130	4.91	254
P.R.	50 S	135.0	127.0	64.0	25.0	65.83	51.7	1,430	4.661	187
P.R.	75 kg	117.0	140.0	68.0	68.0	95.0	74.5	1,130	3.460	167.7
C.R.	74 kg	95.0	200.0	100.0	60.0	94.4	74.1	863.1	3.027	165.6
C.R.	101 kg	105.0	220.0	120.0	72.0	128.8	101.1	1,408	3.31	246
HT	45 kg	177.8	148.4	69.9	14.3	57.5	45.1	2,627	6.759	286.3
E.R.	24 kg	90.5	127.0	19.0	9.5	30.2	23.7	225.8	2.712	35.97
E.R.	13 kg	63.5	89.0	19.0	9.5	16.7	13.1	61.18	1.901	14.94

Notes: 1. Third rail is same as ordinary rail in sections.
2. Demands for particular lengths are complied with.

CHARACTERISTICS, QUALITY, AND USES

Classification	Mark	Characteristics	Specification	Use
Point Rail	P.R.	Most suitable for turning at railway turnout points.	Various domestic and foreign standards.	For turnout points
Third Rail	T.R.	Excellent conductivity	Yawata's specification	For electric conduction in subways etc.
Crane Rail	C.R.	This rail's stable shape can bear heavy loads.	Various domestic and foreign standards.	For cranes
HT Rail	HT	This rail's height makes it suitable for use on road surfaces paved with cobble stones, etc.	JIS E 1105	For street cars
Elevator Rail	E.R.	The top's greater width is designed to make it more suitable for elevator guide.	Various domestic and foreign standards.	For elevators

FISH PLATES



SECTIONS

Classification	type	Thickness	Lenght	Dimensions					Weight
				A	B	C	d	e	
		mm	mm	mm	mm	mm	mm	mm	kg/pair
For JNR 50T rail	Angle	20.0	820.0	70.0	130.0	160.0	24.00	24.00	45.4
For JIS 40 kg N rail	Angle	20.0	560.0	70.0	130.0	160.0	24.00	24.00	28.8
For JIS 40 kg N rail	Angle	20.0	560.0	70.0	130.0	160.0	24.00	24.00	25.2
For JIS 50 kg P.S. rail	Angle	21.0	560.0	89.5	127.0	127	28.00	28.00	28.0
For JIS 37 kg A.S. rail	Angle	16.26	560.0	89.5	127.0	127.0	22.00	29.00	17.2
For JIS 30 kg A.S. rail	Angle	15.88	560.0	89.5	127.0	127.0	22.00	29.00	13.4
For BS 90 lb (R) rail		19.05	457.2	57.2	114.3	114.3	26.99	26.99	19.3
For BS 75 lb (R) rail		19.05	419.1	57.2	101.6	101.6	26.99	21.39	13.4
For BS 70 lb (R) rail		17.46	406.4	50.8	101.6	101.6	22.22	22.22	9.91
For BS 70 lb (R) rail		17.46	406.4	50.8	101.6	101.6	22.23	22.23	11.1
For BS 60 lb (R) rail		17.46	406.4	50.8	101.6	101.6	23.81	23.81	9.91

FISHPLATES FOR ORDINARY RAIL USE JIS E1102-1963 and JNR Specification.

Spec.	Fishplates Type	Chemical Composition (%)					Tensile Property	
		C	Si	Mn	P	S	Tensile Strength	Elongation
JIS	For 30 kg, 37 kg, rails	0.35 ~0.50	0.40 max.	0.55 ~1.00	0.045 max.	0.050 max.	55 kg/mm2 min.	18% min.
	For 40kg N 50 kg and 50 kg N rails	0.40 ~0.55					58 kg/mm2 min.	15% min.
JNR-S	For 50 T rail	0.40 ~0.55	0.40 max.	0.55 ~1.00	0.045 max.	0.050 max.	58 kg/mm2 min.	15% min.

HEAT TREATED FISHPLATES JIS E 1121-1963 and JNR Specification.

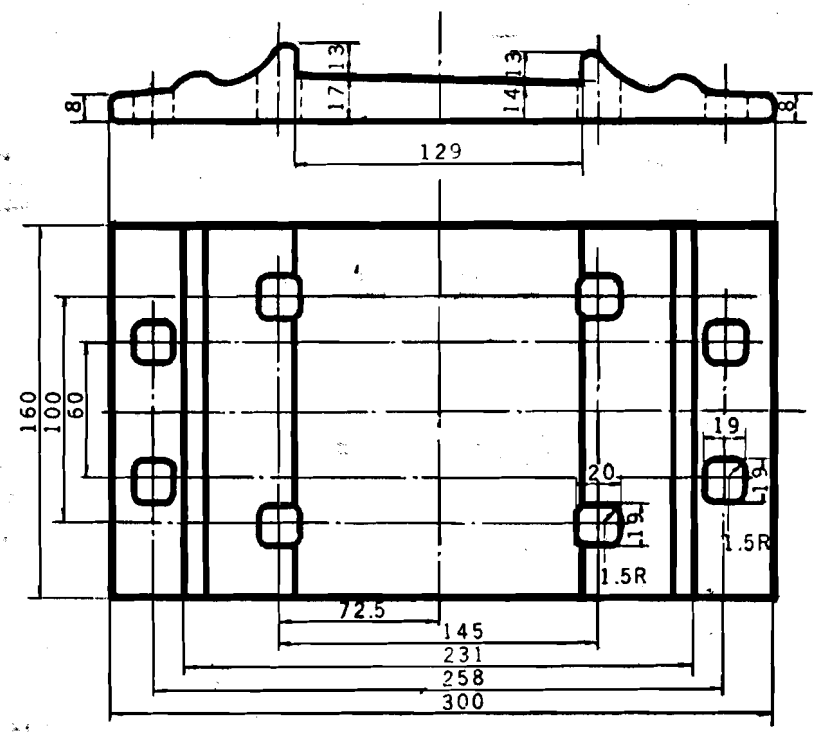
	Classification	Tensile Strength	Elongation	Surface Hardness (Brinnel)	Remarks
JIS	For 30 kg, 37 kg rails	70 kg/mm2 min.	12% min.	262 ~ 331	After heat treatment
	For 40 kg N 50 kg and 50 kg N rails				
JNR-S	For 50 T rail	-	-	262 ~ 331	-

Note: Request for the specificattions other than the above can be met.

TIE PLATES

SECTIONS

Classification	Lenght	Dimensions	Weight
	mm/piece	cm^2	kg/piece
For JNR 50 kg rail (Type E)	160	45.0	5.27
For BS 70 lb rail (Type B)	190.5	33.9	4.73
For BS 70 lb rail (Type F)	190.5	31.9	4.45

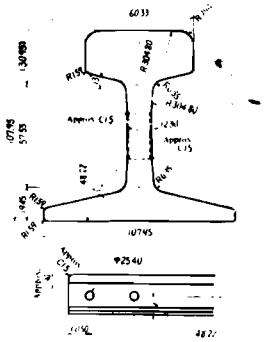


JIS RAILS JIS E 1101 (1980)

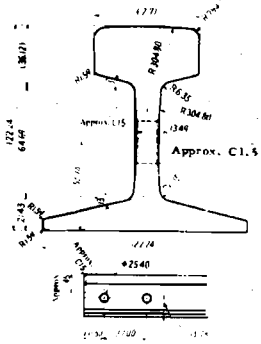
Table 1 . Types

Type	Notation	Remark	
		Calculated mass Kg/m	With fish-bolt holes or without them
30 kg rail	30 A	30.1	With fish-bolt holes
			None
37 kg rail	37 A	37.2	With fish-bolt holes
			None
40 kg N rail	40 N	40.9	With fish-bolt holes
			None
50 kg rail	50 PS	50.4	With fish-bolt holes
			None
50 kg N rail	50 N	50.4	With fish-bolt holes
			None
60 kg rail	60	60.8	With fish-bolt holes
			None

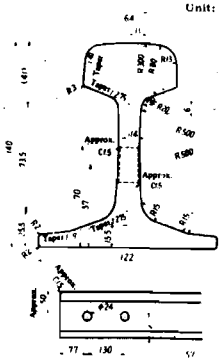
Attached Fig. 1. 30 kg Rail
Unit: mm



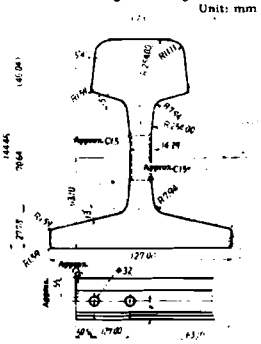
Attached Fig. 2. 37 kg Rail
Unit: mm



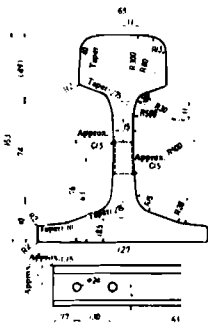
Attached Fig. 3. 40 kg N Rail
Unit: mm



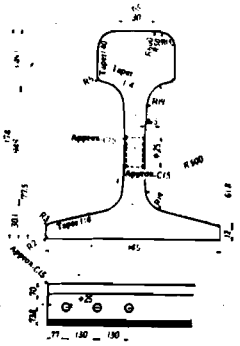
Attached Fig. 4. 50 kg Rail
Unit: mm



Attached Fig. 5. 50 kg N Rail
Unit: mm



Attached Fig. 6. 60 kg Rail
Unit: mm



CARBON STEEL TUBES FOR GENERAL STRUCTURAL PURPOSE JIS G 3444

Outside diameter mm	Thickness mm	Weight kg/m	Reference			
			Cross-sectional area cm^2	Geometrical moment of inertia cm^4	Modulus of section cm^3	Radius of Gyration of area cm
21.7	2.0	0.972	1.238	0.607	0.560	0.700
27.2	2.0	1.24	1.583	1.26	0.930	0.890
	2.3	1.41	1.799	1.41	1.03	0.880
34.0	2.3	1.80	2.291	2.89	1.70	1.12
42.7	2.3	2.29	2.919	5.97	2.80	1.43
	2.8	2.76	3.510	7.02	3.29	1.41
48.6	2.3	2.63	3.345	8.99	3.70	1.64
	2.8	3.16	4.029	10.6	4.36	1.62
	3.2	3.58	4.564	11.8	4.86	1.61
60.5	2.3	3.30	4.205	17.8	5.90	2.06
	3.2	4.52	5.760	23.7	7.84	2.03
	4.0	5.57	7.100	28.5	9.41	2.00
76.3	2.8	5.08	6.465	43.7	11.5	2.60
	3.2	5.77	7.349	49.2	12.9	2.59
	4.0	7.13	9.085	59.5	15.6	2.56
89.1	2.8	5.96	7.591	70.7	15.9	3.05
	3.2	6.78	8.636	79.8	17.9	3.04
	4.0	8.39	10.69	97.0	21.8	3.01
101.6	3.2	7.76	9.892	120	23.6	3.48
	4.0	9.63	12.26	146	28.8	3.45
	5.0	11.9	15.17	177	34.9	3.42
114.3	3.2	8.77	11.17	172	30.2	3.93
	3.6	9.83	12.52	192	33.6	3.92
	4.5	12.2	15.52	234	41.0	3.89
	5.6	15.0	19.12	283	49.6	3.85
139.8	3.6	12.1	15.40	357	51.1	4.82
	4.0	13.4	17.07	394	56.3	4.80
	4.5	15.0	19.13	438	62.7	4.79
	6.0	19.8	25.22	566	80.9	4.74
165.2	4.5	17.8	22.72	734	88.9	5.68
	5.0	19.8	25.16	808	97.8	5.67
	6.0	23.6	30.01	952	115	5.63
	7.0	27.3	34.79	109x10	132	5.60
190.7	4.5	20.7	26.32	114x10	120	6.59
	5.0	22.9	29.17	126x10	132	6.57
	6.0	27.3	34.82	149x10	156	6.53
	7.0	31.7	40.40	171x10	179	6.50
216.3	4.5	23.5	29.94	168x10	155	7.49
	6.0	31.1	39.61	219x10	203	7.44
	7.0	36.1	46.03	252x10	233	7.40
	8.0	41.1	52.35	284x10	263	7.37
267.4	6.0	38.7	49.27	421x10	315	9.24
	7.0	45.0	57.27	486x10	363	9.21
	8.0	51.2	65.19	549x10	411	9.18
	9.0	57.4	73.06	611x10	457	9.14
318.5	6.0	46.2	58.91	719x10	452	11.1
	7.0	53.8	68.50	831x10	552	11.0
	8.0	61.3	78.04	941x10	591	11.0
	9.0	68.7	87.51	105 x 10^2	659	10.9
355.6	6.3	54.3	69.13	105x10^2	593	12.4
	8.0	68.6	87.36	132x10^2	742	12.3
	9.0	76.9	98.00	147x10^2	828	12.3
	12.0	102	129.5	191x10^2	108x10	12.2
406.4	9.0	88.2	112.4	222x10^2	109x10	14.1
	12.0	117	148.7	289x10^2	142x10	14.0
	16.0	154	196.2	374x10^2	184x10	13.8
	19.0	182	231.2	435x10^2	214x10	13.7
457.2	9.0	99.5	126.7	318x10^2	140x10	15.8
	12.0	132	167.8	416x10^2	182x10	15.7
	16.0	174	221.8	540x10^2	236x10	15.6
	19.0	205	261.6	629x10^2	275x10	15.5

JIS G 3444 (Continued)

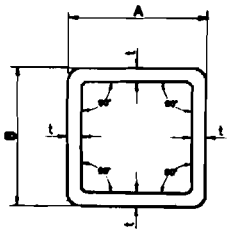
Outside diameter mm	Thickness mm	Weight mm	Reference			
			Cross-sectional Area mm^2	Gommetrical moment of Inertai cm^4	Modulus of Section cm^3	Radius of gyratice of Area cm
500	9.0	109	138.8	418 X 10^2	167 X 10	17.4
	12.2	144	184.0	548 X 10^2	219 X 10	17.3
	14.0	168	213.8	632 X 10^2	253 X 10	17.2
508.0	9.0	111	141.1	439 X 10^2	173 X 10	17.6
	12.0	147	187.0	575 X 10^2	226 X 10	17.5
	14.0	171	217.3	663 X 10^2	261 X 10	17.5
	16.0	194	247.3	749 X 10^2	295 X 10	17.4
	19.0	229	291.9	874 X 10^2	344 X 10	17.3
	22.0	264	335.9	994 X 10^2	391 X 10	17.2
558.8	9.0	122	155.5	588 X 10^2	210 X 10	19.4
	12.0	162	206.1	771 X 10^2	276 X 10	19.3
	16.0	214	272.8	101 X 10^3	360 X 10	19.2
	19.0	253	322.2	118 X 10^3	421 X 10	19.1
	22.0	291	371.0	134 X 10^3	479 X 10	19.0
600	9.0	131	167.1	730 X 10^2	243 X 10	20.9
	12.0	174	221.7	958 X 10^2	320 X 10	20.8
	14.0	202	257.7	111 X 10^3	369 X 10	20.7
	16.0	230	293.6	125 X 10^3	418 X 10	20.7
609	9.0	133	169.8	766 X 10^2	251 X 10	21.2
	12.0	177	225.3	101 X 10^3	330 X 10	21.1
	14.0	206	262.0	116 X 10^3	381 X 10	21.1
	16.0	234	298.4	132 X 10^3	432 X 10	21.0
	19.0	277	352.5	154 X 10^3	505 X 10	20.9
	22.0	319	406.1	176 X 10^3	576 X 10	20.8
700	9.0	153	195.4	117 X 10^3	333 X 10	24.4
	12.0	204	259.4	154 X 10^3	439 X 10	24.3
	14.0	237	301.7	178 X 10^3	507 X 10	24.3
	16.0	270	343.8	201 X 10^3	575 X 10	24.2
711.2	9.0	156	198.5	122 X 10^3	344 X 10	24.8
	12.0	207	263.8	161 X 10^3	453 X 10	24.7
	14.0	241	306.6	186 X 10^3	524 X 10	24.7
	16.0	274	349.4	212 X 10^3	594 X 10	24.6
	19.0	324	413.2	248 X 10^3	696 X 10	24.5
	22.0	374	476.3	283 X 10^3	796 X 10	24.4
812.8	9.0	178	227.3	184 X 10^3	452 X 10	28.4
	12.0	237	301.9	242 X 10^3	596 X 10	28.3
	14.6	276	351.3	280 X 10^3	690 X 10	28.2
	16.0	314	400.5	316 X 10^3	782 X 10	28.2
	19.0	372	473.8	373 X 10^3	919 X 10	28.1
	22.0	439	546.6	428 X 10^3	105 X 10^2	28.0
914.4	12.0	267	340.2	346 X 10^3	758 X 10	31.9
	14.0	311	396.0	401 X 10^3	876 X 10	31.8
	16.0	354	451.6	456 X 10^3	997 X 10	31.8
	19.0	420	534.5	536 X 10^3	117 X 10^2	31.7
	22.0	484	616.5	614 X 10^3	134 X 10^2	31.5
1016.0	12.0	297	378.5	477 X 10^3	939 X 10	35.5
	14.0	346	440.7	553 X 10^3	109 X 10^2	35.4
	16.0	395	502.7	628 X 10^3	124 X 10^2	35.4
	19.0	467	595.1	740 X 10^3	146 X 10	35.2
	22.0	539	687.0	849 X 10^3	167 X 10^2	35.2

JIS G 3444 Mechanical Properties

Class	Notation	Tension Test				Bending test		Flattening test
		Tensile strength kg/mm2	Yidld point or yield strength kg/mm2	Elongation		Bending angle	Inside radius (D is outside diameter of tube)	Distance between flat plates (D is outside diameter of tube)
				Test piece No. 11 Test piece No.12 Vertical direction	Test piece No.5 Horizontal direction			
Class 1	STK 30	30 min.	-	30 min.	25 min.	90°	6 D	2/3 D
Class 2	STK 41	41 min.	24 min.	23 min.	18 min.	90°	6 D	2/3 D
Class 3	STK 51	51 min.	36 min.	15 min.	10 min.	90°	6 D	7/8 D
Class 4	STK 50	50 min.	32 min.	23 min.	18 min.	90°	6 D	7/8 D
Class 5	STK 55	55 min.	40 min.	20 min.	16 min.	90°	6 D	7/8 D

CARBON STEEL SQUARE PIPES FOR GENERAL STRUCTURAL PURPOSE

JIS G 3466 (1968)



Dimension mm		Unit Weight	Sectional Area	Moment of Inertai	Modulus of Section	Radius of Gyratice
Side length A x B	Wall Weight t	kg/m	cm^2	cm^4	cm^3	cm
300 X 300	6.0	54.7	69.63	9960	664	12.0
				9960	664	12.0
300 X 300	4.5	41.3	52.67	7630	508	12.0
				7630	508	12.0
250 X 250	8.0	59.5	75.79	7320	585	9.82
				7320	585	9.82
250 X 250	6.0	45.2	57.63	5670	454	9.92
				5670	454	9.92
250 X 250	5.0	38.0	48.36	4810	384	9.97
				4810	384	9.97
200 X 200	8.0	46.9	59.79	3620	362	7.78
				3620	362	7.76
200 X 200	6.0	35.8	45.63	2830	283	7.88
				2830	283	7.88
175 X 175	6.0	31.1	39.63	1860	213	6.86
				1860	213	6.86
175 X 175	5.0	26.2	33.36	1590	182	6.91
				1590	182	6.91
150 X 150	6.0	26.4	33.63	1150	153	5.84
				1150	153	5.84
150 X 150	5.0	22.3	28.36	982	131	5.89
				982	131	5.89
150 X 150	4.5	20.1	25.67	896	120	5.91
				896	120	5.91
125 X 125	6.0	21.7	27.63	641	103	4.82
				841	103	4.82
125 X 125	5.0	18.3	23.36	553	88.4	4.86
				553	88.4	4.86
125 X 125	4.5	18.6	21.17	506	80.9	4.89
				506	80.9	4.89
125 X 125	3.2	12.0	15.33	376	60.1	4.95
				376	60.1	4.95
100 X 100	4.5	13.1	16.67	249	49.9	3.87
				249	49.9	3.87
100 X 100	4.0	11.7	14.95	226	45.3	3.89
				226	45.3	3.89
100 X 100	3.2	9.52	12.13	187	37.5	3.93
				187	37.5	3.93
100 X 100	2.3	6.95	8.852	140	27.9	3.97
				140	27.9	3.97
125 X 75	4.0	11.7	14.95	311	49.7	4.56
				141	37.5	3.07
125 X 75	3.2	9.52	12.13	257	41.1	4.60
				117	31.1	3.10
125 X 75	2.3	6.95	8.852	192	30.6	4.65
				87.5	23.3	3.14
125 X 40	2.3	5.69	7.242	131	20.9	4.25
				21.6	10.8	1.73
125 X 40	1.6	4.01	5.112	94.4	15.1	4.30
				15.8	7.91	1.76
100 X 50	3.2	7.01	8.927	112	22.5	3.55
				38.0	15.2	2.06
100 X 50	2.3	5.14	6.552	84.8	17.0	3.60
				29.0	11.6	2.10

JIS G 3466 (Continued)

Dimension mm		Unit Weight	Sectional Area	Moment of Inertai	Modulus of Section	Radius of Gyratice
Side length A x B	Wall Weight t	kg/m	cm^2	cm^4	cm^3	cm
100 X 40	2.3	4.78	6.092	73.9	14.8	3.48
				17.5	8.77	1.70
100 X 40	1.6	3.38	4.312	53.5	10.7	3.52
				12.9	6.44	1.73
100 X 20	2.3	4.06	5.172	51.9	10.4	3.17
				3.64	3.64	0.839
100 X 20	1.6	2.88	3.672	38.1	7.61	3.22
				2.76	2.76	0.870
90 X 45	3.2	6.25	7.967	80.2	17.6	3.17
				27.0	12.0	1.84
90 X 45	2.3	4.60	5.862	61.0	13.6	3.23
				20.8	9.22	1.86
90 X 90	3.2	8.51	10.85	135	29.9	3.52
				135	29.9	3.52
90 X 90	2.3	6.23	7.932	101	22.4	3.56
				101	22.4	3.56
80 X 80	3.2	7.51	9.567	92.7	23.2	3.11
				92.7	23.2	3.11
80 X 80	2.3	5.50	7.012	69.9	17.5	3.16
				69.9	17.5	3.16
75 X 75	3.2	7.01	8.927	75.5	20.1	2.91
				75.5	20.1	2.91
75 X 75	2.3	5.14	6.552	57.1	15.2	2.95
				57.1	15.2	2.95
60 X 60	3.2	5.50	7.007	36.9	12.3	2.30
				36.9	12.3	2.30
60 X 60	2.3	4.06	5.172	28.3	9.44	2.34
				28.3	9.44	2.34
60 X 60	1.6	2.88	3.672	20.7	6.89	2.37
				20.7	6.89	2.37
50 X 50	3.2	4.50	5.727	20.4	8.16	1.89
				20.4	8.16	1.89
50 X 50	2.3	3.34	4.252	15.9	6.34	1.93
				15.9	6.34	1.93
50 X 50	1.6	2.38	3.032	11.7	4.68	1.96
				11.7	4.68	1.96
200 X 200	6.0	26.4	33.63	1700	170	7.12
				577	115	4.14
200 X 100	4.5	20.1	25.67	1330	133	7.20
				455	90.9	4.21
150 X 100	6.0	21.7	27.63	835	111	5.50
				444	68.8	4.01
150 X 100	4.5	16.6	21.17	658	87.7	5.58
				352	70.4	4.08
150 X 80	6.0	19.8	25.23	710	94.7	5.31
				264	66.1	3.24
150 X 80	5.0	16.8	21.38	614	81.9	5.36
				230	57.5	3.28
150 X 80	4.5	15.2	19.37	563	75.0	5.39
				211	52.9	3.30
75 X 75	3.2	5.50	7.007	50.8	13.5	2.69
				22.8	10.1	1.60

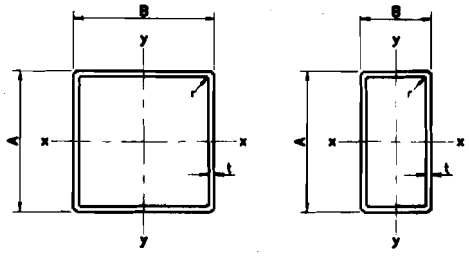
JIS G 3466 (Continued)

Dimension mm		Unit Weight	Sectional Area	Moment of Inertai	Modulus of Section	Radius of Gyratice
Side length A x B	Wall Weight t	kg/m	cm^2	cm^4	cm^3	cm
75 X 45	2.3	4.06	5.172	38.9	10.4	2.74
				17.6	7.82	1.84
75 X 75	1.6	2.88	3.672	28.4	7.56	2.78
				12.9	5.75	1.88
75 X 20	2.3	3.18	4.022	23.7	6.31	2.43
				2.73	2.73	0.824
75 X 20	1.6	2.25	2.872	17.6	4.69	2.47
				2.10	2.10	0.655
60 X 30	3.2	3.99	5.087	21.4	7.15	2.05
				7.08	4.72	1.18
60 X 30	2.3	2.98	3.792	16.8	5.61	2.11
				5.65	3.76	1.22
60 X 30	1.6	2.13	2.712	12.5	4.16	2.15
				4.25	2.83	1.25
50 X 20	2.3	2.25	2.872	8.00	3.20	1.67
				1.83	1.83	0.796
50 X 20	1.6	1.63	2.072	6.06	2.43	1.71
				1.42	1.42	0.829

JIS G 3466 Mechanical Properties

Class	Symbol	Tensile strength ka/mm2	Yield point kg/mm2	Elongation (No. 5 test piece) %
Class 1	STKR 41	41 min.	25 min.	23 min.
Class 2	STKR 50	50 min.	33 min.	23 min.

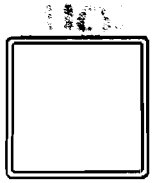
WELDED STEEL TUBING
SQUARE TUBE
RECTANGULAR TUBE



Metric Size

Dimension	mm		Sectional Area	Weight	Moment of Inertai		Radius of Gyration		Modulus of Section	
A x B	t	R	mm^2	kg/m	Ix cm^4	Iy cm^4	ix cm	iy cm	Zx cm^3	Zy cm^3
150 X150	6.0	12	33.63	26.4	1150	1150	5.84	5.84	153	153
150 X150	4.5	9	25.67	20.2	896	896	5.91	5.91	120	120
125 X125	6.0	12	27.63	21.7	641	641	4.62	4.82	103	103
125 X125	4.5	9	21.17	16.6	506	506	4.89	4.89	80.9	80.9
125 X125	3.2	6.4	15.33	12.0	379	379	4.97	4.97	60.6	60.6
100 X100	6.0	12	21.63	17.0	312	312	3.80	3.80	62.4	62.4
100 X100	4.5	9	16.67	13.1	249	249	3.87	3.87	49.9	49.9
100 X100	3.2	6.4	12.13	9.52	187	187	3.93	3.93	37.5	37.5
100 X100	2.3	4.6	6.852	6.95	140	140	3.97	3.97	28.0	26.0
75 X 75	4.5	9	12.17	9.55	99	99	2.85	2.85	26.3	26.3
75 X 75	3.2	6.4	6.925	7.01	75.6	75.6	2.91	2.91	20.2	20.2
75 X 75	2.3	4.6	6.552	5.14	57.1	57.1	2.95	2.95	15.2	15.2
60 X 60	2.3	4.6	5.172	4.06	28.3	28.3	2.34	2.34	9.44	9.44
60 X 60	1.6	3.2	3.672	2.88	20.7	20.7	2.37	2.37	6.69	6.89
50 X 50	2.3	4.6	4.252	3.34	15.9	15.9	1.93	1.91	6.36	6.36
50 X 50	1.6	3.2	3.032	2.38	11.7	11.7	1.97	1.97	4.68	4.68
200 X100	6.0	12	33.63	26.4	1700	577	7.12	4.14	170	115
200 X100	4.5	9	25.67	20.2	1330	455	7.20	4.21	133	90.9
150 X100	6.0	12	27.63	21.7	835	444	5.50	4.01	111	88.8
150 X100	4.5	9	21.17	16.6	658	352	5.58	4.08	87.7	70.4
150 X100	3.2	6.4	15.33	12.0	488	262	5.64	4.14	65.1	52.5
150 X 75	4.5	9	16.92	14.9	537	162	5.33	3.10	71.6	48.5
150 X 75	3.2	6.4	13.73	10.8	401	124	5.41	3.01	55.1	33.2
125 X 75	3.2	6.4	12.13	9.52	256	117	4.60	3.10	41.0	31.1
125 X 75	2.3	4.6	6.852	6.95	192	67.5	4.65	3.14	30.6	23.3
100 X 50	3.2	6.4	8.952	7.01	112	36.0	3.55	2.06	22.5	15.2
100 X 50	2.3	4.6	6.552	5.14	84.9	29.0	3.60	2.10	17.0	11.6
75 X 45	3.2	6.4	7.007	5.50	50.6	22.8	2.69	1.61	13.6	10.2
75 X 45	2.3	4.6	5.172	4.06	38.9	17.6	2.74	1.85	10.4	7.84

SQUARE TUBE Inch Size

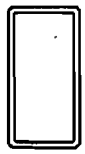


Size & Wall Thickness		Weight		Area of Metal	Moment of Inertai		section Modulus		Radius of Gyration	
					Ix	Iy	ix	Iy	Ix	Iy
in		lb/ft	kg/ft	in^2	in^4	in^4	in^3	in^3	in	in
1/2 X 1/2	0.039	0.240	0.109	0.0706	0.00249	0.00249	0.00996	0.00996	0.188	0.188
	0.047	0.283	0.128	0.0833	0.00284	0.00284	0.0113	0.0113	0.184	0.184
	0.063	0.363	0.165	0.107	0.00337	0.00337	0.135	0.135	1.178	1.178
	0.072	0.404	0.183	0.119	0.00362	0.00362	0.0145	0.145	0.175	0.175
5/8 X 5/8	0.039	0.306	0.139	0.0901	0.00513	0.00513	0.0164	0.0164	0.239	0.239
	0.047	0.363	0.165	0.107	0.00591	0.00591	0.0169	0.0198	0.235	0.235
	0.063	0.470	0.213	0.138	0.00724	0.00724	0.0232	0.0232	0.229	0.229
	0.072	0.526	0.239	0.155	0.00786	0.00786	0.0252	0.0252	0.225	0.225
3/4 X 3/4	0.039	0.373	0.169	0.114	0.00920	0.00920	0.0245	0.0245	0.290	0.290
	0.047	0.443	0.201	0.130	0.0107	0.0107	0.0285	0.0258	0.286	0.286
	0.063	0.577	0.262	0.170	0.0133	0.133	0.0355	0.0355	0.280	0.280
	0.072	0.649	0.294	0.191	0.0146	0.0146	0.0388	0.0388	0.278	0.276
7/8 X 7/8	0.039	0.439	0.199	0.129	0.0149	0.0149	0.0352	0.0352	0.340	0.340
	0.047	0.523	0.237	0.154	0.0175	0.0175	0.0411	0.0411	0.337	0.337
	0.063	0.684	0.310	0.201	0.0219	0.0219	0.0515	0.0515	0.330	0.330
	0.072	0.771	0.350	0.227	0.0241	0.0241	0.0562	0.0256	0.326	0.326
1 X 1	0.047	0.603	0.271	0.177	0.0267	0.0267	0.0535	0.0535	0.388	0.388
	0.063	0.791	0.359	0.233	0.0339	0.0399	0.0678	0.0678	0.382	0.382
	0.072	0.694	0.405	0.263	0.0375	0.0375	0.0751	0.0751	0.378	0.378
	0.078	0.960	0.436	0.282	0.0398	0.0398	0.0797	0.0797	0.376	0.376
	0.095	1.14	0.518	0.336	0.0457	0.0457	0.0913	0.0913	0.369	0.389
	0.120	1.39	0.632	0.410	0.0528	0.0528	0.106	0.106	0.359	0.359
	0.125	1.44	0.654	0.424	0.0537	0.0537	0.107	0.107	0.356	0.356
1 1/4 X 1 1/4	0.047	0.763	0.346	0.224	0.0539	0.0539	0.0862	0.0862	0.490	0.490
	0.063	1.01	0.456	0.296	0.0692	0.0692	0.111	0.111	0.484	0.484
	0.072	1.14	0.516	0.335	0.0771	0.0771	0.123	0.123	0.480	0.480
	0.078	1.23	0.556	0.362	0.0822	0.0822	0.131	0.131	0.477	0.477
	0.095	1.46	0.663	0.431	0.0954	0.0954	0.153	0.153	0.470	0.470
	0.120	1.80	0.817	0.530	0.112	0.112	0.180	0.180	0.460	0.460
	0.125	1.87	0.847	0.849	0.115	0.115	0.184	0.184	0.458	0.458
1 1/2 X 1 1/2	0.047	0.922	0.418	0.271	0.0952	0.0952	0.127	0.127	0.592	0.592
	0.063	1.22	0.553	0.359	0.123	0.123	0.164	0.164	0.586	0.586
	0.072	1.38	0.627	0.407	0.138	0.138	0.184	0.184	0.582	0.582
	0.078	1.49	0.676	0.438	0.147	0.147	0.196	0.196	0.578	0.578
	0.095	1.79	0.811	0.528	0.172	0.172	0.230	0.230	0.572	0.572
	0.120	2.21	1.00	0.601	0.193	0.193	0.257	0.257	0.566	0.566
	0.125	2.29	1.04	0.674	0.211	0.211	0.282	0.282	0.560	0.560
2 X 2	0.120	2.94	1.34	0.865	0.498	0.498	0.498	0.498	0.759	0.759
	0.156	3.70	1.68	1.08	0.591	0.591	0.591	0.591	0.741	0.741
	0.1875	4.32	1.96	1.27	0.670	0.670	0.670	0.670	0.726	0.726
	0.250	5.40	2.45	1.59	0.770	0.770	0.770	0.770	0.696	0.696

SQUARE TUBE Inch size (continued)

Size & Wall Thickness		Weight		Area of Metal	Moment of Inertai		section Modulus		Radius of Gyration	
					Ix	Iy	Ix	Iy	Ix	Iy
in		lb/ft	kg/ft	in^2	in^4	in^4	in^3	in^3	in	in
2 1/2 X 2 1/2	0.120	3.76	1.70	1.11	1.02	1.02	0.820	0.820	0.963	0.963
	0.125	3.90	1.77	1.19	1.06	1.06	0.847	0.847	0.961	0.961
	0.180	5.40	2.45	1.59	1.38	1.38	1.11	1.11	0.934	0.934
	0.1675	5.59	2.54	1.64	1.42	1.42	1.14	1.14	0.930	0.930
	0.250	7.10	3.22	2.09	1.69	1.69	1.36	1.36	0.900	0.900
3 X 3	0.120	4.58	2.08	1.35	1.83	1.83	1.22	1.22	1.17	1.17
	0.125	4.76	2.16	1.40	1.90	1.90	1.26	1.26	1.16	1.16
	0.180	6.62	3.00	1.95	2.52	2.52	1.68	1.68	1.14	1.14
	0.1875	6.65	3.11	2.02	2.60	2.60	1.73	1.73	1.13	1.13
	0.250	8.80	3.99	2.59	3.15	3.15	2.01	2.01	1.10	1.10
3 1/2 X 3 1/2	0.120	5.40	2.45	1.59	2.98	2.98	1.70	1.70	1.37	1.37
	0.125	5.61	2.55	1.65	3.09	3.09	1.77	1.77	1.37	1.37
	0.180	7.66	3.57	2.31	4.16	4.16	2.38	2.38	1.34	1.34
	0.1875	8.13	3.69	2.39	4.30	4.30	2.46	2.46	1.34	1.34
	0.250	10.5	4.76	3.09	5.28	5.28	3.02	3.02	1.31	1.31
4 X 4	0.120	6.22	2.82	1.83	4.54	4.54	2.27	2.27	1.57	1.57
	0.180	9.07	4.12	2.64	6.27	6.27	3.14	3.14	1.54	1.54
	0.1875	9.41	4.22	2.74	6.47	8.47	3.24	3.24	1.54	1.54
	0.250	12.2	5.45	3.54	8.00	8.00	4.00	4.00	1.50	1.50
	0.3125	14.5	6.46	4.27	9.24	9.24	4.62	4.62	1.47	1.47
	0.375	18.8	7.64	4.95	10.2	10.2	5.10	5.10	1.44	1.44
5 X 5	0.125	8.11	3.66	2.38	7.85	7.85	3.14	3.14	1.8	1.8
	0.180	11.4	5.18	3.38	12.8	12.8	5.11	5.11	1.95	1.95
	0.1875	12.0	5.38	3.52	13.4	13.4	6.78	6.78	1.95	1.95
	0.250	15.6	6.99	4.58	16.92	16.9	7.83	7.83	1.92	1.92
	0.3125	18.8	8.52	5.52	19.52	19.52	7.81	7.81	1.88	1.88
	0.375	21.9	9.95	8.45	22.0	22.0	8.80	8.80	1.85	1.85
6 X 6	0.180	13.9	6.29	4.08	22.7	22.7	7.56	7.56	2.36	2.36
	0.1675	14.4	6.54	4.24	23.5	23.5	7.83	7.83	2.35	2.35
	0.250	18.8	8.54	5.54	29.9	29.9	9.95	9.95	2.32	2.32
	0.3125	23.0	10.4	6.77	35.5	35.5	11.8	11.6	2.29	2.29
	0.375	27.0	12.3	7.96	40.5	40.5	13.5	13.5	2.26	2.26
7 X 7	0.180	16.2	7.36	4.77	36.4	36.4	10.4	10.4	2.76	2.76
	0.1875	16.9	7.85	4.96	38.0	38.0	10.6	10.8	2.76	2.76
	0.250	22.0	10.0	5.48	48.7	48.7	13.9	13.9	2.74	2.74
	0.3125	27.0	12.2	7.94	57.4	57.4	16.4	16.4	2.69	2.69
	0.375	31.7	14.4	9.33	66.9	66.9	19.1	19.1	2.68	2.68
8 X 8	0.180	18.7	8.47	5.49	55.2	55.2	13.8	13.8	3.17	3.17
	0.1675	19.4	8.60	5.710	57.2	57.2	14.3	14.3	3.17	3.17
	0.250	25.4	11.5	7.480	73.4	73.4	18.4	18.4	3.13	3.13
	0.3125	31.2	14.2	91.90	88.2	88.2	22.0	22.0	3.10	3.10
	0.375	36.8	16.7	10.8	102	102	25.4	25.4	3.06	3.06

RECTANGULAR TUBE Inch size



Size & Wall Thickness		Weight		Area of Metal	Moment of Inertai		Section Modulus		Radius of Gyration	
					Ix	Iy	Zx	Zy	Ix	Iy
in		lb/ft	kg/ft	in^2	in^4	in^4	in^3	in^3	in	in
1/2 X 1	0.039	0.361	0.164	0.110	0.00454	0.0138	0.0181	0.0188	0.203	0.355
	0.47	0.428	0.194	0.130	0.00521	0.0161	0.0210	0.0321	0.201	0.351
	0.063	0.559	0.254	0.170	0.00642	0.0201	0.0257	0.0401	0.194	0.344
1 X 1 1/2	0.047	0.763	0.346	0.224	0.0374	0.0718	0.0748	0.0955	0.408	0.565
	0.063	1.01	0.456	0.296	0.0478	0.0905	0.0954	0.121	0.402	0.553
	0.078	1.23	0.556	0.360	0.0564	0.107	0.113	0.143	0.396	0.546
	0.095	1.46	0.663	0.431	0.0652	0.125	0.130	0.167	0.389	0.539
	0.109	1.66	0.751	0.487	0.0718	0.140	0.143	0.186	0.383	0.535
	0.120	1.80	0.817	0.530	0.0761	0.148	0.152	0.198	0.379	0.529
1 X 2	0.047	0.922	0.418	0.271	0.0482	0.142	0.0964	0.142	0.422	0.724
	0.063	1.22	0.553	0.359	0.0616	0.184	0.123	0.184	0.414	0.761
	0.072	1.38	0.627	0.407	0.0686	0.206	0.137	0.206	0.411	0.711
	0.078	1.49	0.676	0.438	0.0731	0.221	0.146	0.221	0.408	0.709
	0.095	1.79	0.811	0.526	0.0947	0.259	0.189	0.259	0.401	0.702
	0.120	2.21	1.00	0.650	0.0995	0.310	0.199	0.310	0.391	0.690
	0.128	2.34	1.06	0.688	0.104	0.325	0.207	0.325	0.388	0.678
2 X 3	0.120	3.78	1.70	1.11	0.711	1.34	0.711	0.890	0.802	1.10
	0.125	3.90	1.77	1.15	0.734	1.38	0.734	0.920	0.800	1.10
	0.180	5.40	2.45	1.59	0.952	1.81	0.952	1.20	0.775	1.07
	0.1785	5.59	2.54	1.64	0.977	1.86	0.977	1.24	0.771	1.06
	0.250	7.10	3.22	2.09	1.15	2.21	1.15	1.47	0.742	1.03
	0.3125	8.44	3.83	2.46	1.28	2.44	1.26	1.63	0.714	0.992
2 X 4	0.120	4.58	2.08	1.35	0.923	2.73	0.923	1.38	0.828	1.42
	0.125	4.76	2.16	1.40	0.954	2.82	0.954	1.41	0.826	1.42
	0.180	6.62	3.00	1.95	1.25	1.75	1.25	1.88	0.802	1.39
	0.1875	6.85	3.11	2.02	1.29	3.87	1.29	1.93	0.798	1.38
2 X 4	0.250	8.80	3.99	2.59	1.54	4.69	1.54	2.35	0.770	1.35
	0.3125	10.6	4.79	3.11	1.71	5.32	1.71	2.66	0.743	1.31

RECTANGULAR TUBE inch size (Continued)

Size & Wall Thickness		Weight		Area of Metal	Moment of Inertai		Section Modulus		Radius of Gyration	
					Ix	Iy	Zx	Zy	Ix	Iy
in		lb/ft	kg/ft	in^2	in^4	in^4	in^3	in^3	in	in
2 X 5	0.120	5.39	2.45	1.59	1.14	4.79	1.14	1.92	0.846	1.74
	0.129	5.60	2.55	1.65	1.17	4.96	1.17	1.98	0.844	1.73
	0.180	7.84	3.57	2.31	1.55	6.67	1.55	2.67	0.820	1.70
	0.1875	8.14	3.69	2.39	1.60	6.89	1.60	2.75	0.186	1.70
	0.250	10.5	4.76	3.09	1.92	8.48	1.92	3.39	0.789	1.66
2 X 6	0.120	6.16	2.80	1.81	1.34	7.53	1.34	2.51	0.858	2.04
	0.125	6.41	2.93	1.88	1.38	7.80	1.38	2.60	0.856	2.03
	0.160	8.97	4.12	2.64	1.82	10.5	1.82	3.50	0.831	1.99
	0.1875	9.31	4.22	2.74	1.87	10.8	1.87	3.61	0.827	1.99
1/2 X 4 1/2	0.120	5.39	2.45	1.59	1.71	4.24	1.36	1.88	3.28	1.64
	0.125	5.60	2.55	1.65	1.76	4.39	1.41	1.95	3.27	1.63
	0.180	7.84	3.57	2.31	2.36	5.92	1.88	2.63	3.20	1.60
	0.187	8.14	3.69	2.39	2.43	6.11	1.94	2.72	3.18	1.60
	0.250	10.9	4.76	3.09	2.96	7.54	2.37	3.35	3.10	1.56
3 X 4	0.120	5.40	2.45	1.59	2.33	3.65	1.55	1.82	1.21	1.52
	0.125	5.61	2.55	1.65	2.41	3.76	1.61	1.86	1.21	1.51
	0.180	7.88	3.57	2.31	3.24	5.07	2.16	2.53	1.19	1.48
	0.1675	8.13	3.69	2.39	3.34	5.23	2.23	2.62	1.18	1.48
	0.250	10.5	4.76	3.09	4.10	6.45	2.74	3.23	1.15	1.45
	0.3125	12.7	5.76	3.73	4.71	7.45	3.14	3.72	1.12	1.41
3 X 5	0.125	6.46	2.93	1.84	3.27	8.38	2.18	2.55	1.33	1.86
	0.160	9.07	4.12	2.67	3.99	8.84	2.26	3.53	1.22	1.61
	0.1875	9.41	4.22	2.73	4.06	8.94	2.70	3.56	1.22	1.61
	0.250	12.2	5.45	3.54	4.92	11.0	3.28	4.38	1.18	1.76
	0.3125	14.5	6.46	4.27	5.66	12.7	3.77	5.07	1.15	1.72
	0.375	16.8	7.64	4.95	6.21	14.0	4.14	5.59	1.12	1.68
3 X 6	0.125	7.25	3.29	2.13	3.42	9.97	2.28	3.32	1.27	2.18
	0.180	10.2	4.63	3.00	4.61	13.5	3.07	4.52	1.27	2.12
	0.1875	10.6	4.80	3.11	4.76	14.0	3.17	4.67	1.24	2.12
	0.250	13.7	6.22	4.04	5.88	17.4	3.92	5.82	1.21	2.08
	0.3125	16.74	7.56	4.90	6.79	20.3	4.53	6.78	1.18	2.24
	0.375	19.4	8.80	5.70	7.51	22.7	5.01	7.56	1.15	1.99
4 X 6	0.125	8.11	3.66	2.38	6.52	12.1	3.26	4.04	1.65	2.25
	0.180	11.4	5.16	3.36	8.90	16.6	4.45	5.53	1.63	2.22
	0.1875	11.9	5.38	3.49	9.20	17.2	4.60	5.72	1.62	2.22
	0.250	15.4	6.99	4.54	11.5	21.6	5.76	7.19	1.59	2.18
	0.3125	18.8	8.52	5.52	13.5	25.4	6.75	8.46	1.56	2.14
	0.375	21.9	9.95	6.45	15.2	28.6	7.58	9.54	1.53	2.10

RECTANGULAR TUBE Inch size (Continued)

Size & Wall Thickness		Weight		Area of Metal	Moment of Inertai		Section Modulus		Radius of Gyration	
					ix	iy	Zx	Zy	lx	iy
in		lb/ft	kg/ft	in^2	in^4	in^4	in^3	in^3	in	in
4 X 7	0.1875	13.1	5.96	3.86	10.6	25.0	5.28	7.15	1.65	2.55
	0.250	17.1	7.77	5.04	13.3	31.7	6.64	9.04	1.62	2.51
	0.3125	20.9	9.48	6.15	15.6	37.5	7.81	10.7	1.59	2.47
	0.375	24.5	11.1	7.20	17.6	42.5	8.61	12.1	1.56	2.43
4 X 8	0.180	13.9	6.29	4.08	11.5	33.6	5.76	8.41	1.68	2.87
	0.1875	14.4	6.54	4.24	11.9	34.8	5.96	8.71	1.68	2.87
	0.250	18.8	8.54	5.54	15.0	14.2	7.52	11.1	1.65	2.83
	0.3125	23.0	10.4	6.77	17.8	52.6	8.88	13.1	1.82	2.79
	0.375	27.0	12.3	7.96	20.1	59.9	10.0	15.0	1.59	2.74
5 X 7	0.180	13.9	6.29	4.08	17.0	28.4	6.78	8.11	2.04	2.64
	0.1875	14.4	6.54	4.24	17.6	29.4	7.09	8.40	2.04	2.63
	0.250	18.8	8.54	5.24	22.3	37.4	6.90	10.7	2.00	2.60
	0.3125	23.0	10.4	8.77	26.4	44.4	10.6	12.7	1.97	2.56
	0.375	27.0	12.3	7.96	30.0	50.7	12.0	14.5	1.95	2.52
6 X 8	0.180	16.2	7.36	4.77	28.5	44.2	9.51	11.0	2.45	3.04
	0.1875	16.9	7.65	4.96	29.6	45.8	9.85	11.4	2.44	3.04
	0.250	22.7	10.0	6.48	37.6	58.4	12.5	14.6	2.41	3.00
	0.3125	27.0	12.2	7.94	44.8	69.7	14.9	17.4	2.36	2.96
	0.375	31.7	14.4	9.33	51.2	79.7	17.1	19.9	2.34	2.92

CARBON STEEL PIPES FOR ORDINARY PIPING

JIS G 3452

Nominal Size		Outside diameter mm	Tolerance on outside diameter		Wall thickness mm	Tolerance on wall thickness	Weight excluding socket kg/m
A	B		Pipes to be threaded with taper threads	Other pipes			
6	1/8	10.5	± 0.5 mm	± 0.5 mm	2.0		0.419
8	1/4	13.8	± 0.5 mm	± 0.5 mm	2.3		0.652
10	3/8	17.3	± 0.5 mm	± 0.5 mm	2.3		0.651
15	1/2	21.7	± 0.5 mm	± 0.5 mm	2.8		1.31
20	3/4	27.2	± 0.5 mm	± 0.5 mm	2.8		1.68
25	1	34.0	± 0.5 mm	± 0.5 mm	3.2		2.43
32	1 1/4	42.7	± 0.5 mm	± 0.5 mm	3.5		3.38
40	1 1/2	48.6	± 0.5 mm	± 0.5 mm	3.5		3.89
50	2	60.5	± 0.5 mm	± 1%	3.8		5.31
65	2 1/2	76.3	± 0.7 mm	± 1%	4.2		7.47
80	3	89.1	± 0.8 mm	± 1%	4.2		8.79
90	3 1/2	101.6	± 0.8 mm	± 1%	4.2		10.1
100	4	114.3	± 0.8 mm	± 1%	4.5	+ not specified - 12.5%	12.2
125	5	139.8	± 0.8 mm	± 1%	4.5		15.0
150	6	165.2	± 0.8 mm	± 1%	5.0		19.8
175	7	190.7	± 0.9 mm	± 1%	5.3		24.2
200	8	216.3	± 1.0 mm	± 1%	5.8		30.1
225	9	241.8	± 1.2 mm	± 1%	6.2		36.0
250	10	267.4	± 1.3 mm	± 1%	6.6		42.4
300	12	318.5	± 1.5 mm	± 1%	6.9		53.0
350	14	355.6	-	± 1%	7.9		67.7
400	16	406.4	-	± 1%	7.9		77.6
450	18	457.2	-	± 1%	7.9		87.5
500	20	508.0	-	± 1%	7.9		97.4

CARBON STEEL PIPES FOR PRESSURE SERVICE

JIS G 3454

Nominal diameter		Outside diameter	Nominal wall thickness																							
			Schedule 10				Schedule 20				Schedule 30				Schedule 40				Schedule 50				Schedule 60			
			Wall Thickness	Weight	Hydrostatic test pressure kg/cm² (bar)		Wall Thickness	Weight	Hydrostatic test pressure kg/cm² (bar)		Wall Thickness	Weight	Hydrostatic test pressure kg/cm² (bar)		Wall Thickness	Weight	Hydrostatic test pressure kg/cm² (bar)		Wall Thickness	Weight	Hydrostatic test pressure kg/cm² (bar)		Wall Thickness	Weight	Hydrostatic test pressure kg/cm² (bar)	
A	B	mm	mm	kg/m	class 2	class 3	mm	kg/m	class 2	class 3	mm	kg/m	class 2	class 3	mm	kg/m	class 2	class 3	mm	kg/m	class 2	class 3	mm	kg/m	class 2	class 3
6	1/8	10.5													1.7	0.369	50 (49.0)	50 (49.0)	2.2	0.450	70 (68.6)	70 (68.6)	2.4	0.479	70 (68.6)	70 (68.6)
8	1/4	13.8													2.2	0.629	50 (49.0)	50 (49.0)	2.4	0.675	70 (68.6)	70 (68.6)	3.0	0.799	70 (68.6)	70 (68.6)
10	3/8	17.3													2.3	0.851	50 (49.0)	50 (49.0)	2.6	1.00	70 (68.6)	70 (68.6)	3.2	1.11	70 (68.6)	70 (68.6)
15	1/2	21.7													2.6	1.31	50 (49.0)	50 (49.0)	3.2	1.46	70 (68.6)	70 (68.6)	3.7	1.64	70 (68.6)	70 (68.6)
20	3/4	27.2													2.9	1.74	50 (49.0)	50 (49.0)	3.4	2.00	70 (68.6)	70 (68.6)	3.9	2.24	70 (68.6)	70 (68.6)
25	1	34.0													3.4	3.57	50 (49.0)	50 (49.0)	3.9	2.89	70 (68.6)	70 (68.6)	4.5	3.27	70 (68.6)	70 (68.6)
32	11/4	42.7													3.6	3.47	70 (68.6)	100 (98.07)	4.5	4.24	100 (98.07)	120 (117.7)	4.9	4.57	130 (127.5)	140 (137.3)
40	11/2	48.6													3.7	4.10	70 (68.6)	100 (98.07)	4.5	4.89	100 (98.07)	120 (117.7)	5.1	5.47	130 (127.5)	140 (137.3)
50	2	60.5					3.2	4.52	70 (68.6)	100 (98.07)					3.9	5.44	70 (68.6)	100 (98.07)	4.9	6.72	100 (98.07)	120 (117.7)	5.5	7.46	130 (127.5)	140 (137.3)
65	21/2	76.3					4.5	7.97	70 (68.6)	100 (98.07)					5.2	9.12	70 (68.6)	100 (98.07)	6.0	10.4	100 (98.07)	120 (117.7)	7.0	12.0	130 (127.5)	140 (137.3)
80	3	89.1					4.5	9.39	70 (68.6)	100 (98.07					5.5	11.3	70 (68.6)	100 (98.07)	6.6	13.4	130 (127.5)	140 (137.3)	7.6	15.3	180 (176.5)	180 (176.5)
90	31/2	101.6					4.5	10.6	100 (98.07)	100 (98.07)					5.7	13.5	100 (98.07)	100 (98.07)	7.0	16.3	140 (137.3)	140 (137.3)	8.1	18.7	180 (176.5)	180 (176.5)
100	4	114.3					4.9	13.2	100 (98.07)	100 (98.07)					6.0	16.0	100 (98.07)	100 (98.07)	7.1	18.8	140 (137.3)	140 (137.3)	8.6	22.4	180 (176.5)	180 (176.5)
125	5	139.8					5.1	16.9	100 (98.07)	100 (98.07)					6.6	21.7	100 (98.07)	100 (98.07)	8.1	26.3	140 (137.3)	140 (137.3)	9.5	30.5	180 (176.5)	180 (176.5)
150	6	165.2					5.5	21.7	100 (98.07	100 (98.07)					7.1	27.7	100 (98.07)	100 (98.07)	9.3	35.6	140 (137.3)	140 (137.3)	11.0	41.8	180 (176.5)	180 (176.5)
200	8	216.3					8.4	33.1	70 (68.6)	100 (98.07)	7.0	36.1	100 (98.07)	100 (98.07)	8.2	42.1	100 (98.07)	100 (98.07)	10.3	52.3	130 (127.5)	140 (137.3)	12.7	63.8	160 (156.9)	170 (166.7)
250	10	267.4					6.4	41.2	70 (68.6)	70 (68.6)	7.8	49.9	70 (68.6)	100 (98.07)	9.3	59.2	100 (98.07)	100 (98.07)	12.7	79.6	130 (127.5)	140 (137.3)	15.1	93.9	150 (147.1)	170 (166.7)
300	12	318.5					6.4	49.3	50 (49.0)	70 (68.6)	8.4	64.2	70 (68.6)	70 (68.6)	10.3	78.3	100 (98.07)	100 (98.07)	14.3	107	120 (117.7)	130 (127.5)	17.4	129	140 (137.3)	160 (156.9)
350	14	355.6	6.4	55.1	50 (49.0)	50 (49.0)	7.9	67.7	50 (49.0)	70 (68.6)	9.5	81.1	70 (68.6)	70 (68.6)	11.1	94.3	70 (68.6)	100 (98.07)	15.1	127	110 (107.9)	130 (127.5)	19.0	158	140 (137.3)	160 (156.9)
400	16	406.4	6.4	63.1	50 (49.0)	50 (49.0)	7.9	77.6	50 (49.0)	50 (49.0)	9.5	93.0	70 (68.6)	70 (68.6)	12.7	123	70 (68.6)	100 (98.07)	16.7	160	110 (107.9)	120 (117.7)	21.4	203	140 (137.3)	160 (156.9)
450	18	457.2	6.4	71.1	50 (49.0)	50 (49.0)	7.9	87.5	50 (49.0)	50 (49.0)	11.1	122	70 (68.6)	70 (68.6)	14.3	156	70 (68.6)	100 (98.07)	19.0	205	110 (107.9)	120 (117.7)	23.6	254	140 (137.3)	160 (156.9)
500	20	508.0	6.4	79.2	50 (49.0)	50 (49.0)	9.5	117	50 (49.0)	50 (49.0)	12.7	155	70 (68.6)	70 (68.6)	15.1	184	70 (68.6)	100 (98.07)	20.6	248	110 (107.9)	120 (117.7)	26.2	311	140 (137.3)	160 (156.9)
550	22	558.8	6.4	87.2	40 (39.2)	40 (39.2)	9.5	129	50 (49.0)	50 (49.0)	12.7	171	70 (68.6)	70 (68.6)	15.9	213	70 (68.6)	100 (98.07)								
600	24	609.8	6.4	95.2	40 (39.2)	40 (39.2)	9.5	141	50 (49.0)	50 (49.0)	14.3	228	70 (68.6)	70 (68.6)												
850	26	660.4	7.9	103	40 (39.2)	40 (39.2)	12.7	203	50 (49.0)	50 (49.0)																

ARC WELDED CARBON STEEL PIPES JIS G 3457 (1978)

USED FOR PIPING FOR STEAM, WATER, OIL, GAS, AIR, ETC. OF COMPARATIVELY LOW WORKING PRESSURE

Unit : Kg/m

Nominal diameter		Outside dia. mm \ Wall thickness mm	6.0	6.4	7.1	7.9	8.7	9.5	10.3	11.1	11.9	12.7	13.1	15.1	15.9
A	B														
350	14	355.6	51.7	55.1	61.0	67.7									
400	16	406.4	59.2	83.1	66.9	77.6									
450	18	457.2	66.8	71.1	78.8	87.5									
500	20	508.0	71.3	79.2	87.7	97.4	107	117							
550	22	558.8	81.8	87.2	96.8	107	118	129	139	150	160	171			
600	24	609.6	89.3	95.2	105	117	129	141	152	164	175	187			
650	26	660.4	96.8	103	114	127	140	152	165	178	190	203			
700	28	711.2	104	111	123	137	151	164	178	192	205	219			
750	30	762.0		119	132	147	162	178	191	206	220	235			
800	32	812.8		127	141	157	173	188	204	219	235	251	258	297	312
850	34	663.8				167	183	200	217	233	250	266	275	316	332
900	36	911.4				177	194	212	230	247	265	282	291	335	352
1000	40	1016.0				196	216	236	255	275	295	314	324	373	392
1100	44	1117.6						260	281	303	324	346	357	411	432
1200	48	1219.2						283	307	331	354	378	390	448	472
1350	54	1371.6									399	426	439	505	532
1500	60	1524.0									444	473	488	562	591
1600	64	1625.6											521	600	631
1800	72	1828.8											587	675	711
2000	80	2032.0												751	791

JIS G 3457 Mechanical Properties

Class	Symbol	Tension test		
		Tensile strength kgf/mm2 (N/mm2)	Yield point of proof stress kgf/mm2 (N/mm2)	Elongation % No. 5 test piece Transverse
Are welede carbon steel pipe	STPY 41	41 min. (402) min.	23 min. (226) min.	18 min.

Carbon Steel Pipes For High Temperature Service
JIS G 3456 (1978)
Steel Pipes For Low Temperature Service JIS G 3460 (1978)
Alloy Steel Pipes JIS G 3458 (1978)

Weight

Normal diameter		Outside diameter mm	Norminal wall thickness									
			Schedule 10		Schedule 20		Schedule 30		Schedule 40		Schedule 60	
A	B		Wall thickness mm	Weight kg/m	Wall thickness mm	Weight kg/m	Wall thickness mm	Weight kg/m	Wall thickness mm	Weight kg/m	Wall thickness mm	Weight kg/m
6	1/8	10.5							1.7	0.369		
8	1/4	13.8							2.2	0.629		
10	3/8	17.3							2.3	0.851		
15	1/2	21.7							2.8	1.31		
20	3/4	27.2							2.9	1.74		
25	1	34.0							3.4	2.57		
32	1 1/4	42.7							3.6	3.47		
40	1 1/2	48.6							3.7	4.10		
50	2	60.5							3.9	5.44		
65	2 1/2	76.3							5.2	9.12		
80	3	89.1							5.5	11.3		
90	3 1/2	101.6							5.7	13.5		
100	4	114.3							6.0	16.0		
125	5	139.8							6.6	21.7		
150	6	165.2							7.1	27.7		
200	8	216.3			6.4	33.1	7.0	36.1	8.2	42.1	10.3	52.3
250	10	267.4			6.4	41.2	7.8	49.9	9.3	59.2	12.7	79.8
300	12	318.5			6.4	49.3	8.4	64.2	10.3	78.3	14.3	107
350	14	355.6	6.4	55.1	7.9	67.7	9.5	81.1	11.1	94.3	15.1	127
400	16	406.4	6.4	63.1	7.9	77.6	9.5	93.0	12.7	123	16.7	160
450	18	457.2	6.4	71.1	7.9	87.5	11.1	122	14.3	156	19.0	205
500	20	508.0	6.4	79.2	9.5	117	12.7	155	15.1	184	20.6	248

JIS G 3456
JIS G 3460
JIS G 3458 Continued

Norminal wall thickness										Normal diameter		Outside diameter mm
Schedule 80		Schedule 100		Schedule 120		Schedule 140		Schedule 160				
Wall thickness mm	Weight kg/m	Wall thickness mm	Weight kg/m	Wall thickness mm	Weight kg/m	Wall thickness mm	Weight kg/m	Wall thickness mm	Weight kg/m	A	B	
2.4	0.170									6	1/8	10.5
3.0	0.799									8	1/4	13.8
3.2	1.11									10	3/8	17.3
3.7	1.64							4.7	1.97	15	1/2	21.7
3.9	2.24							5.5	2.94	20	3/4	27.2
4.5	3.27							6.4	4.36	25	1	34.0
4.9	4.57							6.4	5.73	32	1 1/2	42.7
5.1	5.47							7.1	7.27	40	1 1/2	48.6
5.5	7.46							8.7	11.1	50	2	60.5
7.0	12.0							9.5	15.6	65	2 1/2	76.3
7.6	15.3							11.1	21.4	80	3	89.1
8.1	18.7							12.7	27.8	90	3 1/2	101.6
8.6	22.4			11.1	28.2			13.5	33.6	100	4	114.3
9.5	30.5			12.7	39.8			15.9	48.6	125	5	139.8
11.0	41.8			14.3	53.2			18.2	66.0	150	6	165.2
12.7	63.8	15.1	74.9	18.2	88.9	20.6	99.4	23.0	110	200	8	216.3
15.1	93.9	18.2	112	21.4	130	25.4	152	28.6	168	250	10	267.4
17.4	129	21.4	157	25.4	184	28.6	204	33.3	234	300	12	316.5
19.0	158	23.8	195	27.8	225	31.8	254	35.7	282	350	14	355.6
21.4	203	26.2	246	30.9	286	36.5	333	40.5	365	400	16	406.4
23.8	254	29.4	310	34.9	363	39.7	409	45.2	459	450	18	457.2
26.2	311	32.5	380	38.1	441	44.4	508	50.0	565	500	20	508.0

STAINLESS STEEL PIPES JIS G 3459 (1978)

Normal diameter		Outside diameter mm	Norminal wall thickness													
			Schedule 5S		Schedule 10 S		Schedule 20 S		Schedule 40		Schedule 80		Schedule 120		Schedule 160	
A	B		Wall thickness mm	Weight kg/m	Wall thickness mm	Weight kg/m	Wall thickness mm	Weight kg/m	Wall thickness mm	Weight kg/m	Wall thickness mm	Weight kg/m	Wall thickness mm	Weight kg/m	Wall thickness mm	Weight kg/m
6	1/8	10.5	1.0	0.234	1.2	0.275	1.5	0.333	1.7	0.369	2.4	0.479	-	-	-	-
8	1/4	13.8	1.2	0.373	1.65	0.494	2.0	0.582	2.2	0.629	3.0	0.799	-	-	-	-
10	3/8	17.3	1.2	0.476	1.65	0.637	2.0	0.755	2.3	0.851	3.2	1.11	-	-	-	-
15	1/2	21.7	1.65	0.816	2.1	1.02	2.5	1.18	2.8	1.31	3.7	1.64	-	-	4.7	1.97
20	3/4	27.2	1.65	1.04	2.1	1.30	2.5	1.52	2.9	1.74	3.9	2.24	-	-	5.5	2.94
25	1	34.0	1.65	1.32	2.8	2.15	3.0	2.29	3.4	2.57	4.5	3.27	-	-	6.4	4.36
32	1 1/4	42.7	1.65	1.67	2.8	2.76	3.0	2.94	3.6	3.47	4.9	4.57	-	-	6.4	5.73
40	1 1/2	48.6	1.65	1.91	2.8	3.16	3.0	3.37	3.7	4.10	5.1	5.47	-	-	7.1	7.27
50	2	60.5	1.65	2.39	2.8	3.98	3.5	4.92	3.9	5.44	5.5	7.46	-	-	8.7	11.1
65	2 1/2	76.3	2.1	3.84	3.0	5.42	3.5	6.28	5.2	9.12	7.0	12.0	-	-	9.5	15.6
80	3	89.1	2.1	4.51	3.0	6.37	4.0	8.39	5.5	11.3	7.6	15.3	-	-	11.1	21.4
90	3 1/2	101.6	2.1	5.15	3.0	7.29	4.0	9.63	5.7	13.5	8.1	18.7	-	-	12.7	27.8
100	4	114.3	2.1	5.81	3.0	8.23	4.0	10.9	6.0	16.0	8.6	22.4	11.1	28.2	13.5	33.6
125	5	139.8	2.8	9.46	3.4	11.4	5.0	16.6	6.6	21.7	9.5	30.5	12.7	39.8	15.9	48.6
150	6	165.2	2.8	11.2	3.4	13.6	5.0	19.8	7.1	27.7	11.0	41.8	14.3	53.2	18.2	66.0
200	8	216.3	2.8	14.7	4.0	20.9	6.5	33.6	8.2	42.1	12.7	63.8	18.2	88.9	23.0	110
250	10	267.4	3.4	22.1	4.0	26.0	8.5	41.8	9.3	59.2	15.1	93.9	21.4	130	28.6	168
300	12	318.5	4.0	31.0	4.5	34.8	6.5	50.0	10.3	78.3	17.4	129	25.4	184	33.3	234
350	14	355.6	-	-	-	-	-	-	11.1	94.3	19.0	158	27.8	225	35.7	282
400	16	406.4	-	-	-	-	-	-	12.7	123	21.4	203	30.9	286	40.5	365
450	18	457.2	-	-	-	-	-	-	14.3	156	23.8	254	34.9	363	45.2	459
500	20	508.0	-	-	-	-	-	-	15.1	184	26.2	311	38.1	411	50.0	565

EXTRACTS OF API LINE PIPE SPECIFICATION

Extracts of API Line Pipe Specification

Grade		Application	(1) Analysis	Chemical Requirement (%)							Physical Requirement		
				C max.	Mn max.	P max.	S max.	Cb min.	V min.	Ti min.	Yield Strength min. psi (kg/mm²)	Tensile Strength min. psi (kg/mm²)	Elongation
5L	A	Line Pipe	L	0.22	0.90	0.04	0.05	—	—	—	30,000 (21.1)	48,000 (33.7)	See footnote (5).
	B		L	0.27	1.15	0.04	0.05	—	—	—	35,000 (24.6)	60,000 (42.2)	
5LX	X-42		L	0.29 (2)	1.25 (2)	0.04	0.05	—	—	—	42,000 (29.5)	60,000 (42.2)	
	X-46	High-Test Line Pipe	L	0.31 (2)	1.35 (2)	0.04	0.05	—	—	—	46,000 (32.3)	63,000 (44.3)	
	X-52										52,000 (36.6)	66,000 (4) (46.4)	
	X-56		L	0.26 (2)	1.35 (2)	0.04	0.05	0.005 (3)	0.02 (3)	0.03 (3)	56,000 (39.2)	71,000 (4) (49.9)	
	X-60										60,000 (42.2)	75,000 (4) (52.7)	
	X-65		By agreement								65,000 (45.7)	77,000 (4) (54.1)	

Notes

(1) L = Ladle Analysis

(2) For each reduction of 0.01% below the specified maximum carbon content, an increase of 0.05% manganese above the specified maximum is permissible, up to a maximum of 1.45%

(3) Either Cb, V, Ti, or a combination thereof, shall be used.

(4) For pipe less than 20 in. OD.

(5) The minimum elogation in 2 inches shall be that determined by the following formula :

$$e = 625{,}000 \frac{A^{0.2}}{U^{0.9}}$$

Where: e = minimum elongation in 2 inches in percent.
A = cross section area of the tensile test specimen in square inches, of 0.75 square inch, whichever is smaller.
U = specified tensile strength, psi.

Hydrostatic Test	Permissible Variations in Dimensions and Weight			
	Outside Diameter	Wall Thickness	Weight	Length
$P=\frac{2St}{D}$ or 2800 psi whichever is smaller Std: S=0.60×Y.P. Alt: S=0.75×Y.P.	Pipe body D≦1.900in. $^{+0.016}_{-0.031}$ in. 2⅜in.≦D≦ 4in. ±1.00% 4½in.≦D≦18in. ±0.75% For a distance of 4 in. from the end D≦10¾in. $^{+1/16}_{-1/64}$ in. D≧12¾in. $^{+3/32}_{-1/32}$ in.	D≦2⅞ in. $^{+20.0}_{-12.5}$% D=3½ in. $^{+18.0}_{-12.5}$% D≧4 in. $^{+15.0}_{-12.5}$%	Single Lengths: • standard-weight, • regular-weight • extra-strong • double-extra-strong $^{+10.0}_{-3.5}$% • special plain-end • special light-weight $^{+10.0}_{-5.0}$% Carload Lot(min. 40,000 lb) −1.75%	See foot note (6)
$P=\frac{2St}{D}$ or 3000psi whichever is smaller 4½(Std) : S=0.60×Y.P. 4½(Alt) : S=0.75×Y.P. 6⅝ and 8⅝: S=0.75×Y.P. 10¾ to 18 : S=0.85×Y.P. S=fiber stress Y.P.=specified minimum yield strength, psi				

(6) Tolerances on Lengths

	Shortest Length	Shortest Length in 95%	Shortest Length in 90%	Minimum Average Length
Plain-End Pipe				
Single random lengths	9'-0"(2.74m)	–	–	17'-6" (5.33m)
Double random lengths	14'-0"(4.27m)	–	26'-3" (8.00m)	35'-0" (10.67m)
As agreed upon lengths in excess of 20ft.	40% of averge agreed upon	–	75% of average agreed upon	–
Threaded-and Coupled-Pipe				
Single random lengths	16'-0"(4.88m)	18'-0" (5.49m)	–	–
Double random lengths	22-0"(6.71m)	–	–	35'-0"(10.67m)

DIMENSIONS, WEIGHTS AND TEST PRESSURE OF API LINE PIPE

API 5L Standard Weight Threaded Line Pipe

Dimensions, Weights and Test Pressures of API Line Pipe

API 5L Standard Weight Threaded Line Pipe

Nominal Size	Outside Diameter		Wall Thickness		Weight			Test Pressure psi	
in.	in.	mm	in.	mm	lbs/ft	kg/m	kg/ft	Grade A	Grade B
⅛	0.405	10.3	0.068	1.73	0.25	0.37	0.11	700	700
¼	0.540	13.7	0.088	2.24	0.43	0.64	0.20	700	700
⅜	0.675	17.1	0.091	2.31	0.57	0.85	0.26	700	700
½	0.840	21.3	0.109	2.77	0.86	1.28	0.39	700	700
¾	1.050	26.7	0.113	2.87	1.14	1.70	0.52	700	700
1	1.315	33.4	0.133	3.38	1.70	2.53	0.77	700	700
1¼	1.660	42.2	0.140	3.56	2.30	3.43	1.04	1000	1100
1½	1.900	48.3	0.145	3.68	2.75	4.10	1.25	1000	1100
2	2⅜	60.3	0.154	3.91	3.75	5.59	1.70	1000	1100
2½	2⅞	73.0	0.203	5.16	5.90	8.79	2.68	1000	1100
3	3½	88.9	0.216	5.49	7.70	11.47	3.50	1000	1100
3½	4	101.6	0.226	5.74	9.25	13.78	4.20	1200	1300
4	4½	114.3	0.237	6.02	11.00	16.38	4.99	1200	1300
5	5⅝	141.3	0.258	6.55	15.00	22.34	6.81	1200	1300
6	6⅝	168.3	0.280	7.11	19.45	28.97	8.83	1200	1300
8	8⅝	219.1	0.277	7.04	25.55	38.06	11.60	1160	1350
8	8⅝	219.1	0.322	8.18	29.35	43.72	13.32	1340	1570
10	10¾	273.0	0.279	7.09	32.75	48.78	14.87	930	1090
10	10¾	273.0	0.307	7.80	35.75	53.25	16.23	1030	1200
10	10¾	273.0	0.365	9.27	41.85	62.34	19.00	1220	1430
12	12¾	323.8	0.330	8.38	45.45	67.70	20.63	930	1090
12	12¾	323.8	0.375	9.52	51.15	76.19	23.22	1060	1240
14	14	355.6	0.375	9.52	57.00	84.90	25.88	960	1120

API 5L Plain - End Line Pipe

STD : Standard
XS : Extra Strong
XXA : Double Extra Strong

※Special Sizes

Nominal Size	Outside Diameter		Wall Thickness			Weight			Test Pressure psi			
									Grade A		Grade B	
in.	in.	mm	in.	mm	Sch No.	lbs/ft	kg/m	kg/ft	Std	Alt	Std	Alt
1/8	0.405	10.3	0.068	1.73	40 (STD)	0.24	0.36	0.11	700	—	700	—
			0.095	2.41	80 (XS)	0.31	0.46	0.14	850	—	850	—
1/4	0.540	13.7	0.088	2.24	40 (STD)	0.42	0.62	0.19	700	—	700	—
			0.119	3.02	80 (XS)	0.54	0.80	0.25	850	—	850	—
3/8	0.675	17.1	0.091	2.31	40 (STD)	0.57	0.85	0.26	700	—	700	—
			0.126	3.20	80 (XS)	0.74	1.10	0.34	850	—	850	—
1/2	0.840	21.3	0.109	2.77	40(STD)	0.85	1.27	0.39	700	—	700	—
			0.147	3.73	80 (XS)	1.09	1.62	0.49	850	—	850	—
			0.294	7.47	(XXS)	1.71	2.55	0.78	1000	—	1000	—
3/4	1.050	26.7	0.113	2.87	40 (STD)	1.13	1.68	0.51	700	—	700	—
			0.154	3.91	80 (XS)	1.47	2.19	0.67	850	—	850	—
			0.308	7.82	(XXS)	2.44	3.63	1.11	1000	—	1000	—
1	1.315	33.4	0.133	3.38	40 (STD)	1.68	2.50	0.76	700	—	700	—
			0.179	4.55	80 (XS)	2.17	3.23	0.99	850	—	850	—
			0.358	9.09	(XXS)	3.66	5.45	1.66	1000	—	1000	—
1 1/4	1.660	42.2	0.140	3.56	40 (STD)	2.27	3.38	1.03	1200	—	1300	—
			0.191	4.85	80 (XS)	3.00	4.46	1.36	1800	—	1900	—
			0.382	9.70	(XXS)	5.21	7.76	2.37	2200	—	2300	—
1 1/2	1.900	48.3	0.145	3.68	40 (STD)	2.72	4.05	1.23	1200	—	1300	—
			0.200	5.08	80 (XS)	3.63	5.40	1.65	1800	—	1900	—
			0.400	10.16	(XXS)	6.41	9.55	2.91	2200	—	2300	—
2	2 3/8	60.3	0.154	3.91	40(STD)	3.65	5.44	1.66	2300	—	2500	—
			0.218	5.54	80 (XS)	5.02	7.47	2.28	2500	—	2500	—
			0.436	11.07	(XXS)	9.03	13.45	4.10	2500	—	2500	—
2 1/2	2 7/8	73.0	0.203	5.16	40 (STD)	5.79	8.62	2.63	2500	—	2500	—
			0.276	7.01	80 (XS)	7.66	11.40	3.48	2500	—	2500	—
			0.552	14.02	(XXS)	13.70	20.41	6.22	2500	—	2500	—

(Continued)

Nominal Size	Outside Diameter		Wall Thickness			Weight			Test Pressure psi			
									Grade A		Grade B	
in.	in.	mm	in.	mm	Sch No.	lbs/ft	kg/m	kg/ft	Std	Alt	Std	Alt
			※ 0.125	3.18		4.51	6.72	2.05	1290	—	1500	—
			※ 0.156	3.96		5.57	8.30	2.53	1600	—	1870	—
			0.188	4.78		6.65	9.91	3.02	1930	—	2260	—
			0.216	5.49	40(STD)	7.58	11.29	3.44	2220	—	2500	—
3	3½	88.9	0.250	6.35		8.68	12.93	3.94	2500	—	2500	—
			0.281	7.14		9.66	14.39	4.39	2500	—	2500	—
			0.300	7.62	80(XS)	10.25	15.27	4.65	2500	—	2500	—
			0.600	15.24	(XXS)	18.58	27.67	8.44	2500	—	2500	—
			※ 0.125	3.18		5.17	7.70	2.35	1120	—	1310	—
			※ 0.156	3.96		6.40	9.53	2.91	1400	—	1640	—
			※ 0.188	4.78		7.65	11.39	3.47	1690	—	1970	—
3½	4	101.6	※ 0.226	5.74	40(STD)	9.11	13.57	4.14	2030	—	2370	—
			※ 0.250	6.35		10.01	14.91	4.54	2250	—	2620	—
			※ 0.281	7.14		11.16	16.62	5.07	2530	—	2800	—
			0.318	8.08	80(XS)	12.50	18.62	5.68	2800	—	2800	—
			※ 0.125	3.18		5.84	8.70	2.65	1000	—	1170	—
			※ 0.141	3.58		6.56	9.77	2.98	1130	—	1320	—
			※ 0.156	3.96		7.24	10.78	3.29	1250	—	1460	—
			0.172	4.37		7.95	11.84	3.61	1380	—	1610	—
			0.188	4.78		8.66	12.90	3.93	1500	—	1750	—
			0.203	5.16		9.32	13.88	4.23	1620	—	1890	—
			0.219	5.56		10.01	14.91	4.54	1750	—	2040	—
4	4½	114.3	0.237	6.02	40(STD)	10.79	16.07	4.90	1900	—	2210	—
			0.250	6.35		11.35	16.91	5.15	2000	—	2330	—
			0.281	7.14	60	12.66	18.86	5.75	2250	—	2620	—
			0.312	7.92		13.96	20.79	6.34	2500	—	2800	—
			0.337	8.56	80(XS)	14.98	22.31	6.80	2700	—	2800	—
			0.438	11.13	120	19.00	28.30	8.63	2800	—	2800	—
			0.531	13.49	160	22.51	33.53	10.22	2800	—	2800	—
			0.674	17.12	(XXS)	27.54	41.02	12.50	2800	—	2800	—

API 5L Plain - End Line Pipe (Continued)

Nominal Size	Outside Diameter		Wall Thickness			Weight			Test Pressure psi			
									Grade A		Grade B	
in.	in.	mm	in.	mm	Sch No.	lbs/ft	kg/m	kg/ft	Std	Alt	Std	Alt
			※ 0.125	3.18		7.26	10.81	3.29	810	—	940	—
			※ 0.156	3.96		9.01	13.42	4.09	1010	—	1180	—
			※ 0.188	4.78		10.79	16.07	4.90	1220	—	1420	—
			※ 0.219	5.56		12.50	18.62	5.68	1420	—	1650	—
			※ 0.258	6.55	40(STD)	14.62	21.78	6.64	1670	—	1950	—
			※ 0.281	7.14		15.85	23.61	7.20	1820	—	2120	—
5	5 9/16	141.3	※ 0.312	7.92		17.50	26.07	7.95	2020	—	2360	—
			※ 0.344	8.74		19.17	28.55	8.70	2230	—	2600	—
			0.375	9.52	80(XS)	20.78	30.95	9.43	2430	—	2800	—
			※ 0.500	12.70	120	27.04	40.28	12.28	2800	—	2800	—
			※ 0.625	15.88	160	32.96	49.09	14.96	2800	—	2800	—
			0.750	19.05	(XXS)	38.55	57.42	17.50	2800	—	2800	—
			※ 0.141	3.58		9.76	14.54	4.43	770	960	890	1120
			※ 0.156	3.96		10.78	16.06	4.89	850	1060	990	1240
			0.172	4.37		11.85	17.65	5.38	930	1170	1090	1360
			0.188	4.78		12.92	19.24	5.87	1020	1280	1190	1490
			0.203	5.16		13.92	20.73	6.32	1100	1380	1290	1610
			0.219	5.56		14.98	22.31	6.80	1190	1490	1390	1740
			0.250	6.35	30	17.02	25.35	7.73	1360	1700	1580	1980
			0.280	7.11	40(STD)	18.97	28.26	8.61	1520	1900	1780	2220
6	6 5/8	168.3	0.312	7.92		21.04	31.34	9.55	1700	2120	1980	2470
			0.344	8.74		23.08	34.38	10.48	1870	2340	2180	2730
			0.375	9.52		25.03	37.28	11.36	2040	2550	2380	2800
			0.432	10.97	80(XS)	28.57	42.56	12.97	2350	2800	2740	2800
			0.500	12.70		32.71	48.72	14.85	2720	2800	2800	2800
			0.562	14.27	120	36.39	54.20	16.52	2800	2800	2800	2800
			0.625	15.88		40.05	59.65	18.18	2800	2800	2800	2800
			0.719	18.26	160	45.35	67.55	20.59	2800	2800	2800	2800
			0.864	21.95	(XXS)	53.16	79.18	24.13	2800	2800	2800	2800

(Continue)

Norminal Size	Outside Diameter		Wall Thickness			Weight			Test Pressure psi			
									Grade A		Grade B	
in	in	mm	in	mm	Sch No.	lbs/ft	kg/m	kg/ft	Std	Alt	Std	Alt
			0.156	3.96		14.11	21.02	6.41	650	810	760	950
			0.188	4.78		16.94	25.23	7.69	780	980	920	1140
			0.219	5.56		19.66	29.28	8.93	910	1140	1070	1330
			0.250	6.35	20	22.36	33.31	10.15	1040	1300	1220	1520
			0.277	7.04	30	24.70	36.79	11.21	1160	1450	1350	1690
			0.312	7.92		27.70	41.26	12.56	1300	1630	1520	1990
			0.322	8.18	40 (STD)	28.55	42.53	12.96	1340	1680	1570	1960
8	8 5/8	219.1	0.344	8.74		30.42	45.31	13.81	1440	1790	1680	2090
			0.375	9.52		33.04	49.21	15.00	1570	1960	1830	2280
			0.438	11.13		38.30	57.05	17.39	1830	2290	2130	2670
			0.500	12.70	80 (XS)	43.39	64.63	19.70	2090	2610	2430	2800
			0.562	14.27		48.40	72.09	21.97	2350	2800	2740	2800
			0.625	15.88		53.40	79.54	24.24	2610	2800	2800	2800
			0.719	18.26	120	80.71	90.43	27.56	2800	2800	2800	2800
			0.875	22.22	(XXS)	72.42	107.87	32.88	2800	2800	2800	2800
			0.188	4.78		21.21	31.59	9.63	630	790	730	920
			0.219	5.56		24.63	36.69	11.18	730	920	860	1070
			0.250	6.35	20	28.04	41.77	12.73	840	1050	980	1220
			0.279	7.09		31.20	46.47	14.16	930	1170	1090	1360
			0.307	7.80	30	34.24	51.00	15.54	1030	1290	1200	1500
			0.344	8.74		38.23	56.94	17.36	1150	1440	1340	1680
10	10 3/4	273.0	0.365	9.27	40 (STD)	40.48	60.29	18.38	1220	1530	1430	1780
			0.438	11.13		48.24	71.85	21.90	1470	1830	1710	2140
			0.500	12.70	60 (XS)	54.74	81.54	24.85	1670	2090	1950	2440
			0.562	14.27		61.15	91.08	27.76	1880	2350	2200	2740
			0.625	15.88		67.58	100.66	30.68	2090	2620	2440	2800
			0.719	18.26	100	77.03	114.74	34.97	2410	2800	2800	2800
			0.812	20.62		86.18	128.37	39.13	2720	2800	2800	2800

Norminal Size	Outside Diameter		Wall Thickness			Weight			Test Pressure psi			
									Grade A		Grade B	
in	in	mm	in	mm	Sch No.	lbs/ft	kg/m	kg/ft	Std	Alt	Std	Alt
			*0.188	4.78	20	25.22	37.57	11.45	530	660	620	770
			*0.219	5.56	30	29.31	43.66	13.31	620	770	720	900
			0.250	6.35	(STD)	33.38	49.72	15.51	710	880	820	1030
			0.281	7.14	(XS)	37.42	55.74	16.99	790	990	930	1160
			0.312	7.92	60	41.45	61.74	18.82	880	1100	1030	1280
			0.330	8.38	80	43.77	85.20	19.87	930	1160	1090	1360
			0.344	8.74	10	45.58	67.89	20.69	970	1210	1130	1420
12	12 3/4	323.8	0.375	9.52	20	49.56	73.82	22.50	1060	1320	1240	1540
			0.438	11.13	30 (STD)	57.59	85.78	26.15	1240	1550	1440	1800
			0.500	12.70	(XS)	65.42	97.44	29.70	1410	1760	1650	2060
			0.562	14.27	80	73.15	108.96	33.21	1590	1980	1850	2310
			0.625	15.88		80.93	120.55	36.74	1760	2210	2060	2570
			0.688	17.48		88.63	132.01	40.24	1940	2430	2270	2800
			0.750	19.05		96.12	143.17	43.64	2120	2650	2470	2800
			*0.203	5.16		29.91	44.55	13.58	520	650	610	760
			*0.250	6.35		36.71	54.68	16.67	640	800	750	940
			*0.281	7.14		41.17	61.32	18.69	720	900	840	1050
			0.312	7.92		45.61	67.94	20.71	800	1000	940	1170
			0.344	8.74		50.17	74.73	22.78	880	1110	1030	1290
			0.375	9.52		54.57	81.28	24.77	960	1210	1120	1410
14	14	355.6	0.438	11.13		63.44	94.49	28.80	1130	1410	1310	1640
			0.500	12.70		72.09	107.38	32.73	1290	1610	1500	1880
			0.562	14.27		80.66	120.14	36.82	1450	1810	1690	2110
			0.625	15.88		89.28	132.98	40.53	1610	2010	1880	2340
			0.688	17.48		97.81	145.69	44.41	1770	2210	2060	2580
			0.750	19.05		106.13	158.08	48.18	1930	2410	2250	2800
			0.812	20.62		114.37	170.35	51.92	2090	2610	2440	2800

API 5LX Hight - Test Line Pipe

API 5LX Hight - Test Line Pipe

※:These sizes are special light weight sizes.
All other sizes are regular weight.
( ):Alternative test pressure

Outside Diameter		Wall Thickness		Weight			Standard Test Pressure psi					
							Grade	Grade	Grade	Grade	Grade	Grade
in.	mm	in.	mm	lbs/ft	kg/m	kg/ft	X42	X46	X52	X56	X60	X65
		※ 0.125	3.18	5.84	8.70	2.65	1400 (1750)	1530 (1920)	1730 (2170)	1870 (2330)	2000 (2500)	2170 (2710)
		※ 0.141	3.58	6.56	9.77	2.98	1580 (1970)	1730 (2160)	1960 (2440)	2110 (2630)	2260 (2820)	2440 (3000)
		※ 0.156	3.96	7.24	10.78	3.29	1750 (2180)	1910 (2390)	2160 (2700)	2330 (2910)	2500 (3000)	2700 (3000)
		0.172	4.37	7.95	11.84	3.61	1930 (2410)	2110 (2640)	2390 (2980)	2570 (3000)	2750 (3000)	2980 (3000)
		0.188	4.78	8.66	12.90	3.93	2110 (2630)	2310 (2880)	2610 (3000)	2810 (3000)	3000 (3000)	3000 (3000)
		0.203	5.16	9.32	13.88	4.23	2270 (2840)	2490 (3000)	2810 (3000)	3000 (3000)	3000 (3000)	3000 (3000)
		0.219	5.56	10.01	14.91	4.54	2450 (3000)	2690 (3000)	3000 (3000)	3000 (3000)	3000 (3000)	3000 (3000)
4½	114.3	0.237	6.02	10.79	16.07	4.90	2650 (3000)	2910 (3000)	3000 (3000)	3000 (3000)	3000 (3000)	3000 (3000)
		0.250	6.35	11.35	16.91	5.15	2800 (3000)	3000 (3000)	3000 (3000)	3000 (3000)	3000 (3000)	3000 (3000)
		0.281	7.14	12.66	18.86	5.75	3000 (3000)	3000 (3000)	3000 (3000)	3000 (3000)	3000 (3000)	3000 (3000)
		0.312	7.92	13.96	20.79	6.34	3000 (3000)	3000 (3000)	3000 (3000)	3000 (3000)	3000 (3000)	3000 (3000)
		0.337	8.56	14.98	22.31	6.80	3000 (3000)	3000 (3000)	3000 (3000)	3000 (3000)	3000 (3000)	3000 (3000)
		0.438	11.13	19.00	28.30	8.63	3000 (3000)	3000 (3000)	3000 (3000)	3000 (3000)	3000 (3000)	3000 (3000)
		0.531	13.49	22.51	33.53	10.22	3000 (3000)	3000 (3000)	3000 (3000)	3000 (3000)	3000 (3000)	3000 (3000)
		0.674	17.12	27.54	41.02	12.50	3000 (3000)	3000 (3000)	3000 (3000)	3000 (3000)	3000 (3000)	3000 (3000)
		※ 0.156	3.96	10.78	16.06	4.89	1480	1620	1840	1980	2120	2300
		0.172	4.37	11.85	17.65	5.38	1640	1790	2030	2180	2340	2530
		0.188	4.78	12.92	19.24	5.87	1790	1960	2210	2380	2550	2770
		0.203	5.16	13.92	20.73	6.32	1930	2110	2390	2570	2760	2990
		0.219	5.56	14.98	22.31	6.80	2080	2280	2580	2780	2980	3000
		0.250	6.35	17.02	25.35	7.73	2380	2600	2940	3000	3000	3000
		0.280	7.11	18.97	28.26	8.61	2660	2920	3000	3000	3000	3000
6⅝	168.3	0.312	7.92	21.04	31.34	9.55	2970	3000	3000	3000	3000	3000
		0.344	8.74	23.08	34.38	10.48	3000	3000	3000	3000	3000	3000
		0.375	9.52	25.03	37.28	11.36	3000	3000	3000	3000	3000	3000
		0.432	10.97	28.57	42.56	12.97	3000	3000	3000	3000	3000	3000
		0.500	12.70	32.71	48.72	14.85	3000	3000	3000	3000	3000	3000
		0.562	14.27	36.39	54.20	16.52	3000	3000	3000	3000	3000	3000
		0.625	15.88	40.05	59.65	18.18	3000	3000	3000	3000	3000	3000
		0.719	18.26	45.35	67.55	20.59	3000	3000	3000	3000	3000	3000

API 5LX Hight - Test Line Pipe (Continued)

Outside Diameter		Wall Thickness		Weight			Standard Test Pressure psi					
							Grade	Grade	Grade	Grade	Grade	Grade
in.	mm	in.	mm	lbs/ft	kg/m	kg/ft	X42	X46	X52	X56	X60	X65
		※ 0.156	3.96	14.11	21.02	6.41	1140	1250	1410	1520	1630	1760
		0.188	4.78	16.94	25.23	7.69	1370	1500	1700	1830	1960	2130
		0.203	5.16	18.26	27.20	8.29	1480	1620	1840	2000	2120	2290
		0.219	5.56	19.66	29.28	8.93	1600	1750	1980	2130	2290	2480
		0.250	6.35	22.36	33.31	10.15	1830	2000	2260	2430	2610	2830
		0.277	7.04	24.70	36.79	11.21	2020	2220	2510	2700	2890	3000
		0.312	7.92	27.70	41.26	12.58	2280	2500	2820	3000	3000	3000
8⅝	219.1	0.322	8.18	28.55	42.53	12.96	2350	2580	2910	3000	3000	3000
		0.344	8.74	30.42	45.31	13.81	2510	2750	3000	3000	3000	3000
		0.375	9.52	33.04	49.21	15.00	2740	3000	3000	3000	3000	3000
		0.438	11.13	38.30	57.05	17.39	3000	3000	3000	3000	3000	3000
		0.500	12.70	43.39	64.63	19.70	3000	3000	3000	3000	3000	3000
		0.562	14.27	48.40	72.09	21.97	3000	3000	3000	3000	3000	3000
		0.625	15.88	53.40	79.54	24.24	3000	3000	3000	3000	3000	3000
		0.719	18.26	60.71	90.43	27.56	3000	3000	3000	3000	3000	3000
		※ 0.188	4.78	21.21	31.59	9.63	1250	1370	1550	1660	1780	1930
		※ 0.203	5.16	22.87	34.06	10.38	1350	1480	1670	1800	1930	2090
		0.219	5.56	24.63	36.69	11.18	1450	1590	1800	1940	2080	2250
		0.250	6.35	28.04	41.77	12.73	1660	1820	2060	2210	2370	2570
		0.279	7.09	31.20	46.47	14.16	1850	2030	2290	2470	2650	2870
		0.307	7.80	34.24	51.00	15.54	2040	2230	2520	2720	2910	3000
10¾	273.0	0.344	8.74	38.23	56.94	17.36	2280	2500	2830	3000	3000	3000
		0.365	9.27	40.48	60.29	18.38	2420	2660	3000	3000	3000	3000
		0.438	11.13	48.24	71.85	21.90	2910	3000	3000	3000	3000	3000
		0.500	12.70	54.74	81.54	24.85	3000	3000	3000	3000	3000	3000
		0.562	14.27	61.15	91.08	27.76	3000	3000	3000	3000	3000	3000
		0.625	15.88	67.58	100.66	30.68	3000	3000	3000	3000	3000	3000
		0.719	18.26	77.03	114.74	34.97	3000	3000	3000	3000	3000	3000

(Continued)

Outide Diameter		Wall Thickness		Weight			Standard Test Pressure psi					
							Grade	Grade	Grade	Grade	Grade	Grade
in.	mm	in.	mm	lbs/ft	kg/m	kg/ft	X42	X46	X52	X56	X60	X65
		※ 0.188	4.78	25.22	37.57	11.45	1050	1150	1300	1400	1500	1630
		※ 0.203	5.16	27.20	40.51	12.35	1140	1250	1410	1520	1620	1760
		※ 0.219	5.56	29.31	43.66	13.31	1230	1340	1520	1640	1750	1900
		0.250	6.35	33.38	49.72	15.15	1400	1530	1730	1870	2000	2170
		0.281	7.14	37.42	55.74	16.99	1570	1720	1950	2100	2250	2440
		0.312	7.92	41.45	61.74	18.82	1750	1910	2160	2330	2500	2700
		0.330	8.38	43.77	65.20	19.87	1850	2020	2290	2460	2640	2860
		0.344	8.74	45.58	67.89	20.69	1930	2110	2390	2570	2750	2980
12¾	323.8	0.375	9.52	49.56	73.82	22.50	2100	2300	2600	2800	3000	3000
		0.406	10.31	53.52	79.72	24.30	2270	2490	2810	3000	3000	3000
		0.438	11.13	57.59	85.78	26.15	2450	2690	3000	3000	3000	3000
		0.500	12.70	65.42	97.44	29.70	2800	3000	3000	3000	3000	3000
		0.562	14.27	73.15	108.96	33.21	3000	3000	3000	3000	3000	3000
		0.625	15.88	80.93	120.55	36.74	3000	3000	3000	3000	3000	3000
		0.688	17.48	88.63	132.01	40.24	3000	3000	3000	3000	3000	3000
		0.750	19.05	96.12	143.17	43.64	3000	3000	3000	3000	3000	3000
		※ 0.219	5.56	32.23	48.01	14.63	1120	1220	1380	1490	1600	1730
		※ 0.250	6.35	36.71	54.68	16.67	1280	1400	1580	1700	1820	1970
		※ 0.281	7.14	41.17	61.32	18.69	1430	1570	1770	1910	2050	2220
		0.312	7.92	45.61	67.94	20.71	1590	1740	1970	2120	2270	2460
		0.344	8.74	50.17	74.73	22.78	1750	1920	2170	2340	2510	2720
		0.375	9.52	54.57	81.28	24.77	1910	2090	2370	2550	2730	2960
14	355.6	0.406	10.31	58.94	87.79	26.76	2070	2270	2560	2760	2960	3000
		0.438	11.13	63.44	94.49	28.80	2230	2450	2770	2980	3000	3000
		0.469	11.91	67.78	100.96	30.77	2390	2620	2960	3000	3000	3000
		0.500	12.70	72.09	107.38	32.73	2550	2790	3000	3000	3000	3000
		0.562	14.27	80.66	120.14	36.62	2870	3000	3000	3000	3000	3000
		0.625	15.88	89.28	132.98	40.53	3000	3000	3000	3000	3000	3000
		0.688	17.48	97.81	145.69	44.41	3000	3000	3000	3000	3000	3000
		0.750	19.05	106.13	158.08	48.18	3000	3000	3000	3000	3000	3000

PIPE ASTM A - 120 SCHEDULE 40

Size,	outside Diametar		Wall Thickness		Calculated weight of black tube				Test Pressure	
					Plain Ends		Threads and Couplings			
in	in	mm	in	mm	lb/ft	kg/m	lb/ft	kg/m	psi	kg/cm^2
1/2	0.840	21.34	0.109	2.77	0.85	1.3	0.85	1.3	700	49.2
3/4	1.050	26.67	0.113	2.87	1.13	1.7	1.13	1.7	700	49.2
1	1.315	33.40	0.113	3.38	1.68	2.5	1.68	2.5	700	49.2
1 1/4	1.660	42.16	0.140	3.56	2.27	3.4	2.28	3.4	1000	70.3
1 1/2	1.900	48.26	0.145	3.68	2.72	4.0	2.73	4.1	1000	70.3
2	2.375	60.32	0.154	3.91	3.65	5.4	3.68	5.5	1000	70.3
2 1/2	2.875	73.02	0.203	5.16	5.79	8.6	5.82	8.7	1000	70.3
3	3.500	88.90	0.216	5.49	7.58	11.3	7.62	11.4	1000	70.3
3 1/2	4.000	101.60	0.226	5.74	9.11	13.6	9.20	13.7	1200	84.3
4	4.500	114.30	0.237	6.02	10.79	16.1	10.89	16.2	1200	84.4
5	5.563	141.30	0.258	6.55	14.26	21.8	14.81	22.1	1200	84.4
6	6.625	168.32	0.280	7.11	18.97	28.3	19.18	28.6	1200	84.4
8	8.625	219.1	0.277	7.04	24.70	36.8	25.55	38.1	1200	84.4
8	8.625	219.1	0.322	8.18	28.55	42.5	29.35	43.7	1300	91.4

Diamensions, weight, wall thickness, and test pressura given in this Table are identical with those of API–5L Standard Weight Threaded Line Pipe Grade A. Since the steel used for making these ASTM pipes has chemical composition and tensile properties which can meet the API–5L Grade A Line Pipe requirements, these pipes can be used as substitute for API–5L Grade A Threaded Line Pipes.

PIPE ASTM A 53- 61T Standard

Black and Galvanized

Nominal Pipe	Outside Diameter		Wall Thickness		Weight						Number of Threads
					Plain End			Threads and Compling			
in	in	mm	in	mm	lbs/ft	kg/ft	kg/m	lbs/ft	kg/ft	kg/m	
*1/8	0.405	10.29	0.068	1.73	0.24	0.154	0.357	0.24	0.154	0.357	27
*1/4	0.540	10.72	0.088	2.24	0.42	0.191	0.625	0.42	0.191	0.625	18
3/8	0.675	17.15	0.091	2.31	0.57	0.259	0.348	0.57	0.259	0.848	18
1/2	0.840	21.34	0.109	2.77	0.85	0.386	1.26	0.85	0.386	1.26	14
3/4	1.050	26.67	0.113	2.87	1.13	0.513	1.68	1.13	0.513	1.68	14
1	1.315	33.40	0.133	3.38	1.68	0.762	2.50	1.68	0.762	2.50	11 1/2
1 1/4	1.660	42.16	0.140	3.56	2.27	1.03	3.38	2.28	1.03	3.39	11 1/2
1 1/2	1.900	48.26	0.145	3.68	2.72	1.23	4.05	2.73	1.24	4.06	11 1/2
2	2.375	60.33	0.154	3.91	3.65	1.66	5.43	3.68	1.67	5.48	11 1/2
2 1/2	2.875	73.03	0.203	5.16	5.79	2.63	8.62	5.82	2.64	8.66	8
3	3.500	88.90	0.216	5.49	7.58	3.44	11.3	7.62	3.46	11.3	8
3 1/2	4.000	101.60	0.226	5.74	9.11	4.13	13.6	9.20	4.17	13.7	8
4	4.500	114.30	0.237	6.02	10.79	4.89	16.1	10.89	4.94	16.2	8
5	5.563	141.30	0.258	6.55	14.62	6.63	21.8	14.81	6.72	22.0	8
6	6.625	168.28	0.280	7.11	18.97	8.60	28.2	19.81	8.70	28.5	8
8	8.625	219.10	0.277	7.04	24.70	11.2	36.8	25.55	11.6	38.0	8
8	8.625	219.10	0.322	8.18	28.55	13.0	42.5	29.35	13.3	43.7	8
10	10.750	273.05	0.279	7.09	31.20	14.2	46.4	32.75	14.9	48.7	8
10	10.750	273.05	0.365	9.27	40.48	18.4	60.2	41.85	19.0	62.3	8
12	12.750	323.85	0.330	9.38	43.77	19.9	65.1	45.45	20.6	67.6	8
12	12.750	323.85	0.375	9.53	49.56	22.5	73.8	51.15	23.2	76.1	8
14	14.000	355.60	0.375	9.53	54.57	24.8	81.3	57.00	25.9	84.9	8

PIPE ASTM A53 - 61T Extra Strong

Black and Galvanized

Nominal Pipe	Outside Diameter		Wall Thickness		Weight Plain End		
in	in	mm	in	mm	lbs/ft	kg/ft	kg/m
* 1/8	0.405	10.29	0.095	2.41	0.31	0.141	0.461
* 1/4	0.540	13.72	0.119	3.02	0.54	0.245	0.840
3/8	0.675	17.15	0.126	3.20	0.74	0.336	1.10
1/2	0.840	21.34	0.147	3.73	1.09	0.494	1.62
3/4	1.050	26.67	0.154	3.91	1.47	0.667	2.19
1	1.315	33.40	0.179	4.55	2.17	2.986	3.23
1 1/4	1.660	42.16	0.191	4.85	3.00	1.36	4.46
1 1/2	1.900	48.26	0.200	5.08	3.63	1.65	5.40
2	2.375	60.33	0.218	5.54	5.02	2.28	7.47
2 1/2	2.875	73.03	0.276	7.01	7.66	3.14	11.4
3	3.500	88.90	0.300	7.62	10.25	4.65	15.3
3 1/2	4.000	101.60	0.318	8.08	12.51	5.67	18.6
4	4.500	114.30	0.337	8.56	14.98	6.79	22.3
5	5.563	141.30	0.375	9.53	20.78	9.43	31.9
6	6.625	168.28	0.432	10.97	28.57	13.0	42.5
8	8.625	219.28	0.500	12.70	43.39	19.7	64.6
10	10.750	323.85	0.500	12.70	65.42	29.7	97.4
14	14.000	355.60	0.500	12.70	72.09	62.7	107.4

PIPE ASTM A53 - 61T Double Extra Strong

Black and Galvanized

Nominal Pipe	Outside Diameter		Wall Thickness		Weight Plain End		
in	in	mm	in	mm	lbs/ft	kg/ft	kg/m
1/2	0.840	21.34	0.294	7.47	1.71	0.776	2.54
3/4	1.050	26.67	0.308	7.82	2.44	1.11	3.63
1	1.315	33.40	0.358	9.09	3.66	1.66	5.45
1 1/4	1.660	42.16	0.382	9.70	5.21	2.36	7.75
1 1/2	1.900	48.26	0.400	10.16	6.41	2.91	9.54
2	2.375	60.32	0.436	11.07	9.03	4.10	13.4
2 1/2	2.875	73.03	0.552	14.02	13.70	6.21	20.4
3	3.500	88.90	0.600	15.24	18.58	8.43	27.7
4	4.500	114.30	0.674	17.12	27.54	12.5	41.0
5	5.563	141.30	0.750	19.05	38.55	17.5	57.4
6	6.625	168.28	0.864	21.95	53.16	24.1	79.2
8	8.625	219.08	0.875	22.23	72.42	32.8	108.0
10	10.750	273.05	1.000	25.40	104.13	47.2	155.0
12	12.750	323.85	1.000	25.40	125.49	56.8	187.0

BRITISH STANDARD PIPE
BS 1387 : 1967 LIGHT

Nominal bore		Outside diameter				Thickness		Calculated weight of black tube			
								Plain and		Screwed and socketed	
		max.	min.	max.	min.						
in	mm	in	in	mm	mm	in	mm	lb/ft	kg/m	lb/ft	kg/m
1/4	8	0.532	0.518	13.6	13.2	0.072	1.8	0.347	0.517	0.350	0.521
3/8	10	0.671	0.656	17.1	16.7	0.072	1.8	0.453	0.674	0.457	0.680
1/2	15	0.841	0.825	21.4	21.0	0.080	2.0	0.640	0.952	0.646	0.961
3/4	20	1.059	1.041	26.9	26.4	0.092	2.35	0.944	1.41	0.954	1.42
1	25	1.328	1.309	33.8	33.2	0.104	2.65	1.35	2.01	1.36	2.03
1 1/4	32	1.670	1.650	42.5	41.9	0.104	2.65	1.73	2.58	1.75	2.61
1 1/2	40	1.903	1.882	48.4	47.8	0.116	2.9	2.19	3.25	2.22	3.29
2	60	2.370	2.347	60.2	59.6	0.116	2.9	2.76	4.11	2.81	4.18
2 1/2	65	2.991	2.960	76.0	75.2	0.128	3.25	3.90	5.80	3.98	5.92
3	80	3.491	3.460	88.7	87.9	0.128	3.25	4.58	6.81	4.69	6.98
3 1/2	90	3.981	3.950	101.1	103.3	0.144	3.65	5.88	8.750	6.00	8.929
4	100	4.481	4.450	113.9	113.0	0.144	3.65	6.64	9.89	6.84	10.2

BRITISH STANDARD PIPE
BS 1387 : 1967 MEDIUM

Nominal bore		Outside diameter				Thickness		Calculated weight of black tube			
								Plain end		Screwed and socketed	
		max.	min.	max.	min.						
in	mm	in	in	mm	mm	in	mm	lb/ft	kg/m	lb/ft	kg/m
3/8	10	0.685	0.660	17.4	16.8	0.092	2.35	0.573	0.852	0.577	0.858
1/2	15	0.856	0.831	21.7	21.1	0.104	2.65	0.822	1.22	0.828	1.23
3/4	20	1.072	1.047	27.2	26.6	0.104	2.65	1.06	1.58	1.07	1.59
1	25	1.346	1.316	34.2	33.4	0.128	3.25	1.64	2.44	1.65	2.46
1 1/4	32	1.687	1.657	42.9	42.1	0.128	3.25	2.11	3.14	2.13	3.17
1 1/2	40	1.919	1.889	48.8	48.0	0.128	3.25	2.43	3.61	2.46	3.65
2	50	2.394	2.354	60.8	59.8	0.144	3.65	3.42	5.10	3.47	5.17
2 1/2	65	3.014	2.969	76.6	75.4	0.144	3.65	4.38	6.51	4.46	6.63
3	80	3.524	3.469	89.5	88.1	0.160	4.05	5.69	8.47	5.80	8.64
3 1/2	90	4.019	3.959	102.1	100.6	0.160	4.05	6.53	9.718	6.65	9.896
4	100	4.524	4.459	114.9	113.3	0.176	4.5	8.14	12.1	8.34	12.4
5	125	5.534	5.459	140.6	138.7	0.192	4.85	10.9	10.2	11.2	16.7
6	150	6.539	6.459	166.1	164.1	0.192	4.85	12.9	19.2	13.3	19.8

BRITISH STANDARD PIPE
BS 1387 : 1967 HEAVY

Nominal bore		Outside diameter				Thickness		Calculated weight of black tube			
		max.	min.	max.	min.			Plain and		Screwed and socketed	
in	mm	in	in	mm	mm	in	mm	lb/ft	kg/m	lb/ft	kg/m
1/2	15	0.856	0.813	21.7	21.1	0.128	3.25	0.977	1.45	0.983	1.46
3/4	20	1.072	1.047	27.2	26.6	0.128	3.25	1.27	1.90	1.28	1.91
1	25	1.346	1.316	34.2	33.4	0.160	4.05	2.00	2.97	2.01	2.99
1 1/4	32	1.687	1.657	42.9	42.1	0.160	4.05	2.58	3.84	2.60	3.87
1 1/2	40	1.919	1.889	48.8	48.0	0.160	4.05	2.98	4.43	3.01	4.47
2	50	2.394	2.354	60.8	59.8	0.176	4.5	4.14	6.17	4.19	6.24
2 1/2	65	3.014	2.969	76.6	75.4	0.176	4.5	5.31	7.90	5.39	8.02
3	80	3.524	3.469	89.5	88.6	0.192	4.85	6.76	10.1	6.87	10.3
3 1/2	90	4.019	3.959	102.1	100.6	0.192	4.85	7.76	11.548	7.88	11.727
4	100	4.524	4.459	114.9	113.3	0.212	5.4	9.71	14.4	9.91	14.7
5	125	5.534	5.459	140.6	138.7	0.212	5.4	12.0	17.8	12.3	18.3
6	150	6.539	6.459	166.1	164.1	0.212	5.4	14.3	21.2	14.7	21.8

Note: 1) 3-1/2" nominal size was listed in BS 1387 : 1957 but has been deleted from BS 1387 : 1967. This size is available only by special order.

2) 5" and 6" nominal sizes are also available in Class B, BS 1387 : 1947. The wall thickness of Class B 5" and 6"

3) Test pressure is 700 ppsi or 49.2 kg/cm² for all sizes and same for light, Medium and Heavy

SEAMLESS PIPE BS 1387 - 1957 "MEDIUM" BLACK AND GALVANIZED

Nominal Pipe Size	Approx. Outside Diameter		Wall Thickness			Weight of Black Tube						Number of Threads per inch
						Plain End			Threading and Coupling			
in	in	mm	SWG	in	mm	lbs/ft	kg/ft	kg/m	lbs/ft	kg/ft	kg/m	
1/8	0.406	10.319	14	0.080	2.032	0.273	0.124	0.406	0.275	0.125	0.409	28
1/4	0.531	13.494	13	0.092	2.337	0.437	0.198	0.650	0.440	0.200	0.655	19
3/8	0.688	17.462	13	0.092	2.337	0.573	0.260	0.853	0.578	0.262	0.859	19
1/2	0.844	21.431	12	0.104	2.642	0.820	0.373	1.22	0.827	0.376	1.23	14
3/4	1.063	26.987	12	0.104	2.642	1.06	0.481	1.58	1.07	0.485	1.59	14
1	1.344	34.131	10	0.128	3.251	1.64	0.744	2.44	1.65	0.748	2.46	11
1 1/4	1.688	42.862	10	0.128	3.251	2.11	0.957	3.14	2.13	0.966	3.17	11
1 1/2	1.906	48.419	10	0.128	3.251	2.43	1.10	3.62	2.46	1.12	3.66	11
2	2.375	60.325	9	0.144	3.658	3.42	1.55	5.09	3.47	1.57	5.16	11
2 1/2	3.000	76.200	9	0.144	3.658	4.38	1.99	6.52	4.46	2.02	6.64	11
3	3.500	88.900	8	0.160	4.064	5.69	2.70	8.47	5.80	2.63	8.63	11
3 1/2	4.000	101.600	8	0.160	4.064	6.54	2.96	9.72	6.66	3.02	9.90	11
4	4.500	114.300	7	0.176	4.470	8.13	3.69	12.1	8.34	3.78	12.4	11
5	5.500	139.700	6	0.192	4.877	10.9	4.94	16.2	11.2	5.08	16.7	11
6	6.500	165.100	6	0.192	4.877	12.9	6.85	19.2	19.2	6.03	19.8	11

SEAMLESS PIPE BS 1387 - 1957 "HEAVY" BLACK AND GALVANIZED

Nominal Pipe Size	Approx. Outside Diameter		Wall Thickness			Weight of Black Tube						Number of Threads per inch
						Plain End			Threading and Coupling			
in	in	mm	SWG	in	mm	lbs/ft	kg/ft	kg/m	lbs/ft	kg/ft	kg/m	
1/8	0.406	10.319	12	0.104	2.642	0.331	0.150	0.493	0.333	0.151	0.496	28
1/4	0.531	13.494	11	0.116	2.946	0.517	0.235	0.769	0.520	0.236	0.774	19
3/8	0.688	17.462	11	0.116	2.946	0.686	0.311	1.02	0.693	0.313	1.03	19
1/2	0.844	21.431	10	0.128	3.251	0.975	0.443	1.45	0.982	0.446	1.46	14
3/4	1.063	26.987	10	0.128	3.251	1.27	0.576	1.89	1.28	0.581	1.91	14
1	1.344	34.131	8	0.160	4.064	2.00	0.907	2.98	2.01	0.912	2.99	11
1 1/4	1.638	42.862	8	0.160	4.064	2.58	1.17	3.84	2.60	1.18	3.87	11
1 1/2	1.906	48.419	8	0.160	4.064	2.98	1.35	4.43	3.01	1.37	4.48	11
2	2.375	60.325	7	0.176	4.470	4.14	1.88	6.16	4.20	1.90	6.24	11
2 1/2	3.000	76.200	7	0.176	4.470	5.31	2.41	7.90	5.39	2.45	8.20	11
3	3.500	88.900	6	0.192	4.877	6.79	3.07	10.1	6.86	3.12	10.2	11
3 1/2	4.000	101.600	6	0.192	4.877	7.73	3.52	11.5	7.87	3.57	11.7	11
4	4.500	114.300	5	0.212	5.385	9.68	4.40	14.4	9.88	4.50	14.7	11
5	5.500	139.700	5	0.212	5.385	12.0	5.44	17.9	12.3	5.58	18.3	11
6	6.500	165.100	5	0.212	5.385	14.3	6.49	21.3	14.7	6.67	21.9	11

PROPERTIES OF PIPE

The following formulas wep used in the computation of the values shown in the table:

† Weight of Pipe per foot (pounds) = $10.6802\ (D-t)$
Weight of Water per foot (pounds) = $0.3405d^2$
Square feet Outside Surface per foot = $0.2618D$
Square feet Outside Surface per foot = $0.2618d$
Inside Area (square inches) = $0.785d^2$
Area of Metal (square inches) = $0.785\ (D^2 - d^2)$
Moment of Inertia (inches^4) = $0.0491\ (D^4 - d^4)$
= $A_M R_S^2$
Section Modulus (inches^3) = $\dfrac{0.0582\ (D^4 - d^4)}{D}$
Radius of Gyration (inches) = $0.25\ \sqrt{D^2 + d^2}$

† The ferritic stainless steels may about 5% less, and the sustentic stainless steels about 2% greater than the values shown in this table which are based on weights for carbon steel.

A_M = Area of Metal (square inches)
d = Inside Diameter (inches)
D = Outside Diameter (inches)
R_S = Radius of Gyration (inches)
t = Pipe Wall Thickness (inches)

*Note: a. U.S.A.S. B 36.10 Steel Pipe Schedule Numbers.
b. U.S.A.S. B 36.10 Steel Pipe Norminal Wall Thickness Designations.
c. U.S.A.S. B 36.19 Stainless Steel Pipe Schedule Numbers.
Schedule 5S and 10S wall thickness do not permit threading in accordance with U.S.A.S. B2.1.

Nominal Pipe Size Outside Diameter	Schedule Number*			Wall Thickness	Inside Diameter,	Inside Area	Metal Area	Sq Ft Outside Surface	Sq Ft Inside Surface	Weight per ft,	Weight of Water per ft,	Moment of Inertia,	Section Modulus,	Radius Gyration
in	a	b	c	in	in	sq in	sq in	per ft	per ft	lb	lb	in^4	in^4	in
	-	-	10S	0.049	0.307	0.0740	0.0548	0.106	0.0804	0.186	0.0321	0.00088	0.00437	0.1271
1/8	40	Std	40S	0.068	0.269	0.0568	0.0720	0.106	0.0705	0.245	0.0246	0.00106	0.00525	0.1215
0.405	80	XS	80S	0.095	0.215	0.0364	0.0925	0.106	0.0563	0.315	0.0157	0.00122	0.00600	0.1164
	-	-	10S	0.065	0.410	0.1320	0.0970	0.141	0.1073	0.330	0.0572	0.00279	1.01032	0.1694
1/4	40	Std	40S	0.088	0.364	0.1041	0.1250	0.141	0.0955	0.425	0.0451	0.00331	0.01230	0.1628
0.540	80	XS	80S	0.119	0.302	0.0716	0.1574	0.141	0.0794	0.535	0.0310	0.00378	0.01395	0.1547
	-	-	10S	0.065	0.545	0.2333	0.1246	0.177	0.1427	0.423	0.1011	0.00586	0.01737	0.2169
3/8	40	Std	40S	0.091	0.493	0.1910	0.1670	0.177	0.1295	0.568	0.0827	0.00730	0.02160	0.2090
0.675	80	XS	80S	0.126	0.423	0.1405	0.2173	0.177	0.1106	0.739	0.0609	0.00862	0.02554	0.1991
	-	-	10S	0.083	0.674	0.357	0.1974	0.220	0.1765	0.671	0.1547	0.01431	0.0341	0.2692
	40	Std	40S	0.109	0.622	0.304	0.2503	0.220	0.1628	0.851	0.1316	0.01710	0.0407	0.2613
1/2	80	XS	80S	0.147	0.546	0.2340	0.320	0.220	0.1433	1.088	0.1013	0.02010	0.0478	0.2505
0.840	160	-	-	0.187	0.466	0.1706	0.383	0.220	0.1220	1.304	0.0740	0.02213	0.0527	0.2402
	-	XXS	-	0.294	0.252	0.0499	0.504	0.220	0.0660	1.714	0.0216	0.02425	0.0577	0.2192
	-	-	5S	0.065	0.920	0.665	0.2011	0.275	0.2409	0.684	0.2882	0.02451	0.0467	0.349
	-	-	10S	0.083	0.884	0.614	0.2521	0.275	0.2314	0.857	0.2661	0.02970	0.0566	0.343
3/4	40	Std	40S	0.113	0.824	0.533	0.333	0.275	0.2157	1.131	0.2301	0.0370	0.0706	0.334
1.050	80	XS	80S	0.154	0.742	0.432	0.435	0.275	0.1943	1.474	0.1875	0.0448	0.0853	0.321
	160	-	-	0.218	0.614	0.2961	0.570	0.275	0.1607	1.937	0.1284	0.0527	0.1004	0.304
	-	XXS	-	0.308	0.434	0.1479	0.718	0.275	0.1137	2.441	0.0641	0.0579	0.1104	0.2840
	-	-	5S	0.065	1.185	1.103	0.2553	0.344	0.310	0.868	0.478	0.0500	0.0760	0.443
	-	-	10S	0.109	1.097	0.945	0.413	0.344	0.2872	1.404	0.409	0.0757	0.1151	0.428
1	40	Std	40S	0.133	1.049	0.864	0.494	0.344	0.2746	1.679	0.374	0.0874	0.1329	0.421
1.315	80	XS	80S	0.179	0.957	0.719	0.639	0.344	0.2520	2.172	0.311	0.1056	0.1606	0.407
	160	-	-	0.250	0.815	0.522	0.836	0.344	0.2134	2.844	0.2261	0.1252	0.1903	0.387
	-	XXS	-	0.358	0.599	0.2818	1.076	0.344	0.1570	3.659	0.1221	0.1405	0.2137	0.361
	-	-	5S	0.065	1.530	1.839	0.326	0.434	0.401	1.107	0.797	0.1038	0.1250	0.564
	-	-	10S	0.109	1.442	1.633	0.531	0.434	0.378	1.805	0.707	0.1605	0.1934	0.550
1 1/4	40	Std	40S	0.140	1.380	1.496	0.669	0.434	0.361	2.273	0.648	0.1948	0.2346	0.540
1.660	80	XS	80S	0.191	1.278	1.283	0.881	0.434	0.335	2.997	0.555	0.2418	0.2913	0.524
	160	-	-	0.250	1.160	1.057	1.107	0.434	0.304	3.765	0.458	0.2839	0.342	0.506
	-	XXS	-	0.382	0.896	0.631	1.534	0.434	0.2346	5.214	0.2732	0.341	0.411	0.472
1 1/2	-	-	5S	0.065	1.770	2.461	0.375	0.497	0.463	1.274	1.067	0.1580	0.1663	0.649
1.900	-	-	10S	0.109	1.682	2.222	0.613	0.497	0.440	2.085	0.962	0.2469	0.2599	0.634

PRORERTIES OF PIPE (Continued)

Nominal Pipe Size Outside Diameter in	Schedule Number*			Wall Thickness	Inside Diameter,	Inside Area	Metal Area	Sq Ft Outside Surface	Sq Ft Inside Surface	Weight per ft,	Weight of Water per ft,	Moment of Inertia,	Section Modulus,	Radius Gyration
	a	b	c	in	in	sq in	sq in	per ft	per ft	lb	lb	in^4	in^4	in
1 1/2 1.900	40	Std	40S	0.145	1.610	2.036	0.799	0.497	0.421	2.718	0.882	0.310	0.326	0.623
	80	XS	80S	0.200	1.500	1.767	1.068	0.497	0.393	3.631	0.765	0.391	0.412	0.605
	160	-	-	0.281	1.338	1.406	1.429	0.497	0.350	4.859	0.068	0.483	0.508	0.581
	-	XXS	-	0.400	1.100	0.950	1.885	0.497	0.288	6.408	0.412	0.568	0.598	0.549
	-	-	5S	0.065	2.245	3.96	0.472	0.622	0.588	1.604	1.716	0.315	0.2652	0.817
	-	-	10S	0.109	2.157	3.65	0.776	0.662	0.565	2.638	1.582	0.499	0.420	0.802
2 2.375	40	Std	40S	0.154	2.067	3.36	1.075	0.622	0.541	3.653	1.455	0.666	0.561	0.787
	80	XS	80S	0.218	1.939	2.953	1.477	0.622	0.508	5.022	1.280	0.868	0.731	0.766
	160	-	-	0.343	1.689	2.240	2.190	0.622	0.442	7.444	0.971	1.163	0.979	0.729
	-	XXS	-	0.436	1.503	1.774	2.656	0.622	0.393	9.029	0.769	1.312	1.104	0.703
	-	-	5S	0.083	2.709	5.76	0.728	0.753	0.709	2.475	2.499	0.710	0.494	0.988
	-	-	10S	0.120	2.635	5.45	1.039	0.753	0.690	3.531	2.361	0.988	0.687	0.975
2 1/2 2.875	40	Std	40S	0.203	2.469	4.79	1.704	0.753	0.646	5.793	2.076	1.530	1.064	0.947
	80	XS	80S	0.276	2.323	4.24	2.254	0.753	0.608	7.661	1.837	1.925	1.339	0.924
	160	-	-	0.375	2.125	3.55	2.945	0.753	0.556	10.01	1.535	2.353	1.637	0.894
	-	XXS	-	0.552	1.771	2.464	4.03	0.753	0.464	13.70	1.067	2.872	1.998	0.844
	-	-	5S	0.083	3.334	8.73	0.891	0.916	0.873	3.03	3.78	1.301	0.744	1.208
	-	-	10S	0.120	3.260	8.35	1.274	0.916	0.853	4.33	3.61	1.822	1.041	1.196
3	40	Std	40S	0.216	3.068	7.39	2.228	0.916	0.803	7.58	3.20	3.02	1.724	1.164
3.500	80	XS	80S	0.300	2.900	6.61	3.02	0.916	0.759	10.25	2.864	3.90	2.226	1.136
	160	-	-	0.437	2.626	5.42	4.21	0.916	0.687	14.32	2.348	5.03	2.876	1.094
	-	XXS	-	0.600	2.300	4.15	5.47	0.916	0.602	18.58	1.801	5.99	3.43	1.047
	-	-	5S	0.083	3.834	11.55	1.021	1.047	1.004	3.47	5.01	1.960	0.980	1.385
3 1/2	-	-	10S	0.120	3.760	11.10	1.463	1.047	0.984	4.97	4.81	2.756	1.378	1.372
4.000	40	Std	40S	0.226	3.548	9.98	2.680	1.047	0.929	9.11	4.28	4.79	2.394	1.337
	80	XS	80S	0.318	3.364	8.89	3.68	1.047	0.881	12.51	3.85	6.28	3.14	1.307
	-	-	5S	0.083	4.334	14.75	1.152	1.178	1.135	3.92	6.40	2.811	1.249	1.562
	-	-	10S	0.120	4.260	14.25	1.651	1.178	1.115	5.61	6.17	3.96	1.762	1.549
4	40	Std	40S	0.237	4.026	12.73	3.17	1.178	1.054	10.79	5.51	7.23	3.21	1.510
	80	XS	80S	0.337	3.826	11.50	4.41	1.178	1.002	14.98	4.98	9.61	4.27	1.477
4.500	120	-	-	0.437	3.624	10.33	5.58	1.178	0.949	18.96	4.48	11.65	5.18	1.445
	160	-	-	0.531	3.438	9.28	6.62	1.178	0.900	22.51	4.02	13.27	5.90	1.416
	-	XXS	-	0.674	3.152	7.80	8.10	1.178	0.825	27.54	3.38	15.29	6.79	1.374
	-	-	5S	0.109	5.345	22.44	1.868	1.456	1.399	6.35	9.73	6.95	2.498	1.929
	-	-	10S	0.134	5.295	22.02	2.285	1.456	1.386	7.77	9.53	8.43	3.03	1.920
5	40	Std	40S	0.258	5.047	20.01	4.30	1.456	1.321	14.62	8.66	15.17	5.45	1.878
5.563	80	XS	80S	0.375	4.813	18.19	6.11	1.456	1.260	20.78	7.89	20.68	7.43	1.839
	120	-	-	0.500	4.563	16.35	7.95	1.456	1.195	27.04	7.09	25.74	9.25	1.799
	160	-	-	0.625	4.313	14.61	9.70	1.456	1.129	32.96	6.33	30.0	10.80	1.760
	-	XXS	-	0.750	4.063	12.97	11.34	1.456	1.064	38.55	5.62	33.6	12.10	1.722
	-	-	5S	0.109	6.407	32.2	2.231	1.734	1.677	7.58	13.98	11.85	3.58	2.304
	-	-	10S	0.134	6.357	31.7	2.733	1.734	1.664	2.29	13.74	14.40	4.35	2.295
6	40	Std	40S	0.280	6.065	28.89	5.58	1.734	1.588	18.97	12.51	28.14	8.50	2.245
6.625	80	XS	80S	0.432	5.761	26.07	8.40	1.734	1.508	28.57	11.29	40.5	12.23	2.195
	120	-	-	0.562	5.501	23.77	10.70	1.734	1.440	36.39	10.30	49.6	14.98	2.153
	160	-	-	0.718	5.189	21.15	13.33	1.734	1.358	45.30	9.16	59.0	17.81	2.104
	-	XXS	-	0.864	4.897	18.83	15.64	1.734	1.282	53.16	8.17	66.3	20.03	2.060
	-	-	5S	0.109	8.407	55.5	2.916	2.258	2.201	9.91	24.07	26.45	6.13	3.01
	-	-	10S	0.148	8.329	54.5	3.94	2.258	2.180	13.40	23.59	35.4	8.21	3.00
8	20	-	-	0.250	8.125	51.8	6.58	2.258	2.127	22.36	22.48	57.7	13.39	2.962
8.625	30	-	-	0.277	8.071	51.2	7.28	2.258	2.113	24.70	22.18	63.4	11.69	2.953
	40	Std	40S	0.322	7.981	50.0	8.40	2.258	2.089	28.55	21.69	72.5	16.81	2.938
	60	-	-	0.406	7.813	47.9	10.48	2.258	2.045	35.64	20.79	88.8	20.58	2.909
	80	XS	80S	0.500	7.625	45.7	12.76	2.258	1.996	43.39	19.80	105.7	24.52	2.878

PROPERTIES OF PIPE (Continued)

PROPERTIES OF PIPE (Continued)

Nominal Pipe Size Outside Diameter in	Schedule Number*			Wall Thickness	Inside Diameter,	Inside Area	Metal Area	Sq Ft Outside Surface	Sq Ft Inside Surface	Weight per ft,	Weight of Water per ft,	Moment of Inertia,	Section Modulus,	Radius Gyration
	a	b	c	in	in	sq in	sq in	per ft	per ft	lb	lb	in^4	in^4	in
	100	-	-	0.593	7.439	48.5	14.96	2.258	1.948	50.87	18.84	121.4	28.14	2.847
	120	-	-	0.719	7.187	40.6	17.84	2.258	1.882	60.63	17.60	140.6	32.6	2.807
8	140	-	-	0.812	7.001	38.5	19.93	2.258	1.833	67.76	16.69	153.8	35.7	2.777
8.62	-	XXS	-	0.875	6.875	37.1	21.30	2.258	1.800	72.42	16.09	162.0	37.6	2.757
	160	-	-	0.906	6.813	36.5	21.97	2.258	1.784	74.69	15.80	165.9	38.5	2.748
	-	-	5S	0.134	10.482	86.3	4.52	2.815	2.744	15.15	37.4	63.7	11.85	3.75
	-	-	10S	0.165	10.420	85.3	5.49	2.815	2.728	18.70	36.9	76.9	14.30	3.74
	20	-	-	0.250	10.250	82.5	8.26	2.815	2.683	28.04	35.8	113.7	21.16	3.71
	-	-	-	0.279	10.192	81.6	9.18	2.815	2.668	31.20	35.3	125.9	23.42	3.70
	30	-	-	0.307	10.136	80.7	10.07	2.815	2.654	34.24	35.0	137.5	25.57	3.69
10	40	Std	40S	0.365	10.020	78.9	11.91	2.815	2.623	40.48	34.1	160.8	29.90	3.67
10.750	60	XS	80S	0.500	9.750	74.7	16.10	2.815	2.553	54.74	32.3	212.0	39.4	3.63
	80	-	-	0.594	9.562	71.8	18.92	2.815	2.504	64.33	31.1	244.9	45.6	3.60
	100	-	-	0.719	9.312	68.1	22.63	2.815	2.438	76.93	29.5	286.2	53.2	3.56
	120	-	-	0.844	9.062	64.5	26.24	2.815	2.373	89.20	28.0	324	60.3	3.52
	140	-	-	1.000	8.750	60.1	30.6	2.815	2.291	104.13	26.1	368	68.4	3.47
	160	-	-	1.125	8.500	56.7	34.0	2.815	2.225	115.65	24.6	399	74.3	3.43
	-	-	5S	0.165	12.420	121.2	6.52	3.34	3.25	19.56	52.5	129.2	20.27	4.45
	-	-	10S	0.180	12.390	120.6	7.11	3.34	3.24	24.20	52.2	140.5	22.03	4.44
	20	-	-	0.250	12.250	117.9	9.84	3.34	3.21	33.38	51.1	191.9	30.1	4.42
	30	-	-	0.330	12.090	114.8	12.88	3.34	3.17	43.77	49.7	248.5	39.0	4.39
	-	Std	40S	0.375	12.000	113.1	14.58	3.34	3.14	49.56	49.0	279.3	43.8	4.38
12	40	-	-	0.406	11.938	111.9	15.74	3.34	3.13	53.53	48.5	300	47.1	4.37
12.750	-	XS	80S	0.500	11.750	108.4	19.24	3.34	3.08	65.42	47.0	362	56.7	4.33
	60	-	-	0.562	11.626	106.2	21.52	3.34	3.04	73.16	46.0	401	62.8	4.31
	80	-	-	0.687	11.376	101.6	26.04	3.34	2.978	88.51	44.0	475	74.5	4.27
	100	-	-	0.844	11.062	96.1	31.5	3.34	2.897	107.20	41.6	562	88.1	4.22
	120	-	-	1.000	10.750	90.8	36.9	3.34	2.814	125.49	39.3	642	100.7	4.17
	140	-	-	1.125	10.500	86.6	41.1	3.34	2.749	139.68	37.5	701	109.9	4.13
	160	-	-	1.312	10.126	80.5	47.1	3.34	2.651	160.27	34.9	781	122.6	4.07
	10	-	-	0.250	13.500	143.1	10.80	3.67	3.53	36.71	62.1	255.4	36.5	4.86
	20	-	-	0.312	13.376	140.5	13.42	3.67	3.50	45.68	60.9	314	44.9	4.84
	30	Std	-	0.375	13.250	137.9	16.05	3.67	3.47	54.57	59.7	373	53.3	4.82
	40	-	-	0.437	13.126	135.3	18.62	3.67	3.44	63.37	58.7	429	61.2	4.80
	-	XS	-	0.500	13.000	132.7	21.21	3.67	3.40	72.09	57.5	484	69.1	4.78
	-	-	-	0.562	12.876	130.2	23.73	3.67	3.37	80.66	56.5	537	76.7	4.76
	60	-	-	0.593	12.814	129.0	24.98	3.67	3.35	84.91	55.9	562	80.3	4.74
14	-	-	-	0.625	12.750	127.7	26.26	3.67	3.34	89.28	55.3	589	84.1	4.73
14.000	-	-	-	0.687	12.626	125.2	28.73	3.67	3.31	97.68	54.3	638	91.2	4.71
	80	-	-	0.750	12.500	122.7	31.2	3.67	3.27	106.13	53.2	687	98.2	4.69
	-	-	-	0.875	12.250	117.9	36.1	3.67	3.21	122.66	51.1	781	111.5	4.65
	100	-	-	0.938	12.124	115.5	38.5	3.67	3.17	130.73	50.0	825	117.8	4.63
	120	-	-	1.094	11.812	109.6	44.3	3.67	3.09	150.67	47.5	930	132.8	4.58
	140	-	-	1.250	11.500	103.9	50.1	3.67	3.01	170.22	45.0	1127	146.8	4.53
	160	-	-	1.406	11.188	98.3	55.6	3.67	2.929	189.12	42.6	1017	159.6	4.48
	10	-	-	0.250	15.500	188.7	12.37	4.19	4.06	42.05	81.8	384	48.0	5.57
	20	-	-	0.312	15.376	185.7	15.38	4.19	4.03	52.36	80.5	473	59.2	5.55
	30	Std	-	0.375	15.250	182.6	18.41	4.19	3.99	62.58	79.1	562	70.3	5.53
	-	-	-	0.437	15.126	179.7	21.37	4.19	3.96	72.64	77.9	648	80.9	5.50
	40	XS	-	0.500	15.000	176.7	24.35	4.19	3.93	82.77	76.5	732	91.5	5.48
16	-	-	-	0.562	14.876	173.8	27.26	4.19	3.89	92.66	75.4	813	106.6	5.46
16.000	-	-	-	0.625	14.750	170.9	30.2	4.19	3.86	102.63	74.1	894	112.2	7.44
	60	-		0.656	14.688	169.4	31.6	4.19	3.85	107.50	73.4	933	116.6	5.43
	-	-	-	0.687	14.626	168.0	33.0	4.19	3.83	113.36	72.7	971	121.4	5.42
	-	-	-	0.750	14.500	165.1	35.9	4.19	3.80	122.05	71.5	1047	130.9	5.40
	80	-	-	0.844	14.312	160.9	40.1	4.19	3.75	136.46	69.7	1157	144.6	5.37

PROPERTIES OF PIPE (Continued)

Nominal Pipe Size Outside Diameter	Schedule Number*			Wall Thickness	Inside Diameter,	Inside Area	Metal Area	Sq Ft Outside Surface	Sq Ft Inside Surface	Weight per ft,	Weight of Water per ft,	Moment of Inertia,	Section Modulus,	Radius Gyration
in	a	b	c	in	in	sq in	sq in	per ft	per ft	lb	lb	in^4	in^4	in
	-	-	-	0.875	14.250	159.5	41.8	4.19	3.73	141.35	69.1	1193	154.1	5.36
	100	-	-	1.031	13.938	152.6	48.5	4.19	3.65	165.83	66.1	1365	170.6	5.30
16	120	-	-	1.219	13.562	144.5	56.6	4.19	3.55	192.29	62.6	1556	194.5	5.24
16.000	140	-	-	1.437	13.124	135.3	65.7	4.19	3.44	223.50	58.6	1760	220.0	5.17
	160	-	-	1.594	12.812	129.0	72.1	4.19	3.35	245.11	55.9	1894	236.7	5.12
	10	-	-	0.250	17.500	240.5	13.94	4.71	4.58	47.39	104.3	549	61.0	6.28
	20	-	-	0.312	17.376	237.1	17.34	4.71	4.55	59.03	102.8	678	75.5	6.25
	-	Std	-	0.375	17.250	233.7	20.76	4.71	4.52	70.59	101.2	807	89.6	6.23
	30	-	-	0.437	17.126	230.4	24.11	4.71	4.48	82.06	99.9	931	103.4	6.21
	-	XS	-	0.500	17.000	227.0	27.49	4.71	4.45	93.45	98.4	1053	117.0	6.19
	40	-	-	0.562	16.876	223.7	30.8	4.71	4.42	104.75	97.0	1172	130.2	6.17
16	-	-	-	0.625	16.750	220.5	34.1	4.71	4.39	115.98	95.5	1289	143.3	6.15
18.000	-	-	-	0.687	16.626	217.1	37.4	4.71	4.35	127.03	94.1	1403	156.3	6.13
	60	-	-	0.750	16.500	213.8	40.6	4.71	4.32	138.17	92.7	1515	168.3	6.10
	-	-	-	0.875	16.250	207.4	47.1	4.71	4.25	160.04	89.9	1731	192.8	6.06
	80	-	-	0.938	16.124	204.2	50.2	4.71	4.22	170.75	88.5	1834	203.8	6.04
	100	-	-	1.156	15.688	193.3	61.2	4.71	4.11	207.96	83.7	2180	242.2	5.97
	120	-	-	1.375	15.250	182.6	71.8	4.71	3.99	244.14	79.2	2499	277.6	5.90
	140	-	-	1.562	14.876	173.8	80.7	4.71	3.89	274.23	75.3	2750	306	5.84
	160	-	-	1.781	14.438	163.7	90.7	4.71	3.78	308.51	71.0	3020	336	5.77
	10	-	-	0.250	19.500	298.6	15.51	5.24	5.11	52.73	129.5	757	75.7	6.98
	-	-	-	0.312	19.376	294.9	19.30	5.24	5.07	65.40	128.1	935	93.5	6.96
	20	Std	-	0.375	19.250	291.0	23.12	5.24	5.04	78.60	126.0	1114	111.4	6.94
	-	-	-	0.437	19.126	287.3	26.86	5.24	5.01	91.31	124.6	1286	128.6	6.92
	30	XS	-	0.500	19.000	283.5	30.6	5.24	4.97	104.13	122.8	1457	145.7	6.90
	-	-	-	0.562	18.876	279.8	34.3	5.24	4.94	116.67	121.3	1624	162.4	6.88
	40	-	-	0.593	18.814	278.0	36.2	5.24	4.93	122.91	120.4	1704	170.4	6.86
	-	-	-	0.625	18.750	276.1	38.0	5.24	4.91	129.33	119.7	1787	178.7	6.85
20	-	-	-	0.687	18.626	272.5	41.7	5.24	4.88	141.71	118.1	1946	194.6	6.83
20.000	-	-	-	0.750	18.500	268.8	45.4	5.24	4.84	154.20	116.5	2105	210.5	6.81
	60	-	-	0.812	18.376	265.2	48.9	5.24	4.81	166.40	115.0	2257	225.7	6.79
	-	-	-	0.875	18.250	261.6	52.6	5.24	4.78	178.73	113.4	2409	240.9	6.77
	80	-	-	1.031	17.938	252.7	61.4	5.24	4.70	208.87	109.4	2772	277.2	6.72
	100	-	-	1.281	17.438	238.8	75.3	5.24	4.57	256.10	103.4	3320	332	6.63
	120	-	-	1.500	17.000	227.0	87.2	5.24	4.45	296.37	98.3	3760	376	6.56
	140	-	-	1.750	16.500	213.8	100.3	5.24	4.32	341.10	92.6	4420	422	6.48
	160	-	-	1.969	16.062	202.7	111.5	5.24	4.21	379.01	87.9	4590	459	6.41
	10	-	-	0.250	23.500	434	18.65	6.28	6.15	63.41	188.0	1316	109.6	8.40
	-	-	-	0.312	23.376	430	23.20	6.28	6.12	78.93	186.1	1628	35.8	8.38
	20	Std	-	0.375	23.250	425	27.83	6.28	6.09	94.62	183.8	1943	161.9	8.35
	-	-	-	0.437	23.126	420	32.4	6.28	6.05	109.97	182.1	2246	187.4	8.33
	-	XS	-	0.500	23.000	415	36.9	6.28	6.02	125.49	180.1	2550	212.5	8.31
	30	-	-	0.562	22.876	411	41.4	6.28	5.99	140.80	178.1	2840	237.0	8.29
24	-	-	-	0.625	22.750	406	45.9	6.28	5.96	156.03	176.2	3140	261.4	8.27
24.000	40	-	-	0.687	22.626	402	50.3	6.28	5.92	171.17	174.3	3420	285.2	8.25
	-	-	-	0.750	22.500	398	54.8	6.28	5.89	186.24	172.4	3710	309	8.22
	60	-	-	0.969	22.062	382	70.0	6.28	5.78	238.11	165.8	4650	388	8.15
	80	-	-	1.219	21.562	365	87.2	6.28	5.65	296.38	158.3	5670	437	8.07
	100	-	-	1.531	20.938	344	108.1	6.28	5.48	367.40	149.3	6850	571	7.96
	120	-	-	1.812	20.376	326	126.3	6.28	5.33	429.39	141.4	7830	652	7.87
	140	-	-	2.062	19.876	310	142.1	6.28	5.20	483.13	134.5	8630	719	7.79
	160	-	-	2.344	19.312	293	159.4	6.28	5.06	541.94	127.0	9460	788	7.70
30	10	-	-	0.312	29.376	678	29.1	7.85	7.69	98.93	[illegible]	3210	214	10.50
30.000	20	-	-	0.500	29.000	661	46.3	7.85	7.59	157.53	286.3	5040	336	10.43
	30	-	-	0.625	28.750	649	57.6	7.85	7.53	196.08	281.5	6220	415	10.39

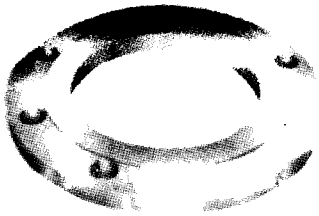
Steel Flanges USAS B 16 5

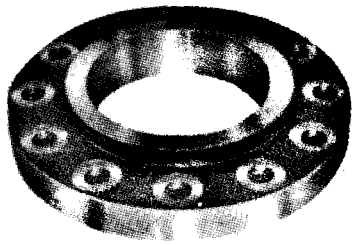
1) Material:

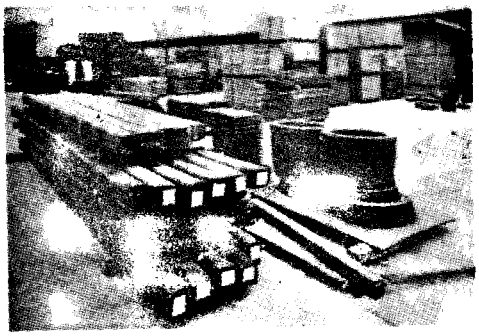
Unless other material is specified, **Futawa's** USAS flanges are forged from rolled steel billets conforming to Japanese Industrial Standard JIS G 4051 S25C, which covers both ASTM A 181 and A 105.

MECHANICAL & CHEMICAL REQUIREMENTS:

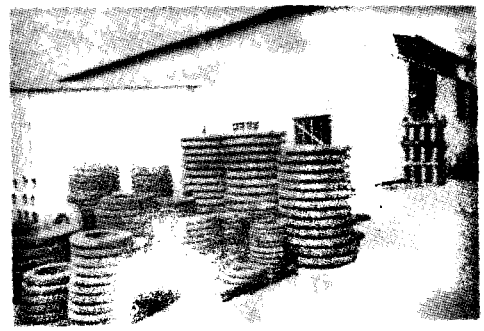
These steel shall conform to below prescribed mechanical properties and chemical compositions.







ROLLED STEEL BILLETS



ROUGH FORGED PRODUCTS

At primary service pressure ratings of 150 pounds and 300 pounds per square inch.

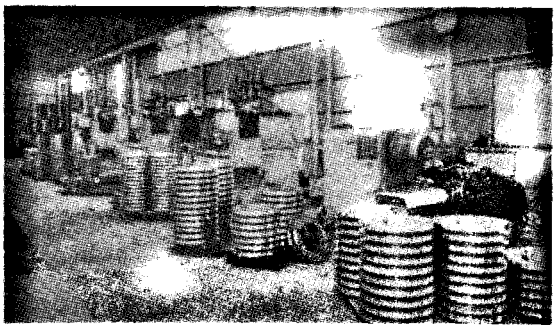
	Grade 1	Grade 2
Tensile strength, (Min)	60,000 psi	70,000 psi
Yield point, (Min)	30,000 psi	36,000 psi
Elongation in 2", (Min)	22%	18%
Reduction of area, (Min)	35%	24%
Phosphorus, (Max)	0.05%	0.05%
Sulphur, (Max)	0.05%	0.05%
Manganese, (Max)	0.90%	0.90%
Carbon, (Max)	0.35%	0.35%

B) ASTM A 105

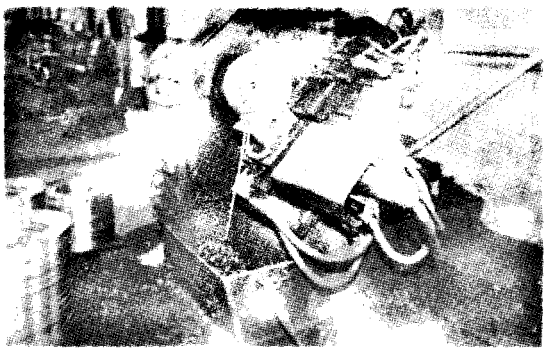
At primary service pressure ratings from 400 pounds to 2,500 pounds per square inch.

	Grade 1	Grade 2
Tensile strength, (Min)	60,000 psi	70,000 psi
Yield point, (Min)	30,000 psi	36,000 psi
Elongation in 2", (Min)	25%	22%
Reduction of area, (Min)	38%	30%
Phosphorus, (Max)	0.05%	0.05%
Sulphur, (Max)	0.05%	0.05%
Manganese, (Max)	0.90%	0.90%
Carbon, (Max)	0.35%	0.35%

2) Machining



LATHES



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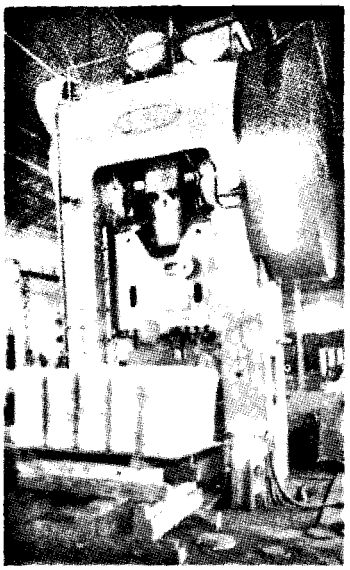
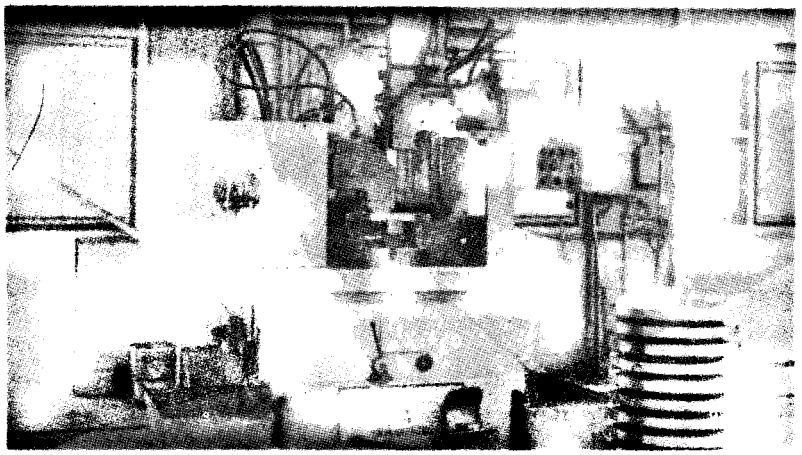
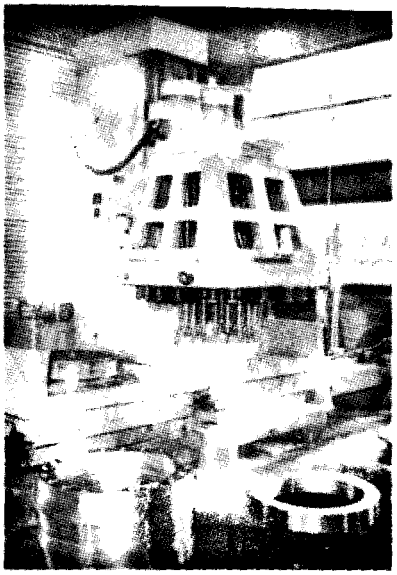


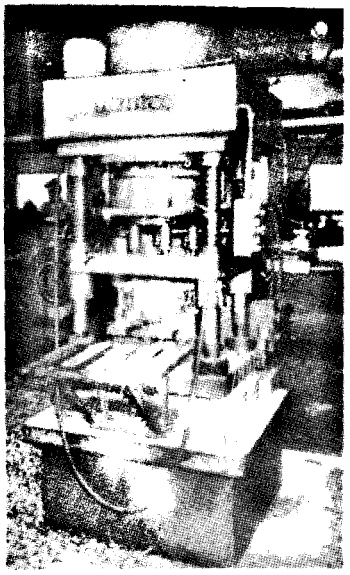
PUNCHING MACHINE



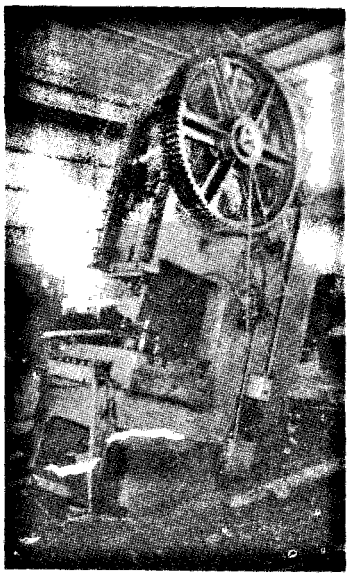
AUTOMATICE LATHE



RADIAL BRILLING MACHINE



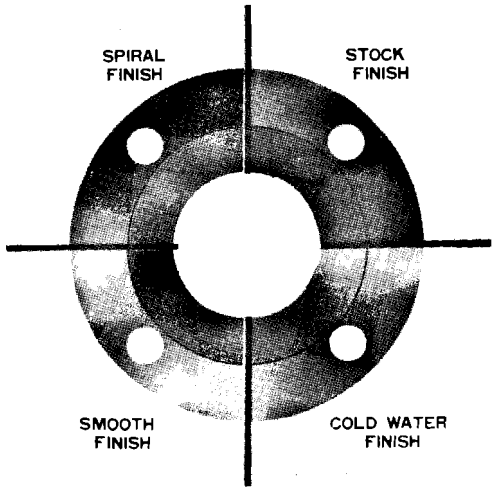
MULTIPLE DRILLING MACHINE



PUNCHING MACHINE

When furnished with raised face or flat face, **Futawa**'s USAS flanges may have any type of the gasket surface finishes. Unless otherwise specified by the purchaser, the SPIRAL SERRATED FINISH will be furnished.

SPIRAL SERRATED FINISH:
is a continuous spiral groove. The groove is 0.001" to 0.006" deep and is 20 to 50 per inch.



The following details should be noted:

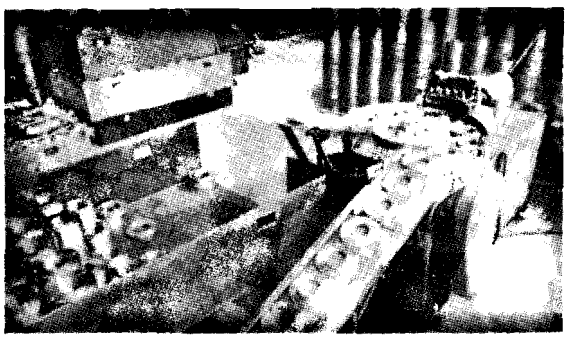
a) Gasket surface is always square with axis of pipe.
b) Bolt holes are multiple-drilled with extreme accuracy.
c) Spot facing or back facing is not done, if the back of flange is parallel to the flange face within 1 degree.
d) The fillet radius at base of hub is designed to provide enough clearance so that socket wrenches can be used.

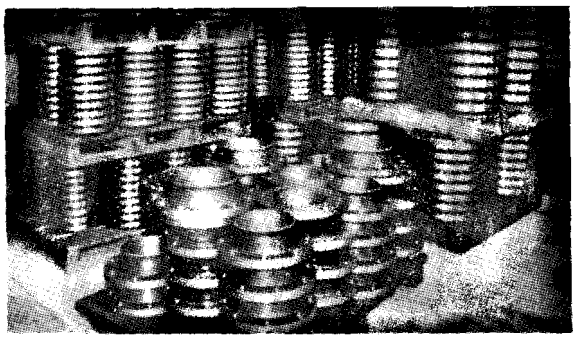
3) INSPECTION:

After machining, finished flanges are individually checked as to all details, and mill's inspection certificate shall submit you upon request. If necessary, independent inspector's inspection can be applied at purchaser's account.

4) Marking:

Each flange is either run through a marking machine or hand stamped along the outside diameter for complete and permanent identification. The stamping is done for the pressure rating, the nominal pipe size, the material specification and the trademark of FUTAWA.

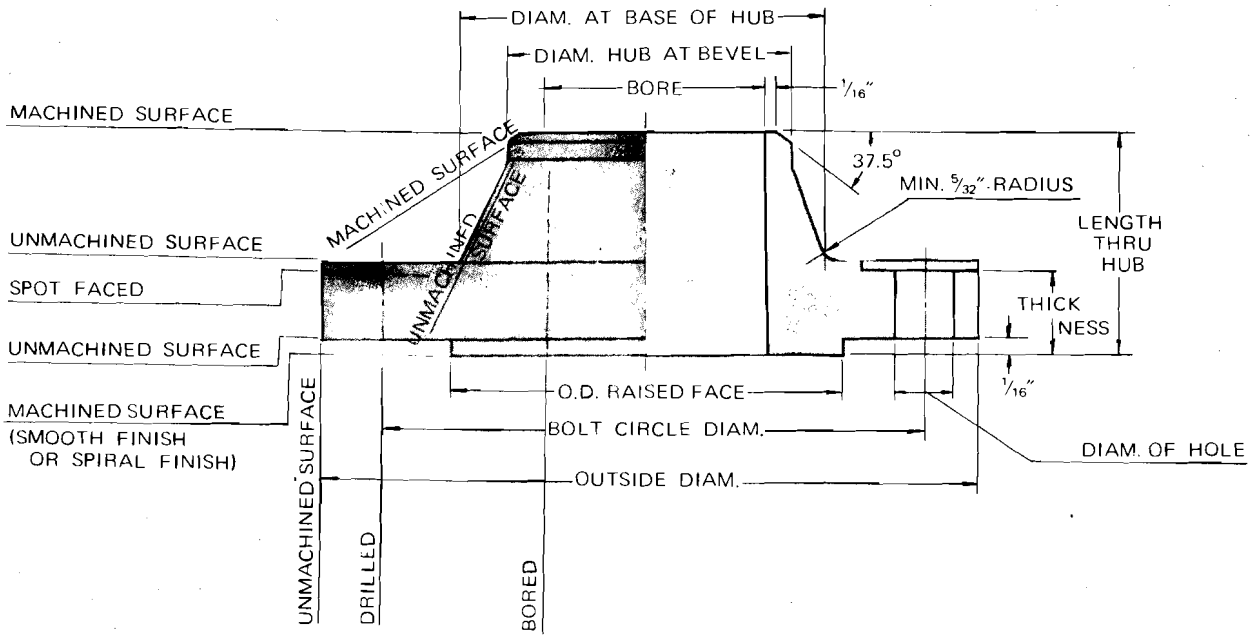




5) Cleaning and coating:

Finished flanges are washed thoroughly with thinner then dipped in synthetic enamel.

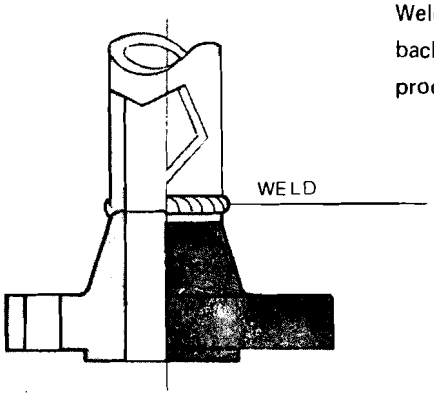
WELDING NECK FLANGES



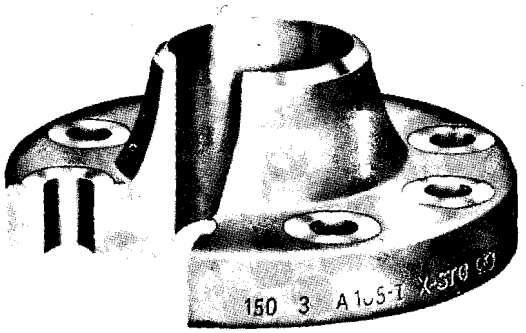
TOLEARNACES:

O.D. OF 1/16" RAISED FACE:		1/32"
FLANGE THICKNESS:	18" & SMALLER	1/8". 0"
	20" & LARGER	3/16". 0"
DIAM. OF HUB AT BEVEL:	5" & SMALLER	3/32". 1/32"
	6" & LARGER	5/32" 1/32"
BORE:	10" & SMALLER	1/32"
	12" to 18"	1/16"
	20" & LARGER	1/8". 1/16"
LENGTH THRU. HUB:	10" & SMALLER	1/16"
	12" & LARGER	1/8
BOLT CIRCLE DIAM.:		1/16"

METHODS OF ATTACHMENT

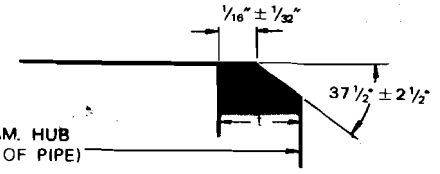


This type of flange is attached by butt-welding to the adjoining pipe or shell. Welding may be made either manually or automatically with or without a backing strip. Sound welds are readily obtained with any recognized welding procedure.

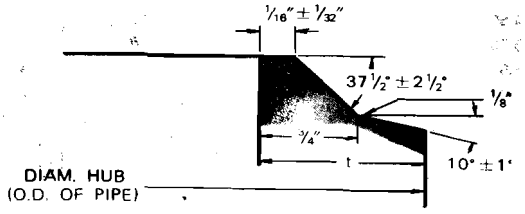


WELDING BEVEL STANDARDS

FOR WALL THICKNESS "t" 3/16" TO 3/4" INCL.



FOR WALL THICKNESS "t" GREATER THAN 3/4"



DIMENSIONS OF WELDED AND SEAMLESS PIPE
(Carben and Alloy Steel Pipe)

NOMINAL PIPE	O.D. OF PIPE	NOMINAL WALL THICKNESS "t"													NOMINAL PIPE SIZE
		SCH. 10	SCH. 20	SCH. 30	STD. WALL	SCH. 40	SCH. 60	EXTRA STRONG	SCH. 80	SCH. 100	SCH. 120	SCHED 140	SCHED 160	XX STRONG	
1/8	0.405				0.068	0.068		0.095	0.095						1/8
1/4	0.540				0.088	0.088		0.119	0.119						1/4
3/8	0.675				0.091	0.091		0.126	0.126						3/8
1/2	0.840				0.109	0.109		0.147	0.147				0.187	0.294	1/2
3/4	1.050				0.113	0.113		0.154	0.154				0.218	0.308	3/4
1	1.315				0.133	0.133		0.179	0.179				0.250	0.358	1
1 1/4	1.660				0.140	0.140		0.191	0.191				0.250	0.382	1 1/4
1 1/2	1,900				0.145	0.145		0.200	0.200				0.281	0.400	1 1/2
2	2.375				0.154	0.154		0.218	0.218				0.343	0.436	2
2 1/2	2,875				0.203	0.203		0.276	0.276				0.375	0.552	2 1/2
3	3.500				0.216	0.216		0.300	0.300				0.438	0.600	3
3 1/2	4.000				0.226	0.226		0.318	0.318					0.636	3 1/2
4	4.500				0.237	0.237		0.337	0.337		0.438		0.531	0.674	4
5	5.563				0.258	0.258		0.375	0.375		0.500		0.625	0.750	5
6	6.625				0.280	0.280		0.432	0.432		0.562		0.718	0.864	6
8	8.625		0.250	0.277	0.322	0.322	0.406	0.500	0.500	0.593	0.718	0.812	0.906	0.875	8
10	10.750		0.250	0.307	0.365	0.365	0.500	0.500	0.593	0.718	0.843	1.000	1.125	1.000	10
12	12.750		0.250	0.330	0.375	0.406	0.562	0.500	0.687	0.843	1.00	1.125	1.312	1.000	12
14	14.000	0.250	0.312	0.375	0.375	0.438	0.593	0.500	0.750	0.937	1.093	1.250	1.406		14
16	16.000	0.250	0.312	0.375	0.375	0.500	0.656	0.500	0.843	1.031	1.218	1.438	1.593		16
18	18.000	0.250	0.312	0.438	0.375	0.562	0.750	0.500	0.937	1.156	1.375	1.562	1.781		18
20	20.000	0.250	0.375	0.500	0.375	0.593	0.812	0.500	1.013	1.281	1.500	1.750	1.968		20
24	24.000	0.250	0.375	0.562	0.375	0.688	0.968	0.500	1.218	1.531	1.812	2.062	2.343		24
26	26.000	0.312	0.500		0.375			0.500							
28	28.000	0.312	0.500	0.625	0.375			0.500							
30	30.000	0.312	0.500	0.625	0.375			0.500							
32	32.000	0.312	0.500	0.625	0.375	0.688		0.500							
34	34.000	0.312	0.500	0.625	0.375	0.688		0.500							
36	36.000	0.312	0.500	0.625	0.375	0.750		0.500							

ABOVE DIMENSIONS ARE INCLUDED IN USAS B36.10

150 lbs. WELDING NECK FLANGES

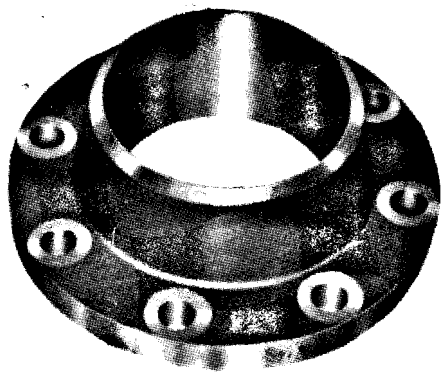
NOMINAL PIPE SIZE	OUTSIDE DIAM.	THICK-NESS (MIN.)	O.D. OF RAISED FACE	DIAM. AT BASE OF HUB	DIAM. HUB AT BEVEL	BORE	LENGTH THRU. HUB	BOLT CIRCLE DIAM.	NUMBER OF HOLES	DIAM. OF HOLE	UNIT WEIGHT (kg) (APPROX.)	PRICE (FOB)
1/2	3 1/2	7/16	1 3/8	1 3/16	0.84	0.62	1 7/8	2 3/8	4	5/8	0.5	
3/4	3 7/8	1/2	1 11/16	1 1/2	1.05	0.82	2 1/16	2 3/4	4	5/8	0.8	
1	4 1/4	9/16	2	1 15/16	1.32	1.05	2 3/16	3 1/8	4	5/8	1.1	
1 1/4	4 5/8	5/8	2 1/2	2 5/16	1.66	1;38	2 1/4	3 1/2	4	5/8	1.4	
1 1/2	5	11/16	2 7/8	2 9/16	1.90	1.61	2 7/16	3 7/8	4	5/8	1.9	
2	6	3/4	3 5/8	3 1/16	2.38	2.07	2 1/2	4 3/4	4	3/4	2.8	
2 1/2	7	7/8	4 1/8	3 9/16	2.88	2.47	2 3/4	5 1/2	4	3/4	4.3	
3	7 1/2	15/16	5	4 1/4	3.50	3.07	2 3/4	6	4	3/4	5.2	
3 1/2	8 1/2	15/16	5 1/2	4 13/16	4.00	3.55	2 13/16	7	8	3/4	6.6	
4	9	15/16	6 3/16	5 5/16	4.50	4.03	3	7 1/2	8	3/4	7.4	
5	10	15/16	7 5/16	6 7/16	5.56	5.05	3 1/2	8 1/2	8	7/8	9.6	
6	11	1	8 1/2	7 9/16	6.63	6.07	3 1/2	9 1/2	8	7/8	12.1	
8	13 1/2	1 1/8	10 5/8	9 11/16	8.63	7.98	4	11 3/4	8	7/8	20.1	
10	16	1 3/16	12 3/4	12	10.75	10.02	4	14 1/4	12	1	28.3	
12	19	1 1/4	15	14 3/8	12.75	12.00	4 1/2	17	12	1	43.0	
14	21	1 3/8	16 1/4	15 3/4	14.00	13.25	5	18 3/4	12	1 1/8	56.2	
16	23 1/2	1 7/16	18 1/2	18	16.00	15.25	5	21 1/4	16	1 1/8	73.2	
18	25	1 9/16	21	19 7/8	18.00	17.25	5 1/2	22 3/4	16	1 1/4	86.1	
20	27 1/2	1 11/16	23	22	20.00	19.25	5 11/16	25	20	1 1/4	109.7	
22	29 1/2	1 13/16	25 1/4	24 1/4	22.00	21.25	5 7/8	27 1/4	20	1 3/8	102.0	
24	32	1 7/8	27 1/4	26 1/8	24.00	23.25	6	29 1/2	20	1 3/8	157.5	
26	34 1/4	2	29 1/4	28 1/2	26.00	AS	5	31 3/4	24	1 3/8	136.0	
28	36 1/2	2 1/16	31 1/4	30 3/4	28.00	SPECI-	5 1/16	34	28	1 3/8	142.8	
30	38 3/4	2 1/8	33 3/4	32 3/4	30.00	FIED	5 1/8	36	28	1 3/8	163.2	
32	41 3/4	2 1/4	35 3/4	35	32.00	BY	5 1/4	38 1/2	28	1 5/8	197.3	
34	43 3/4	2 5/16	37 3/4	37	34.00	PUR-	5 5/16	40 1/2	32	1 5/8	210.9	
36	46	2 3/8	40 1/4	39 1/4	36.00	CHASER	5 3/8	42 3/4	32	1 5/8	235.8	
42	53	2 5/8	47	46	42.00		5 5/8	49 1/2	36	1 5/8	340.1	

NOTE: 1) 22" SIZE NOT COVERED BY USAS B16.5.

2) SIZES 26" AND LARGER IN FLANGE AND DRILLING DIMENSIONS SHALL CONFORM TO CLASS 125 CAST IRON FLANGES, USAS B16.1.

3) FLANGES WILL BE BORED TO THESE DIMENSIONS (TO MATCH STANDARD WALL PIPE) UNLESS OTHERWISE SPECIFIED.

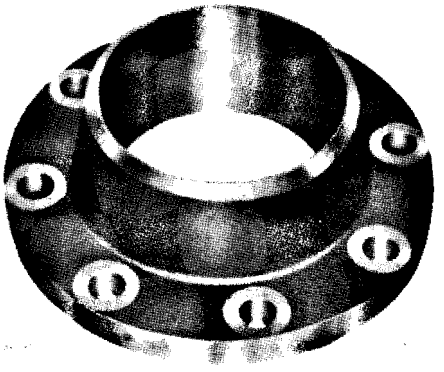
4) UNLESS OTHER MATERIAL IS SPECIFIED, FUTAWA'S FLANGES ARE FORGED FROM ROLLED STEEL BILLETS CONFORMING TO ASTM SPECIFICATION A-181.

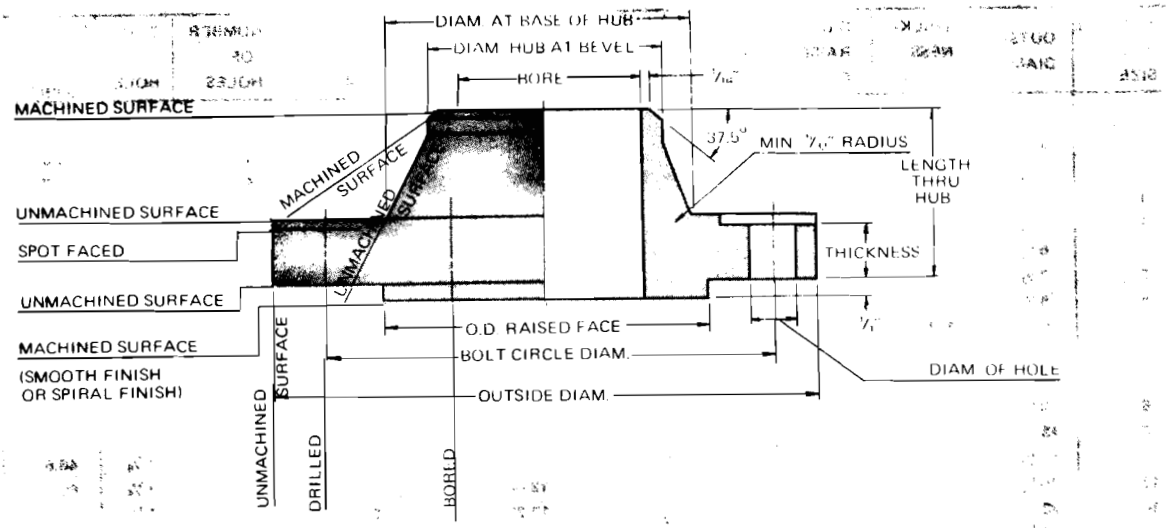


300 lbs. WELDING NECK FLANGES

NOMINAL PIPE SIZE	OUTSIDE DIAM.	THICK-NESS (MIN.)	O.D. OF RAISED FACE	DIAM. AT BASE OF HUB	DIAM. HUB AT BEVEL	BORE	LENGTH THRU. HUB	BOLT CIRCLE DIAM.	NUMBER OF HOLES	DIAM. OF HOLE	UNIT WEIGHT (kg) (APPROX)	PRICE (FOB)
1/2	3 3/4	9/16	1 3/8	1 1/2	0.84	0.62	2 1/16	2 5/8	4	5/8	0.8	
3/4	4 5/8	5/8	1 11/16	1 7/8	1.05	0.82	2 1/4	3 1/4	4	3/4	1.3	
1	4 7/8	11/16	2	2 1/8	1.32	1.05	2 7/16	3 1/2	4	3/4	1.7	
1 1/4	5 1/4	3/4	2 1/2	2 1/2	1.66	1.38	2 9/16	3 7/8	4	3/4	2.1	
1 1/2	6 1/8	13/16	2 7/8	2 3/4	1.90	1.61	2 11/16	4 1/2	4	7/8	3.0	
2	6 1/2	7/8	3 5/8	3 5/16	2.38	2.07	2 3/4	5	8	3/4	3.6	
2 1/2	7 1/2	1	4 1/8	3 15/16	2.88	2.47	3	5 7/8	8	7/8	5.3	
3	8 1/4	1 1/8	5	4 5/8	3.50	3.07	3 1/8	6 5/8	8	7/8	7.2	
3 1/2	9	1 3/16	5 1/2	5 1/4	4.00	3.55	3 3/16	7 1/4	8	7/8	9.2	
4	10	1 1/4	6 3/16	5 3/4	4.50	4.03	3 3/8	7 7/8	8	7/8	11.9	
5	11	1 3/8	7 5/16	7	5.56	5.05	3 7/8	9 1/4	8	7/8	16.0	
6	12 1/2	1 7/16	8 1/2	8 1/8	6.63	6.07	3 7/8	10 5/8	12	7/8	20.8	
8	15	1 5/8	10 5/8	10 1/4	8.63	7.98	4 3/8	13	12	1	32.2	
10	17 1/2	1 7/8	12 3/4	12 5/8	10.75	10.02	4 5/8	15 1/4	16	1 1/8	46.6	
12	20 1/2	2	15	14 3/4	12.75	12.00	5 1/8	17 3/4	16	1 1/4	69.0	
14	23	2 1/8	16 1/4	16 3/4	14.00	13.25	5 5/8	20 1/4	20	1 1/4	93.4	
16	25 1/2	2 1/4	18 1/2	19	16.00	15.25	5 3/4	22 1/2	20	1 3/8	119.6	
18	28	2 3/8	21	21	18.00	17.25	6 1/4	24 3/4	24	1 3/8	150.5	
20	30 1/2	2 1/2	23	23 1/8	20.00	19.25	6 3/8	27	24	1 3/8	184.4	
22	33	2 5/8	25 1/4	25 1/4	22.00	21.25	6 1/2	29 1/4	24	1 5/8	210.9	
24	36	2 3/4	27 1/4	27 5/8	24.00	23.25	6 5/8	32	24	1 5/8	274.7	
26	38 1/4	3 1/8	29 1/2	28 3/8	26 1/4	TO BE	7 1/4	34 1/2	28	1 3/4	303.9	
28	40 3/4	3 3/8	31 1/2	30 1/2	28 1/4	SPECI-	7 3/4	37	28	1 3/4	367.4	
30	43	3 5/8	33 3/4	32 9/16	30 1/4	FIED	8 1/4	39 1/4	28	1 7/8	421.8	
32	45 1/4	3 7/8	36	34 11/16	32 1/4	BY	8 3/4	41 1/2	28	2	467.7	
34	47 1/2	4	38	36 7/8	34 5/16	PUR-	9 1/8	43 1/2	28	2	544.0	
36	50	4 1/8	40 1/4	39	36 5/16	CHASER	9 1/2	46	32	2 1/8	589.5	

NOTE:
1) 22" SIZE NOT COVERED BY USAS B16.5.
2) SIZES 26" AND LARGER ARE COVERED BY MSS-SP44 CLASS 300.
3) FLANGES WILL BE BORED TO THESE DIMENSIONS (TO MATCH STANDARD WALL PIPE) UNLESS OTHERWISE SPECIFIED.
4) FLANGES 24" AND SMALLER ARE FORGED FROM STEEL BILLETS CONFORMING TO ASTM A181.
5) FLANGES 26" AND LARGER FORGED FROM STEEL BILLETS CONFORMING TO ASTM A105.





400 lbs. WELDING NECK FLANGES

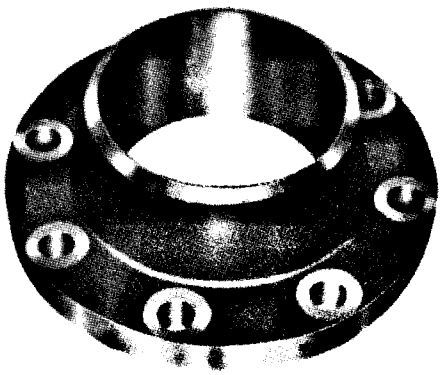
NOMINAL PIPE SIZE	OUTSIDE DIAM.	THREAD LENGTH (MIN.)	O.D. OF RAISED FACE	DIAM. AT BASE OF HUB	DIAM. HUB AT BEVEL	BORE	LENGTH THRU. HUB	BOLT CIRCLE DIAM.	NUMBER OF HOLES	DIAM. OF HOLE	UNIT WEIGHT (kg) (APPROX.)	PRICE (FOB)
1/2	3 3/4	9/16	1 3/8	1 1/2	0.84	TO BE SPECIFIED BY PURCHASER	2 1/16	2 5/8	4	5/8	0.9	
3/4	4 5/8	5/8	1 11/16	1 7/8	1.05		2 1/4	3 1/4	4	3/4	1.5	
1	4 7/8	11/16	2	2 1/8	1.32		2 7/16	3 1/2	4	3/4	1.8	
1 1/4	5 1/4	13/16	2 1/2	2 1/2	1.66		2 5/8	3 7/8	4	3/4	2.5	
1 1/2	6 1/8	7/8	2 7/8	2 3/4	1.90		2 3/4	4 1/2	4	7/8	3.5	
2	6 1/2	1	3 5/8	3 5/16	2.38		2 7/8	5	8	3/4	4.4	
2 1/2	7 1/2	1 1/8	4 1/8	3 15/16	2.88		3 1/8	5 7/8	8	7/8	6.3	
3	8 1/4	1 1/4	5	4 5/8	3.50		3 1/4	6 5/8	8	7/8	8.6	
3 1/2	9	1 3/8	5 1/2	5 1/4	4.00		3 3/8	7 1/4	8	1	10.7	
4	10	1 3/8	6 3/16	5 3/4	4.50		3 1/2	7 7/8	8	1	15.8	
5	11	1 1/2	7 5/16	7	5.56		4	9 1/4	8	1	19.5	
6	12 1/2	1 5/8	8 1/2	8 1/8	6.63		4 1/16	10 5/8	12	1	25.8	
8	15	1 7/8	10 5/8	10 1/4	8.63		4 5/8	13	12	1 1/8	40.3	
10	17 1/2	2 1/8	12 3/4	12 5/8	10.75		4 7/8	15 1/4	16	1 1/4	56.9	
12	20 1/2	2 1/4	15	14 3/4	12.75		5 3/8	17 3/4	16	1 3/8	79.3	
14	23	2 3/8	16 1/4	16 3/4	14.00		5 7/8	20 1/4	20	1 3/8	104.8	
16	25 1/2	2 1/2	18 1/2	19	16.00		6	22 1/2	20	1 1/2	133.8	
18	28	2 5/8	21	21	18.00		6 1/2	24 3/4	24	1 1/2	158.7	
20	30 1/2	2 3/4	23	23 1/8	20.00		6 5/8	27	24	1 5/8	192.7	
22	33	2 7/8	25 1/4	25 1/4	22.00		6 3/4	29 1/4	24	1 3/4	229.0	
24	36	3	27 1/4	27 5/8	24.00		6 7/8	32	24	1 7/8	281.2	
26	38 1/4	3 1/2	29 1/2	28 5/8	26 5/16		7 5/8	34 1/2	28	1 7/8	340.1	
28	40 3/4	3 3/4	31 1/2	30 13/16	28 5/16		8 1/8	37	28	2	399.1	
30	43	4	33 3/4	32 15/16	30 5/16		8 5/8	39 1/4	28	2 1/8	453.5	
32	45 1/4	4 1/4	36	35	32 3/8		9 1/8	41 1/2	28	2 1/8	521.6	
34	47 1/2	4 3/8	38	37 3/16	34 3/8		9 1/2	43 1/2	28	2 1/8	589.5	
36	50	4 1/2	40 1/4	39 3/8	36 7/16		9 7/8	46	32	2 1/8	670.0	

NOTE: 1) 22" SIZE NOT COVERED BY USAS B16.5
2) SIZES 26" AND LARGER ARE COVERED BY MSS-SP44 CLASS 400.
3) UNLESS OTHER MATERIAL IS SPECIFIED, FUTAWA'S FLANGES ARE FORGED FROM STEEL BILLETS COVERED BY ASTM A105.

600 lbs. WELDING NECK FLANGES

NOMINAL PIPE SIZE	OUTSIDE DIAM.	THICK-NESS (MIN.)	O.D. OF RAISED FACE	DIAM. AT BASE OF HUB	DIAM. HUB AT BEVEL	BORE	LENGTH THRU. HUB	BOLT CIRCLE DIAM.	NUMBER OF HOLES	DIAM. OF HOLE	UNIT WEIGHT (kg) (APPROX)	PRICE (FOB)
1/2 3/4 1 1 1/4 1 1/2 2 2 1/2 3 3 1/2	DIMENSIONS OF 1/2" THROUGH 3 1/2" ARE THE SAME WITH FOR 400 lbs. FLANGES.											
4	10 3/4	1 1/2	6 3/16	6	4.50	TO BE SPECIFIED BY PURCHASER	4	8 1/2	8	1	17.5	
5	13	1 3/4	7 5/16	7 7/16	5.56		4 1/2	10 1/2	8	1 1/8	29.3	
6	14	1 7/8	8 1/2	8 3/4	6.63		4 5/8	11 1/2	12	1 1/8	35.3	
8	16 1/2	2 3/16	10 5/8	10 3/4	8.63		5 1/4	13 3/4	12	1 1/4	53.6	
10	20	2 1/2	12 3/4	13 1/2	10.75		6	17	16	1 3/8	89.1	
12	22	2 5/8	15	15 3/4	12.75		6 1/8	19 1/4	20	1 3/8	110.2	
14	23 3/4	2 3/4	16 1/4	17	14.00		6 1/2	20 3/4	20	1 1/2	126.9	
16	27	3	18 1/2	19 1/2	16.00		7	23 3/4	20	1 5/8	181.7	
18	29 1/4	3 1/4	21	21 1/2	18.00		7 1/4	25 3/4	20	1 3/4	221.1	
20	32	3 1/2	23	24	20.00		7 1/2	28 1/2	24	1 3/4	278.2	
22	34 1/4	3 3/4	25 1/4	26 1/4	22.00		7 3/4	30 5/8	24	1 7/8	326.5	
24	37	4	27 1/4	28 1/4	24.00		8	33	24	2	399.4	
26	40	4 1/4	29 1/2	29 7/16	26 7/16		8 3/4	36	28	2	467.0	
28	42 1/4	4 3/8	31 1/2	31 5/8	28 1/2		9 1/4	38	28	2 1/8	535.0	
30	44 1/2	4 1/2	33 3/4	33 15/16	30 1/2		9 3/4	40 1/4	28	2 1/8	589.5	
32	47	4 5/8	36	36 1/8	32 1/2		10 1/4	42 1/2	28	2 3/8	680.3	
34	49	4 3/4	38	38 5/16	34 9/16		10 5/8	44 1/2	28	2 3/8	762.9	
36	51 3/4	4 7/8	40 1/4	40 5/8	36 9/16		11 1/8	47	28	2 5/8	793.7	

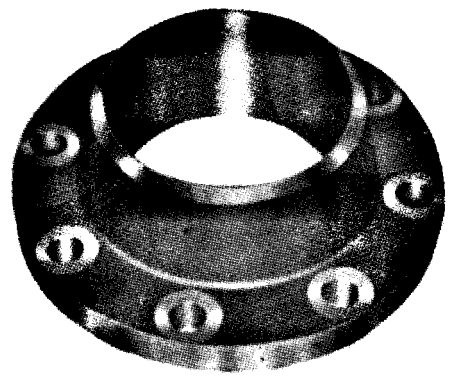
NOTE: 1) 22" SIZE NOT COVERED BY USAS B16.5
2) SIZES 26" AND LARGER ARE COVERED BY MSS-SP44 CLASS 600.
3) UNLESS OTHER MATERIAL IS SPECIFIED, FUTAWA'S FLANGES ARE FORGED FORM STEEL BILLETS COVERED BY ASTM A105.



900 lbs. WELDING NECK FLANGES

NOMINAL PIPE SIZE	OUTSIDE DIAM.	THICK-NESS (MIN.)	O.D. OF RAISED FACE	DIAM. AT BASE OF HUB	DIAM. HUB AT BEVEL	BORE	LENGTH THRU. HUB	BOLT CIRCLE DIAM.	NUMBER OF HOLES	DIAM. OF HOLE	UNIT WEIGHT (kg) (APPROX)	PRICE (FOB)
1/2	4 3/4	7/8	1 3/8	1 1/2	0.84	TO BE SPECIFIED BY PURCHASER	2 3/8	3 1/4	4	7/8	1.9	
3/4	5 1/8	1	1 11/16	1 3/4	1.05		2 3/4	3 1/2	4	7/8	2.7	
1	5 7/8	1 1/8	2	2 1/16	1.32		2 7/8	4	4	1	3.8	
1 1/4	6 1/4	1 1/8	2 1/2	2 1/2	1.66		2 7/8	4 3/8	4	1	4.4	
1 1/2	7	1 1/4	2 7/8	2 3/4	1.90		3 1/4	4 7/8	4	1 1/8	6.0	
2	8 1/2	1 1/2	3 5/8	4 1/8	2.38		4	6 1/2	8	1	11.0	
2 1/2	9 5/8	1 5/8	4 1/8	4 7/8	2.88		4 1/8	7 1/2	8	1 1/8	15.2	
3	9 1/2	1 1/2	5	5	3.50		4	7 1/2	8	1	13.9	
4	11 1/2	1 3/4	6 3/16	6 1/4	4.50		4 1/2	9 1/4	8	1 1/4	22.8	
5	13 3/4	2	7 5/16	7 1/2	5.56		5	11	8	1 3/8	37.0	
6	15	2 3/16	8 1/2	9 1/4	6.63		5 1/2	12 1/2	12	1 1/4	48.4	
8	18 1/2	2 1/2	10 5/8	11 3/4	8.63		6 3/8	15 1/2	12	1 1/2	83.3	
10	21 1/2	2 3/4	12 3/4	14 1/2	10.75		7 1/4	18 1/2	16	1 1/2	123.8	
12	24	3 1/8	15	16 1/2	12.75		7 7/8	21	20	1 1/2	166.9	
14	25 1/4	3 3/8	16 1/4	17 3/4	14.00		8 3/8	22	20	1 5/8	189.3	
16	27 3/4	3 1/2	18 1/2	20	16.00		8 1/2	24 1/4	20	1 3/4	234.7	
18	31	4	21	22 1/4	18.00		9	27	20	2	318.9	
20	33 3/4	4 1/4	23	24 1/2	20.00		9 3/4	29 1/2	20	2 1/8	399.3	
24	41	5 1/2	27 1/4	29 1/2	24.00		11 1/2	35 1/2	20	2 5/8	730.5	
26	42 3/4	5 1/2	29 1/2	30 1/2	26 5/8		11 1/4	37 1/2	20	2 7/8	716.0	
28	46	5 5/8	31 1/2	32 3/4	28 11/16		11 3/4	40 1/4	20	3 1/8	839.0	
30	48 1/2	5 7/8	33 3/4	35	30 3/4		12 1/4	42 3/4	20	3 1/8	975.0	
32	51 3/4	6 1/4	36	37 1/4	32 3/4		13	45 1/2	20	3 3/8	1,001.0	
34	55	6 1/2	38	39 5/8	34 13/16		13 3/4	48 1/4	20	3 5/8	1,374.0	
36	57 1/2	6 3/4	40 1/4	41 7/8	36 7/8		14 1/4	50 3/4	20	3 5/8	1,564.9	

NOTE: 1) SIZES 26" AND LARGER ARE COVERED BY MSS-SP44 CLASS 900.
2) UNLESS OTHER MATERIAL IS SPECIFIED, FUTAWA'S FLANGES ARE FORGED FROM STEEL BILLETS COVERED BY ASTM A105.



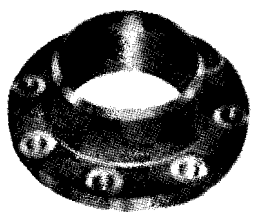
1500 lbs. WELDING NECK FLANGES

NOMINAL PIPE SIZE	OUTSIDE DIAM.	THICK-NESS (MIN.)	O.D. OF RAISED FACE	DIAM. AT BASE OF HUB	DIAM. HUB AT BEVEL	BORE	LENGTH THRU. HUB	BOLT CIRCLE DIAM.	MUMBER OF HOLES	DIAM. OF HOLE	UNIT WEIGHT (kg) (APPROX)	PRICE (FOB)
1/2 3/4 1 1 1/4 1 1/2 2 2 1/2	DIMENSIONS OF SIZES 1/2 " THROUGH 2-1/2" ARE THE SAME WITH FOR 900 lbs. FLANGES.											
3	10 1/2	1 7/8	5	5 1/4	3.50	TO BE SPECIFIED BY PURCHASER	4 5/8	8	8	1 1/4	20.1	
4	12 1/4	2 1/8	6 3/16	6 3/8	4.50		4 7/8	9 1/2	8	1 3/8	30.0	
5	14 3/4	2 7/8	7 5/16	7 3/8	5.56		6 1/8	11 1/2	8	1 5/8	57.1	
6	15 1/2	3 1/4	8 1/2	9	6.63		6 3/4	12 1/2	12	1 1/2	69.0	
8	19	3 5/8	10 5/8	11 1/2	8.63		8 3/8	15 1/2	12	1 3/4	118.4	
10	23	4 1/4	12 3/4	14 1/2	10.75		10	19	12	2	208.2	
12	26 1/2	4 7/8	15	17 3/4	12.75		11 1/8	22 1/2	16	2 1/8	312.1	
14	29 1/2	5 1/4	16 1/4	19 1/2	14.00		11 3/4	25	16	2 3/8	406.5	
16	32 1/2	5 3/4	18 1/2	21 3/4	16.00		12 1/4	27 3/4	16	2 5/8	525.0	
18	36	6 3/8	21	23 1/2	18.00		12 7/8	30 1/2	16	2 7/8	687.2	
20	38 3/4	7	23	25 1/4	20.00		14	32 3/4	16	3 1/8	852.6	
24	46	8	27 1/4	30	24.00		16	39	16	3 5/8	1,366.8	

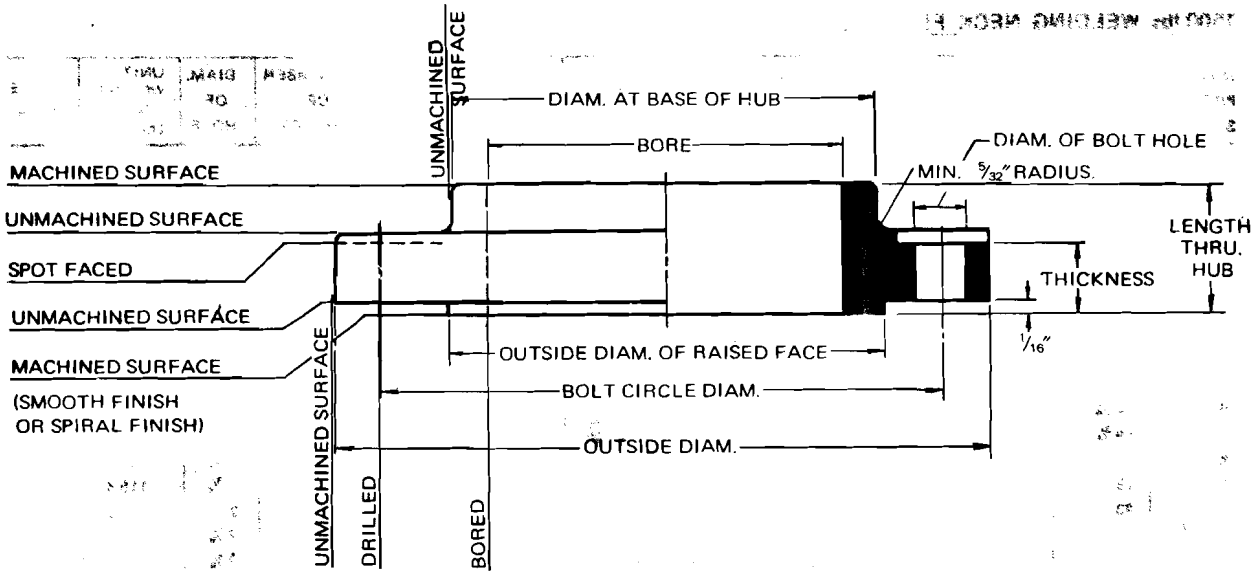
2500 lbs. WELDING NECK FLANGES

NOMINAL PIPE SIZE	OUTSIDE DIAM.	THICK-NESS (MIN.)	O.D. OF RAISED FACE	DIAM. AT BASE OF HUB	DIAM. HUB AT BEVEL	BORE	LENGTH THRU. HUB	BOLT CIRCLE DIAM.	NUMBER OF HOLES	DIAM. OF HOLE	UNIT WEIGHT (kg) (APPROX)	PRICE (FOB)
1/2	5 1/4	1 3/16	1 3/8	1 11/16	0.84	TO BE SPECIFIED BY PURCHASER	2 7/8	3 1/2	4	7/8	3.1	
3/4	5 1/2	1 1/4	1 11/16	2	1.05		3 1/8	3 3/4	4	7/8	3.6	
1	6 1/4	1 3/8	2	2 1/4	1.32		3 1/2	4 1/4	4	1	5.4	
1 1/4	7 1/4	1 1/2	2 1/2	2 7/8	1.66		3 3/4	5 1/8	4	1 1/8	7.7	
1 1/2	8	1 3/4	2 7/8	3 1/8	1.90		4 3/8	5 3/4	4	1 1/4	11.3	
2	9 1/4	2	3 5/8	3 3/4	2.38		5	6 3/4	8	1 1/8	19.0	
2 1/2	10 1/2	2 1/4	4 1/8	4 1/2	2.88		5 5/8	7 3/4	8	1 1/4	23.5	
3	12	2 5/8	5	5 1/4	3.50		6 5/8	9	8	1 3/8	42.6	
4	14	3	6 3/16	6 1/2	4.50		7 1/2	10 3/4	8	1 5/8	65.7	
5	16 1/2	3 5/8	7 5/16	8	5.56		9	12 3/4	8	1 7/8	111.1	
6	19	4 1/4	8 1/2	9 1/4	6.63		10 3/4	14 1/2	8	2 1/8	172.3	
8	21 3/4	5	10 5/8	12	8.63		12 1/2	17 1/4	12	2 1/8	263.0	
10	26 1/	6 1/2	12 3/4	14 3/4	10.75		16 1/2	21 1/4	12	2 5/8	489.8	
12	30	7 1/4	15	17 3/8	12.75		18 1/	24 3/8	12	2 7/8	694.5	

UNLESS OTHER MATERIAL IS SPECIFIED, FUTAWA 'S FLANGES ARE FORGED FROM STEEL BILLETS COVERED BY ASTM A105.



SLIP ON FLANGES

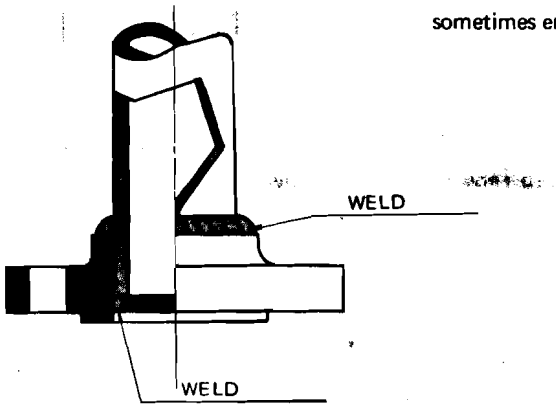


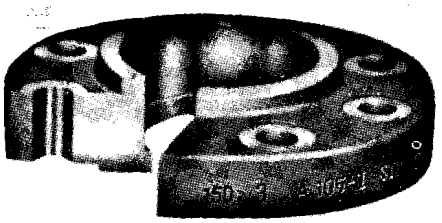
TOLERANCES:

O.D. OF 1/16" RAISED FACE:		±1/32"
FLANGE THICKNESS:	18" & SMALLER	+1/8".−0"
	20" & LARGER	+3/16".−0"
BORE:	10" & SMALLER	+1/32".−0"
	12" & LARGER	+1/16".−0"
BOLT CIRCLE DIAM.		±1/16"

METHODS OF ATTACHMENT

Although recommended practice in attaching Slip-on type flanges is to weld both at the flange hub and the pipe end, for mild service conditions only one is sometimes employed. In this case the weld is normally made at the pipe end.





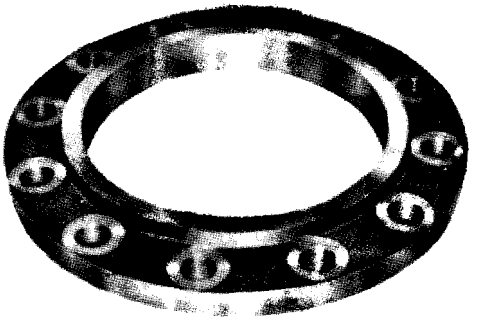
150 lbs. SLIP ON FANGES

NOMINAL PIPE SIZE	OUTSIDE DIAM.	THICK-NESS (MIN.)	O.D. OF RAISED FACE	DIAM. AT BASE OF HUB	BORE	LENGTH THRU. HUB	BOLT CIRCLE DIAM.	NUMBER OF HOLES	DIAM. OF HOLE	UNIT WEIGHT (kg) (APPROX)	PRICE (FOB)
1/2	3 1/2	7/16	1 3/8	1 3/18	0.88	5/8	2 3/8	4	5/8	0.4	
3/4	3 7/8	1/2	1 11/16	1 1/2	1.09	5/8	2 3/4	4	5/8	0.6	
1	4 1/4	9/16	2	1 15/16	1.36	11/16	3 1/8	4	5/8	0.8	
1 1/4	4 5/8	5/8	2 1/2	2 5/16	1.70	13/16	3 1/2	4	5/8	1.0	
1 1/2	5	11/16	2 7/8	2 9/16	1.95	7/8	3 7/8	4	5/8	1.3	
2	6	3/4	3 5/8	3 1/16	2.44	1	4 3/4	4	3/4	2.1	
2 1/2	7	7/8	4 1/8	3 9/16	2.94	1 1/8	5 1/2	4	3/4	3.2	
3	7 1/2	15/16	5	4 1/4	3.57	1 3/16	6	4	3/4	3.9	
3 1/2	8 1/2	15/16	5 1/2	4 13/16	4.07	1 1/4	7	8	3/4	4.9	
4	9	15/16	6 3/16	5 5/16	4.57	1 5/16	7 1/2	8	3/4	5.3	
5	10	15/16	7 5/16	6 7/16	5.66	1 7/16	8 1/2	8	7/8	6.2	
6	11	1	8 1/2	7 9/16	6.72	1 9/16	9 1/2	8	7/8	7.7	
8	13 1/2	1 1/8	10 5/8	9 11/16	8.72	1 3/4	11 3/4	8	7/8	12.5	
10	16	1 3/16	12 3/4	12	10.88	1 15/16	14 1/4	12	1	17.5	
12	19	1 1/4	15	14 3/8	12.88	2 3/16	17	12	1	27.4	
14	21	1 3/8	16 1/4	15 3/4	14.14	2 1/4	18 3/4	12	1 1/8	34.7	
16	23 1/2	1 7/16	18 1/2	18	16.16	2 1/2	21 1/4	16	1 1/8	44.4	
18	25	1 9/16	21	19 7/8	18.18	2 11/16	22 3/4	16	1 1/4	51.9	
20	27 1/2	1 11/16	23	22	20.20	2 7/8	25	20	1 1/4	61.7	
22	29 1/2	1 13/16	25 1/4	24 1/4	22.22	3 1/8	27 1/4	20	1 3/8	83.9	
24	32	1 7/8	27 1/4	26 1/8	24.25	3 1/4	29 1/2	20	1 3/8	87.4	
26	34 1/4	2	29 1/4	28 1/2	26.25	3 3/8	31 3/4	24	1 3/8	113.3	
28	36 1/2	2 1/16	31 1/4	30 3/4	28.25	3 7/16	34	28	1 3/8	129.2	
30	38 3/4	2 1/8	33 3/4	32 3/4	30.25	3 1/2	36	28	1 3/8	142.8	
32	41 3/4	2 1/4	35 3/4	35	32.25	3 5/8	38 1/2	28	1 3/8	179.1	
34	43 3/4	2 5/16	37 3/4	37	34.25	3 11/16	40 1/2	32	1 5/8	190.5	
36	46	2 3/8	40 1/4	39 1/4	36.25	3 3/4	42 3/4	32	1 5/8	217.7	
42	53	2 5/8	47	46	42.25	4	49 1/2	36	1 5/8	263.0	

NOTE: 1) 22" SIZE NOT COVERED BY USAS B16.5

2) 26" AND LARGER HAVE THE SAME FLANGE AND DRILLING DIMENSIONS AS CLASS 125 CAST IRON FLANGES, USAS B16.1.

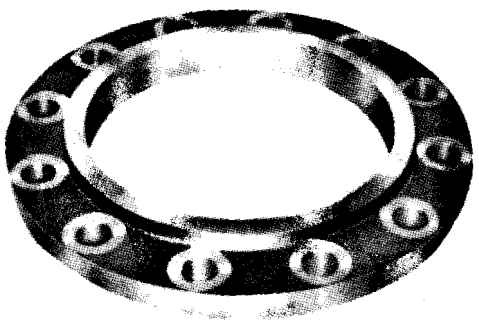
3) UNLESS OTHER MATERIAL IS SPECIFIED, FUTAWA'S FLANGES ARE FORGED FROM STEEL BILLETS COVERED BY ASTM A181.

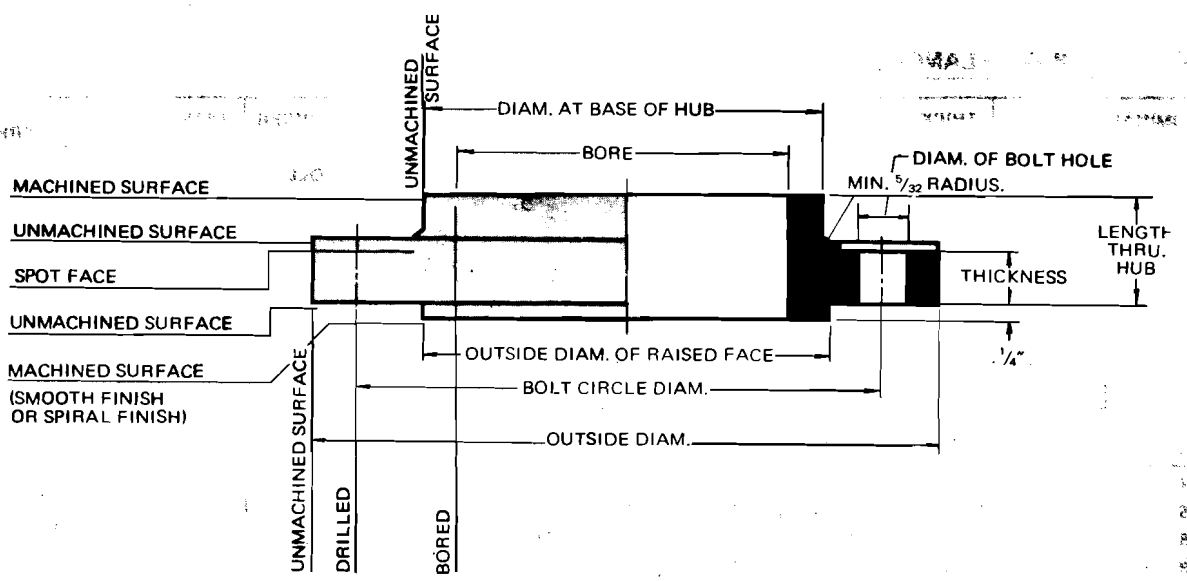


300 lbs. SLIP ON FLANGES

NOMINAL PIPE SIZE	OUTSIDE DIAM.	THICK-NESS (MIN.)	O.D. OF RAISED FACE	DIAM. AT BASE OF HUB	BORE	LENGTH THRU. HUB	BOLT CIRCLE DIAM.	NUMBER OF HOLES	DIAM. OF HOLE	UNIT WEIGHT (kg) (APPROX)	PRICE (FOB)
1/2	3 3/4	9/16	1 3/8	1 1/2	0.88	7/8	2 5/8	4	5/8	0.6	
3/4	4 5/8	5/8	1 11/16	1 7/8	1.09	1	3 1/4	4	3/4	1.1	
1	4 7/8	11/16	2	2 1/8	1.36	1 1/16	3 1/2	4	3/4	1.4	
1 1/4	5 1/4	3/4	2 1/2	2 1/2	1.70	1 1/16	3 7/8	4	3/4	1.7	
1 1/2	6 1/8	13/16	2 7/8	2 3/4	1.95	1 3/16	4 1/2	4	7/8	2.5	
2	6 1/2	7/8	3 5/8	3 5/16	2.44	1 5/16	5	8	3/4	2.9	
2 1/2	7 1/2	1	4 1/8	3 15/16	2.94	1 1/2	5 7/8	8	7/8	4.2	
3	8 1/4	1 1/8	5	4 5/8	3.57	1 11/16	6 5/8	8	7/8	5.9	
3 1/2	9	1 3/16	5 1/2	5 1/4	4.07	1 3/4	7 1/4	8	7/8	7.4	
4	10	1 1/4	6 3/16	5 3/4	4.57	1 7/8	7 7/8	8	7/8	9.7	
5	11	1 3/8	7 5/16	7	5.66	2	9 1/4	8	7/8	12.3	
6	12 1/2	1 7/16	8 1/2	8 1/8	6.72	2 1/16	10 5/8	12	7/8	15.9	
8	15	1 5/8	10 5/8	10 1/4	8.72	2 7/16	13	12	1	24.7	
10	17 1/2	1 7/8	12 3/4	12 5/8	10.88	2 5/8	15 1/4	16	1 1/8	35.7	
12	20 1/2	2	15	14 3/4	12.88	2 7/8	17 3/4	16	1 1/4	51.6	
14	23	2 1/8	16 1/4	16 3/4	14.14	3	20 1/4	20	1 1/4	69.8	
16	25 1/2	2 1/4	18 1/2	19	16.16	3 1/4	22 1/2	20	1 3/8	87.6	
18	28	2 3/8	21	21	18.18	3 1/2	24 3/4	24	1 3/8	108.7	
20	30 1/2	2 1/2	23	23 1/8	20.20	3 3/4	27	24	1 3/8	134.5	
22	33	2 5/8	25 1/4	25 1/4	22.22	4	29 1/4	24	1 5/8	167.8	
24	36	2 3/4	27 1/4	27 5/8	24.25	4 3/16	32	24	1 5/8	203.0	
26	38 1/4	3 1/8	29 1/2	28 3/8	26.25	7 1/4	34 1/2	28	1 3/4	258.5	
28	40 3/4	3 3/8	31 1/2	30 1/2	28.25	7 3/4	37	28	1 3/4	326.5	
30	43	3 5/8	33 3/4	32 9/16	30.25	8 1/4	39 1/4	28	1 7/8	367.4	
32	45 1/4	3 7/8	36	34 11/16	32.25	8 3/4	41 1/2	28	2	403.7	
34	47 1/2	4	38	36 7/8	34.25	9 1/8	43 1/2	28	2	489.0	
36	50	4 1/8	40 1/4	39	36.25	9 1/2	46	32	2 1/8	544.3	

NOTE: 1) 22" SIZE NOT COVERED BY USAS B16.5
2) 26" AND LARGER COVERED BY MSS-SP44 CLASS 300.
3) FLANGES 24" AND SMALLER FORGED FROM ROLLED STEEL BILLETS COVERED BY ASTM A181.
4) 26" AND LARGER FORGED FROM STEEL BILLETS COVERED BY ASTM A105.





400 lbs. SLIP ON FLANGES

NOMINAL PIPE SIZE	OUTSIDE DIAM.	THICK-NESS (MIN.)	O.D. OF RAISED FACE	DIAM. AT BASE OF HUB	BORE	LENGTH THRU. HUB	BOLT CIRCLE DIAM.	NUMBER OF HOLES	DIAM. OF HOLE	UNIT WEIGHT (kg) (APPROX)	PRICE (FOB)
1/2	3 3/4	9/16	1 3/8	1 1/2	0.88	7/8	2 5/8	4	5/8	0.8	
3/4	4 5/8	5/8	1 11/16	1 7/8	1.09	1	3 1/4	4	3/4	1.3	
1	4 7/8	11/16	2	2 1/8	1.36	1 1/16	3 1/2	4	3/4	1.5	
1 1/4	5 1/4	13/16	2 1/2	2 1/2	1.70	1 1/8	3 7/8	4	3/4	2.0	
1 1/2	6 1/8	7/8	2 7/8	2 3/4	1.95	1 1/4	4 1/2	4	7/8	3.0	
2	6 1/2	1	3 5/8	3 5/16	2.44	1 7/16	5	8	3/4	3.6	
2 1/2	7 1/2	1 1/8	4 1/8	3 15/16	2.94	1 5/8	5 7/8	8	7/8	5.2	
3	8 1/4	1 1/4	5	4 5/8	3.57	1 13/16	6 5/8	8	7/8	7.0	
3 1/2	9	1 3/8	5 1/2	5 1/4	4.07	1 15/16	7 1/4	8	1	8.8	
4	10	1 3/8	6 3/16	5 3/4	4.57	2	7 7/8	8	1	11.7	
5	11	1 1/2	7 5/16	7	5.66	2 1/8	9 1/4	8	1	14.0	
6	12 1/2	1 5/8	8 1/2	8 1/8	6.72	2 1/4	10 5/8	12	1	19.9	
8	15	1 7/8	10 5/8	10 1/4	8.72	2 11/16	13	12	1 1/8	30.3	
10	17 1/2	2 1/8	12 3/4	12 5/8	10.88	2 7/8	16 1/4	16	1 1/4	41.2	
12	20 1/2	2 1/4	15	14 3/4	12.88	3 1/8	17 3/4	16	1 3/8	58.9	
14	23	2 3/8	16 1/4	16 3/4	14.14	3 5/16	20 1/4	20	1 3/8	81.6	
16	25 1/2	2 1/2	18 1/2	19	16.16	3 11/16	22 1/2	20	1 1/2	106.5	
18	28	2 5/8	21	21	18.18	3 7/8	24 3/4	24	1 1/2	129.2	
20	30 1/2	2 3/4	23	23 1/8	20.20	4	27	24	1 5/8	156.4	
22	33	2 7/8	25 1/4	25 1/4	22.22	4 1/4	29 1/4	24	1 3/4	188.7	
24	36	3	27 1/4	27 5/8	24.25	4 1/2	32	24	1 7/8	231.3	
26	38 1/4	3 1/2	29 1/2	28 5/8	26.25	7 5/8	34 1/2	28	1 7/8	294.8	
28	40 3/4	3 3/4	31 1/2	30 13/16	28.25	8 1/8	37	28	2	353.8	
30	43	4	33 3/4	32 15/16	30.25	8 5/8	39 1/4	28	2	408.2	
32	45 1/4	4 1/4	36	35	32.25	9 1/8	41 1/2	28	2 1/8	467.0	
34	47 1/2	4 3/8	38	37 3/16	34.25	9 1/2	43 1/2	28	2 1/8	521.6	
36	50	4 1/2	40 1/4	39 3/8	36.25	9 7/8	46	32	2 1/8	603.0	

NOTE: 1) 22" SIZE NOT COVERED BY USAS B16.5

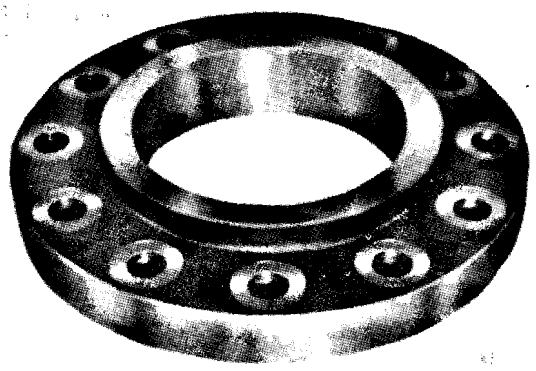
2) SIZES 26" AND LARGER ARE COVERED BY MSS-SP44 CLASS 400

3) UNLESS OTHER MATERIAL IS SPECIFIED, FUTAWA'S FLANGES ARE FORGED FROM STEEL BILLETS COVERED BY ASTM A105.

600 lbs. SLIP ON FLANGES

NOMINAL PIPE SIZE	OUTSIDE DIAM	THICK-NESS (MIN.)	O.D. OF RAISED FACE	DIAM. AT BASE OF HUB	BORE	LENGTH THRU. HUB	BOLT CIRCLE DIAM.	NUMBER OF HOLES	DIAM. OF HOLE	UNIT WEIGHT (kg) (APPROX)	PRICE (FOB)
1/2 3/4 1 1 1/4 1 1/2 2 2 1/2 3 3 1/2	DIMENSIONS OF SIZES 1/2 " through 3 1/2" ARE THE SAME WITH FOR 400 lbs. FLANGES.										
4	10 3/4	1 1/2	6 3/16	6	4.57	2 1/8	8 1/2	8	1	14.6	
5	13	1 3/4	7 5/16	7 7/16	5.66	2 3/8	10 1/2	8	1 1/8	24.7	
6	14	1 7/8	8 1/2	8 3/4	6.72	2 5/8	11 1/2	12	1 1/8	29.6	
8	16 1/2	2 3/16	10 5/8	10 3/4	8.72	3	13 3/4	12	1 1/4	44.1	
10	20	2 1/2	12 3/4	13 1/2	10.88	3 3/8	17	16	1 3/8	71.9	
12	22	2 5/8	15	15 3/4	12.88	3 5/8	19 1/4	20	1 3/8	95.4	
14	23 3/4	2 3/4	16 1/4	17	14.14	3 11/16	20 3/4	20	1 1/2	98.7	
16	27	3	18 1/2	19 1/2	16.16	4 3/16	23 3/4	20	1 5/8	143.0	
18	29 1/4	3 1/4	21	21 1/2	18.18	4 5/8	25 3/4	20	1 3/4	174.0	
20	32	3 1/2	23	24	20.20	5	28 1/2	24	1 3/4	222.0	
22	34 1/4	3 3/4	25 1/4	26 1/4	22.22	5 1/4	30 5/8	24	1 7/8	267.6	
24	37	4	27 1/4	28 1/4	24.25	5 1/2	33	24	2	312.2	
26	40	4 1/4	29 1/2	29 7/16	26.25	8 3/4	36	28	2	340.9	
28	42 1/4	4 3/8	31 1/2	31 5/8	28.25	9 1/4	38	28	2 1/8	489.0	
30	44 1/2	4 1/2	33 3/4	33 15/16	30.25	9 3/4	40 1/4	28	2 1/8	535.0	
32	47	4 5/8	36	36 1/8	32.25	10 1/4	42 1/2	28	2 3/8	625.0	
34	49	4 3/4	38	38 5/16	34.25	10 5/8	44 1/2	28	2 3/8	680.3	
36	51 3/4	4 7/8	40 1/4	40 5/8	36.25	11 1/8	47	28	2 5/8	725.7	

NOTE: 1) 22" SIZE NOT COVERED BY USAS B16.5.
2) SIZES 26" AND LARGER ARE COVERED BY MSS-SP44 CLASS 600
3) UNLESS OTHER MATERIAL IS SPECIFIED, FUTAWA'S FLANGES ARE FORGED FROM STEEL BILLETS COVERED BY ASTM A105.

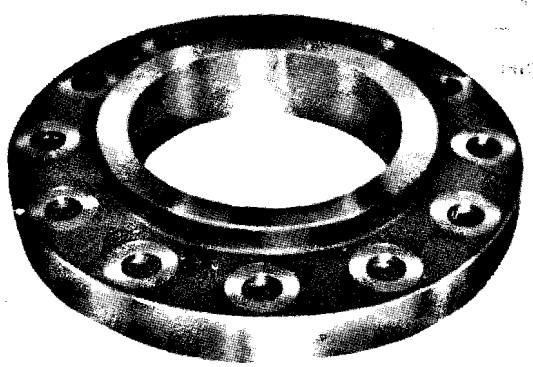


900 lbs. SLIP ON FLANGES

NOMINAL PIPE SIZE	OUTSIDE DIAM.	THICK-NESS (MIN.)	O.D. OF RAISED FACE	DIAM. AT BASE OF HUB	BORE	LENGTH THRU. HUB	BOLT CIRCLE DIAM.	NUMBER OF HOLES	DIAM. OF HOLE	UNIT WEIGHT (kg) (APPROX)	PRICE (FOB)
1/2	4 3/4	7/8	1 3/8	1 1/2	0.88	1 1/4	3 1/4	4	7/8	1.8	
3/4	5 1/8	1	1 11/16	1 3/4	1.09	1 3/8	3 1/2	4	7/8	2.3	
1	5 7/8	1 1/8	2	2 1/16	1.36	1 5/8	4	4	1	3.4	
1 1/4	6 1/4	1 1/8	2 1/2	2 1/2	1.70	1 5/8	4 3/8	4	1	4.0	
1 1/2	7	1 1/4	2 7/8	2 3/4	1.95	1 3/4	4 7/8	4	1 1/8	5.4	
2	8 1/2	1 1/2	3 5/8	4 1/8	2.44	2 1/4	6 1/2	8	1	10.0	
2 1/2	9 5/8	1 5/8	4 1/8	4 7/8	2.94	2 1/2	7 1/2	8	1 1/8	13.6	
3	9 1/2	1 1/2	5	5	3.57	2 1/8	7 1/2	8	1	11.7	
4	11 1/2	1 3/4	6 3/16	6 1/4	4.57	2 3/4	9 1/4	8	1 1/4	19.9	
5	13 3/4	2	7 5/16	7 1/2	5.66	3 1/8	11	8	1 3/8	32.3	
6	15	2 3/16	8 1/2	9 1/4	6.72	3 3/8	12 1/2	12	1 1/4	41.8	
8	18 1/2	2 1/2	10 5/8	11 3/4	8.72	4	15 1/2	12	1 1/2	72,3	
10	21 1/2	2 3/4	12 3/4	14 1/2	10.88	4 1/4	18 1/2	16	1 1/2	102.7	
12	24	3 1/8	15	16 1/2	12.88	4 5/8	21	20	1 1/2	136.7	
14	25 1/4	3 3/8	16 1/4	17 3/4	14.14	5 1/8	22	20	1 5/8	153.9	
16	27 3/4	3 1/2	18 1/2	20	16.16	5 1/4	24 1/4	20	1 3/4	184.8	
18	31	4	21	22 1/4	18.18	6	27	20	2	261.2	
20	33 3/4	4 1/4	23	24 1/2	20.20	6 1/4	29 1/2	20	2 1/8	317.9	
24	41	5 1/2	27 1/4	29 1/2	24.25	8	35 1/2	20	2 5/8	607.7	
26	42 3/4	5 1/2	29 1/2	30 1/2	26.25	11 1/4	37 1/2	20	2 7/8	694.0	
28	46	5 5/8	31 1/2	32 3/4	28.25	11 3/4	40 1/4	20	3 1/8	816.4	
30	48 1/2	5 7/8	33 3/4	35	30.25	12 1/4	42 3/4	20	3 1/8	942.0	
32	51 3/4	6 1/4	36	37 1/4	32.25	13	45 1/2	20	3 3/8	1,139.9	
34	55	6 1/2	38	39 5/8	34.25	13 3/4	48 1/4	20	3 5/8	1,338.1	
36	57 1/2	6 3/4	40 1/4	41 7/8	36.25	14 1/4	50 3/4	20	3 5/8	1,519.5	

NOTE: 1) SIZES 26" AND LARGER ARE COVERED BY MSS-SP44 CLASS 900

2) UNLESS OTHER MATERIAL IS SPECIFIED, FUTAWA'S FLANGES ARE FORGED FROM STEEL BILLETS COVERED BY ASTM A105.



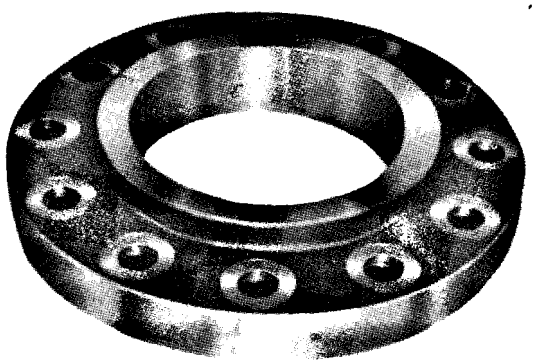
1500 lbs. SLIP ON FLANGES

NOMINAL PIPE SIZE	OUTSIDE DIAM.	THICK-NESS (MIN.)	O.D. OF RAISED FACE	DIAM. AT BASE OF HUB	BORE	LENGTH THRU. HUB	BOLT CIRCLE DIAM.	NUMBER OF HOLES	DIAM. OF HOLE	UNIT WEIGHT (kg) (APPROX)	PRICF (FOB)
1/2 3/4 1 1 1/4 1 1/2 2 2 1/2	DIMENSIONS OF SIZES 1/2 " THROUGH 2 1/2 " ARE THE SAME WITH FOR 900 lbs. FLANGES.										
3	10 1/2	1 7/8	5	5 1/4	3.57	2 7/8	8	8	1 1/4	18.0	
4	12 1/4	2 1/8	6 3/16	6 3/8	4.57	3 9/16	9 1/2	8	1 3/8	27.8	
5	14 3/4	2 7/8	7 5/16	7 3/4	5.66	4 1/8	11 1/2	8	1 5/8	52.6	
6	15 1/2	3 1/4	8 1/2	9	6.72	4 11/16	12 1/2	12	1 1/2	62.2	
8	19	3 5/8	10 5/8	11 1/2	8.72	5 5/8	15 1/2	12	1 3/4	104.5	
10	23	4 1/4	12 3/4	14 1/2	10.88	6 1/4	19	12	2	178.6	
12	26 1/2	4 7/8	15	17 3/4	12.88	7 1/8	22 1/2	16	2 1/8	267.8	

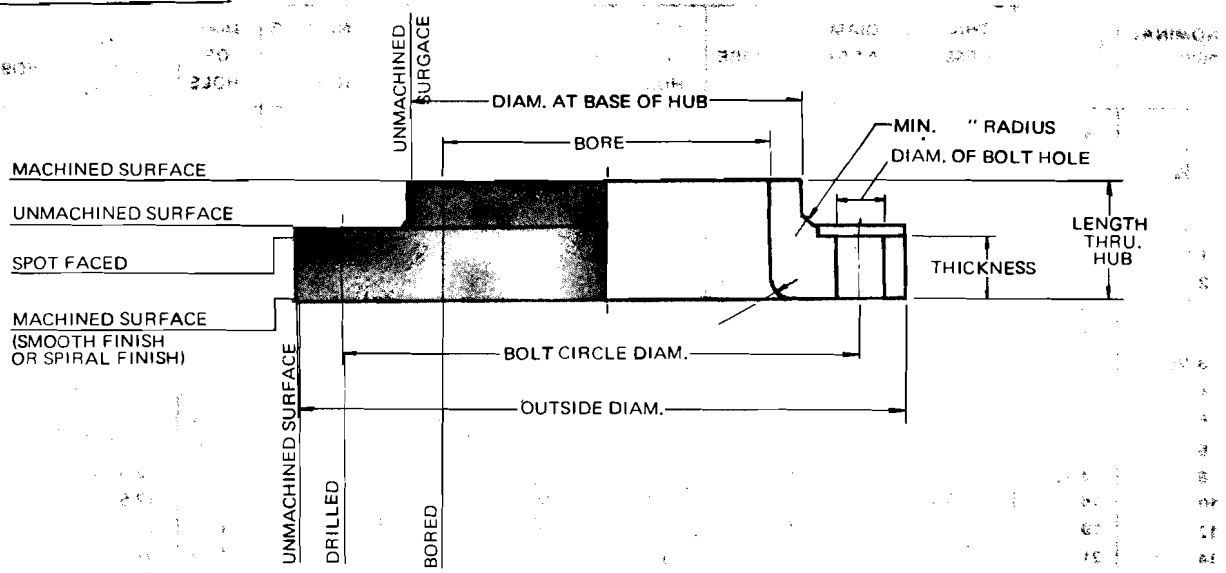
2500 lbs. SLIP ON FLANGE

NOMINAL PIPE SIZE	OUTSIDE DIAM.	THICK-NESS (MIN.)	O.D. OF RAISED FACE	DIAM. AT BASE OF HUB	BORE	LENGTH THRU. HUB	BOLT CIRCLE DIAM.	NUMBER OF HOLES	DIAM. OF HOLE	UNIT WEIGHT (kg) (APPROX)	PRICE (FOB)
1/2	5 1/4	1 3/16	1 3/8	1 11/16	0.88	1 9/16	3 1/2	4	7/8	3.1	
3/4	5 1/2	1 1/4	1 11/16	2	1.09	1 11/16	3 3/4	4	7/8	3.6	
1	6 1/4	1 3/8	2	2 1/4	1.36	1 7/8	4 1/4	4	1	4.9	
1 1/4	7 1/4	1 1/2	2 1/2	2 7/8	1.70	2 1/16	5 1/8	4	1 1/8	7.2	
1 1/2	8	1 3/4	2 7/8	3 1/8	1.95	2 3/8	5 3/4	4	1 1/4	9.9	
2	9 1/4	2	3 5/8	3 3/4	2.44	2 3/4	6 3/4	8	1 1/8	17.2	
2 1/2	10 1/2	2 1/4	4 1/8	4 1/2	2.94	3 1/8	7 3/4	8	1 1/4	24.9	
3	12	2 5/8	5	5 1/4	3.57	3 5/8	9	8	1 3/8	37.6	
4	14	3	6 3/16	6 1/2	4.57	4 1/4	10 3/4	8	1 5/8	56.6	
5	16 1/2	3 5/8	7 5/16	8	5.66	5 1/8	12 3/4	8	1 7/8	95.2	
6	19	4 1/4	8 1/2	9 1/4	6.72	6	14 1/2	8	2 1/8	147.4	
8	21 3/4	5	10 5/8	12	8.72	7	17 1/4	12	2 1/8	219.9	
10	26 1/2	6 1/2	12 3/4	14 3/4	10.88	9	21 1/4	12	2 5/8	421.8	
12	30	7 1/4	15	17 3/8	12.88	10	24 3/8	12	2 7/8	498.9	

UNLESS OTHER MATERIAL IS SPECIFIED, FUTAWA'S FLANGES ARE FORGED FROM STEEL BILLETS COVERED BY ASTM A105.



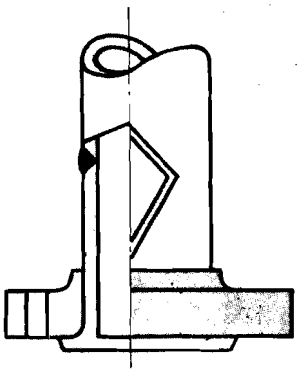
LAP JOINT FLANGES

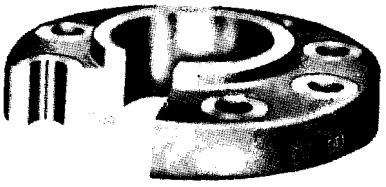


TOLERANCES:

O.D. OF 1/16" RAISED FACE:		$\pm 1/32''$
FLANGE THICKNESS:	18" & SMALLER	$+1/8''.-0''$
	20" & LARGER	$+3/16''.-0''$
BORE:	10" & SMALLER	$+1/32''.-0''$
	12" & LARGER	$+1/16''.-0''$
BOLT CIRCLE DIAM.		$\pm 1/16''$

METHODS OF ATTACHMENT



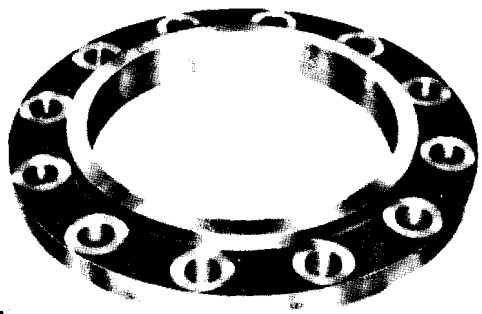


Lap Joint Flanges are most frequently, used with lap Joint Stub Ends, although in some cases the lap is formed on the pipe end. Since they are free to rotate or swivel there is no problem of bolt hole alignment. Such joints may be readily broken for inspection, cleaning, etc. The radius at the ID of the flange face accommodates that at the back of the lap, thus permitting more uniform application of loading.

150 lbs. LAP JOINT FLANGES

NOMINAL PIPE SIZE	OUTSIDE DIAM.	THICK-NESS. (MIN.)	DIAM. AT BASE OF HUB	BORE	LENGTH THRU. HUB	RADIUS OF FILLET	BOLT CIRCLE DIAM.	NUMBER OF HOLES	DIAM. OF HOLE	UNIT WEIGHT (kg) (APPROX)	PRICE (FOB)
1/2	3 1/2	7/16	1 3/16	0.90	5/8	1/8	2 3/8	4	5/8	0.4	
3/4	3 7/8	1/2	1 1/2	1.11	5/8	1/8	2 3/4	4	5/8	0.6	
1	4 1/4	9/16	1 15/16	1.38	11/16	1/8	3 1/8	4	5/8	0.8	
1 1/4	4 5/8	5/8	2 5/16	1.72	13/16	3/16	3 1/2	4	5/8	1.0	
1 1/2	5	11/16	2 9/16	1.97	7/8	1/4	3 7/8	4	5/8	1.3	
2	6	3/4	3 1/16	2.46	1	5/16	4 3/4	4	3/4	2.1	
2 1/2	7	7/8	3 9/16	2.97	1 1/8	5/16	5 1/2	4	3/4	3.2	
3	7 1/2	15/16	4 1/4	3.60	1 3/16	3/8	6	4	3/4	3.9	
3 1/2	8 1/2	15/16	4 13/16	4.10	1 1/4	3/8	7	8	3/4	4.9	
4	9	15/16	5 5/16	4.60	1 5/16	7/16	7 1/2	8	3/4	5.3	
5	10	15/16	6 7/16	5.69	1 7/16	7/16	8 1/2	8	7/8	6.2	
6	11	1	7 9/16	6.75	1 9/16	1/2	9 1/2	8	7/8	7.7	
8	13 1/2	1 1/8	9 11/16	8.75	1 3/4	1/2	11 3/4	8	7	12.5	
10	16	1 3/16	12	10.92	1 15/16	1/2	14 1/4	12	1	17.5	
12	19	1 1/4	14 3/8	12.92	2 3/16	1/2	17	12	1	27.4	
14	21	1 3/8	15 3/4	14.18	3 1/8	1/2	18 3/4	12	1 1/8	47.6	
16	23 1/2	1 7/16	18	16.19	3 7/16	1/2	21 1/4	16	1 1/8	63.5	
18	25	1 9/16	19 7/8	18.20	3 13/16	1/2	22 3/4	16	1 1/4	72.5	
20	27 1/2	1 11/16	22	20.25	4 1/16	1/2	25	20	1 1/4	88.4	
22	29 1/2	1 13/16	24 1/4	22.25	4 1/4	1/2	27 1/4	20	1 3/8	111.1	
24	32	1 7/8	26 1/8	24.25	4 3/8	1/2	29 1/2	20	1 3/8	124.7	

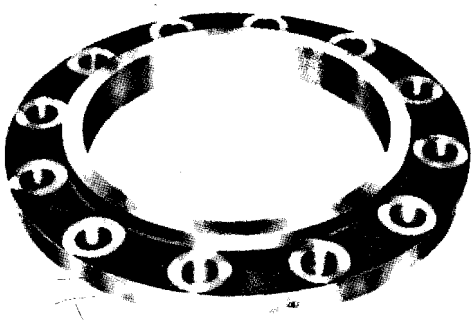
NOTE: 1) 22" SIZE NOT COVERED BY USAS B16.5
2) UNLESS OTHER MATERIAL IS SPECIFIED, FUTAWA'S FLANGES ARE FORGED FROM STEEL BILLETS COVERED BY ASTM A181.



300 lbs. LAP JOINT FLANGES

NOMINAL PIPE SIZE	OUTSIDE DIAM.	THICK-NESS (MIN.)	DIAM. AT BASE OF HUB	BORE	LENGTH THRU. HUB	RADIUS OF FILLET	BOLT CIRCLE DIAM.	NUMBER OF HOLES	DIAM OF HOLE	UNIT WEIGHT (kg) (APPROX)	PRICE FOB)
1/2	3 3/4	9/16	1 1/2	0.90	7/8	1/8	2 5/8	4	5/8	0.9	
3/4	4 5/8	5/8	1 7/8	1.11	1	1/8	3 1/4	4	3/4	1.3	
1	4 7/8	11/16	2 1/8	1.38	1 1/16	1/8	3 1/2	4	3/4	1.3	
1 1/4	5 1/4	3/4	2 1/2	1.72	1 1/16	3/16	3 7/8	4	3/4	1.8	
1 1/2	6 1/8	13/16	2 3/4	1.97	1 3/16	1/4	4 1/2	4	7/8	2.7	
2	6 1/2	7/8	3 5/16	2.46	1 5/16	5/16	5	8	3/4	3.1	
2 1/2	7 1/2	1	3 15/16	2.97	1 1/2	5/16	5 7/8	8	7/8	4.5	
3	8 1/4	1 1/8	4 5/8	3.60	1 11/16	3/8	6 5/8	8	7/8	5.8	
3 1/2	9	1 3/16	5 1/4	4.10	1 3/4	3/8	7 1/4	8	7/8	7.7	
4	10	1 1/4	5 3/4	4.60	1 7/8	7/16	7 7/8	8	7/8	9.9	
5	11	1 3/8	7	5.69	2	7/16	9 1/4	8	7/8	12.7	
6	12 1/2	1 7/16	8 1/8	6.75	2 1/16	1/2	10 5/8	12	7/8	17.6	
8	15	1 5/8	10 1/4	8.75	2 7/16	1/2	13	12	1	26.3	
10	17 1/2	1 7/8	12 5/8	10.92	3 3/4	1/2	15 1/4	16	1 1/8	41.2	
12	20 1/2	2	14 3/4	12.92	4	1/2	17 3/4	16	1 1/4	63.5	
14	23	2 1/8	16 3/4	14.18	4 3/8	1/2	20 1/4	20	1 1/4	86.1	
16	25 1/2	2 1/4	19	16.19	4 3/4	1/2	22 1/2	20	1 3/8	113.3	
18	28	2 3/8	21	18.20	5 1/8	1/2	24 3/4	24	1 3/8	133.8	
20	30 1/2	2 1/2	23 1/8	20.15	5 1/2	1/2	27	24	1 3/8	167.8	
22	33	2 5/8	25 1/4	22.25	5 3/4	1/2	29 1/4	24	1 5/8	197.3	
24	36	2 3/4	27 5/8	24.25	6	1/2	32	24	1 5/8	249.4	

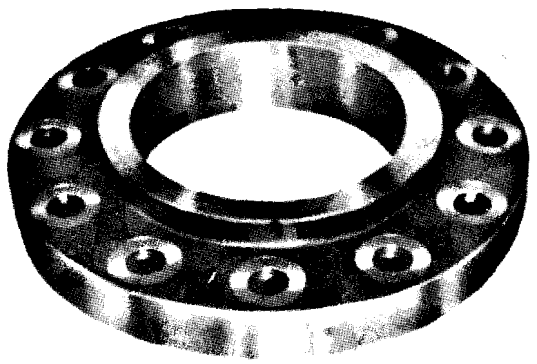
NOTE: 1) 22" SIZE NOT COVERED BY USAS B165
2) UNLESS OTHER MATERIAL IS SPECIFIED, FUTAWA'S FLANGES ARE FORGED FROM STEEL BILLETS COVERED BY ASTM A181.



400 lbs. LAP JOINT FLANGES

NOMINAL PIPE SIZE	OUTSIDE DIAM.	THICK-NESS (MIN.)	DIAM. AT BASE OF HUB	BORE	LENGTH THRU. HUB	RADIUS OF FILLET	BOLT CIRCLE DIAM.	NUMBER OF HOLES	DIAM. OF HOLE	UNIT WEIGHT (kg) (APPROX)	PRICE (FOB)
1/2	3 3/4	9/16	1 1/2	0.90	7/8	1/8	2 5/8	4	5/8	0.9	
3/4	4 5/8	5/8	1 7/8	1.11	1	1/8	3 1/4	4	3/4	1.3	
1	4 7/8	11/16	2 1/8	1.38	1 1/16	1/8	3 1/2	4	3/4	1.8	
1 1/4	5 1/4	13/16	2 1/2	1.72	1 1/8	3/16	3 7/8	4	3/4	2.2	
1 1/2	6 1/8	7/8	2 3/4	1.97	1 1/4	1/4	4 1/2	4	7/8	3.1	
2	6 1/2	1	3 5/16	2.46	1 7/16	5/16	5	8	3/4	4.0	
2 1/2	7 1/2	1 1/8	3 15/16	2.97	1 5/8	5/16	5 7/8	8	7/8	5.4	
3	8 1/4	1 1/4	4 5/8	3.60	1 13/16	3/8	6 5/8	8	7/8	6.8	
3 1/2	9	1 3/8	5 1/4	4.10	1 15/16	3/8	7 1/4	8	1	9.0	
4	10	1 3/8	5 3/4	4.60	2	7/16	7 7/8	8	1	11.3	
5	11	1 1/2	7	5.69	2 1/8	7/16	9 1/4	8	1	13.1	
6	12 1/2	1 5/8	8 1/8	6.75	2 1/4	1/2	10 5/8	12	1	19.0	
8	15	1 7/8	10 1/4	8.75	2 11/16	1/2	13	12	1 1/8	29.0	
10	17 1/2	2 1/8	12 5/8	10.92	4	1/2	15 1/4	16	1 1/4	49.8	
12	20 1/2	2 1/4	14 3/4	12.92	4 1/4	1/2	17 3/4	16	1 3/8	68.0	
14	23	2 3/8	16 3/4	14,18	4 5/8	1/2	20 1/4	20	1 3/8	92.9	
16	25 1/2	2 1/2	19	16.19	5	1/2	22 1/2	20	1 1/2	117.9	
18	28	2 5/8	21	18.20	5 3/8	1/2	24 3/4	24	1 1/2	142.8	
20	30 1/2	2 3/4	23 1/8	20.25	5 3/4	1/2	27	24	1 5/8	174.6	
22	33	2 7/8	25 1/4	22.25	6	1/2	29 1/4	24	1 3/4	206.3	
24	36	3	27 5/8	24.25	6 1/4	1/2	32	24	1 7/8	258.5	

NOTE: 1) 22" SIZE NOT COVERED BY USAS B165
2) UNLESS OTHER MATERIAL IS SPECIFIED, FUTAWA'S FLANGES ARE FORGED FROM STEEL BILLETS COVERED BY ASTM A105.



600 lbs. LAP JOINT FLANGES

NOMIN PIPE SIZE	OUTSIDE DIAM.	THICK-NESS (MIN.)	DIAM. AT BASE OF HUB	BORE	LENGTH THRU HUB	RADIUS OF FILLET	BOLT CIRCLE DIAM.	NUMBER OF HOLES	DIAM. OF HOLE	WEIGHT (kg)	PRICE (FOB)
	DIMESNIONS OF SIZES ½" THROUGH 3 ½"" ARE THE SAME WITH FOR 400 lbs. FLANGES.										
4	10 3/4	1 1/2	6	4.60	2 1/8	7/16	8 1/2	8	1	16.3	
5	13	1 3/4	7 7/16	5.69	2 3/8	1/16	10 1/2	8	1 1/8	27.6	
6	14	1 7/8	8 3/4	6.75	2 5/8	1/2	11 1/2	12	1 1/8	35.3	
8	16 1/2	2 3/16	10 3/4	8.75	3	1/2	13 3/4	12	1 1/4	49.8	
10	20	2 1/2	13 1/2	10.92	4 3/8	1/2	17	16	1 3/8	77.1	
12	22	2 5/8	15 3/4	12.92	4 5/8	1/2	19 1/4	20	1 3/8	90.7	
14	23 3/4	2 3/4	17	14 18	5	1/2	20 3/4	20	1 1/2	113.3	
16	27	3	19 1/2	16.19	5 1/2	1/2	23 3/4	20	1 5/8	165.5	
18	29 1/4	3 1/4	21 1/2	18.20	6	1/2	25 3/4	20	1 3/4	197.3	
20	32	3 1/2	24	20.25	6 1/2	1/2	28 1/2	24	1 3/4	258.5	
22	34 1/4	3 3/4	26 1/4	22.25	6 7/8	1/2	30 5/8	24	1 7/8	303.9	
24	37	4	28 1/4	24.25	7 1/4	1/2	33	24	2	367.4	

NOTE: 1) SIZE 22" NOT COVERED BY USAS B165

2) UNLESS OTHER MATERIAL IS SPECIFIED, FUTAWA'S FLANGES ARE FORGED FROM STEEL BILLETS COVERED BY ASTM A105.

900 lbs. LAP JOINT FLANGES

NOMINAL PIPE SIZE	OUTSIDE DIAM.	THICK-NESS (MIN.)	DIAM. AT BASE OF HUB	BORE	LENGTH THRU. HUB	RADIUS OF FILLET	BOLT CIRCLE DIAM.	NUMBER OF HOLES	DIAM. OF HOLE	WEIGHT (kg)	PRICE (FOB)
1/2	4 3/4	7/8	1 1/2	0.90	1 1/4	1/8	3 1/4	4	7/8	1.8	
3/4	5 1/8	1	1 3/4	1.11	1 3/8	1/8	3 1/2	4	7/8	2.2	
1	5 7/8	1 1/8	2 1/16	1.38	1 5/8	1/8	4	4	1	3.6	
1 1/4	6 1/4	1 1/8	2 1/2	1.72	1 5/8	3/16	4 3/8	4	1	4.0	
1 1/2	7	1 1/4	2 3/4	1.97	1 3/4	1/4	4 7/8	4	1 1/8	5.4	
2	8 1/2	1 1/2	4 1/8	2.46	2 1/4	5/16	6 1/2	8	1	11.3	
2 1/2	9 5/8	1 5/8	4 7/8	2.97	2 1/2	5/16	7 1/2	8	1 1/8	15.8	
3	9 1/2	1 1/2	5	3.60	2 1/8	3/8	7 1/2	8	1	11.3	
4	11 1/2	1 3/4	6 1/4	4.60	2 3/4	7/16	9 1/4	8	1 1/4	23.1	
5	13 3/4	2	7 1/2	5.69	3 1/8	7/16	11	8	1 3/8	36.7	
6	15	2 3/16	9 1/4	6.75	3 3/8	1/2	12 1/2	12	1 1/4	47.6	
8	18 1/2	2 1/2	11 3/4	8.75	4 1/2	1/2	15 1/2	12	1 1/2	86.1	
10	21 1/2	2 3/4	14 1/2	10.92	5	1/2	18 1/2	16	1 1/2	124.7	
12	24	3 1/8	16 1/2	12.92	5 5/8	1/2	21	20	1 1/2	167.8	
14	25 1/4	3 3/8	17 3/4	14.18	6 1/8	1/2	22	20	1 5/8	188.2	
16	27 3/4	3 1/2	20	16.19	6 1/2	1/2	24 1/4	20	1 3/4	210.9	
18	31	4	22 1/4	18.20	7 1/2	1/2	27	20	2	294.8	
20	33 3/4	4 1/4	24 1/2	20.25	8 1/4	1/2	29 1/2	20	2 1/8	367.4	
24	41	5 1/2	29 1/2	24.25	10 1/2	1/2	35 1/2	20	2 5/8	703.0	

NOTE: UNLESS OTHER MATERIAL IS SPECIFIED, FUTAWA'S FLANGES ARE FORGED FROM STEEL BILLETS COVERED BY ASTM A105.

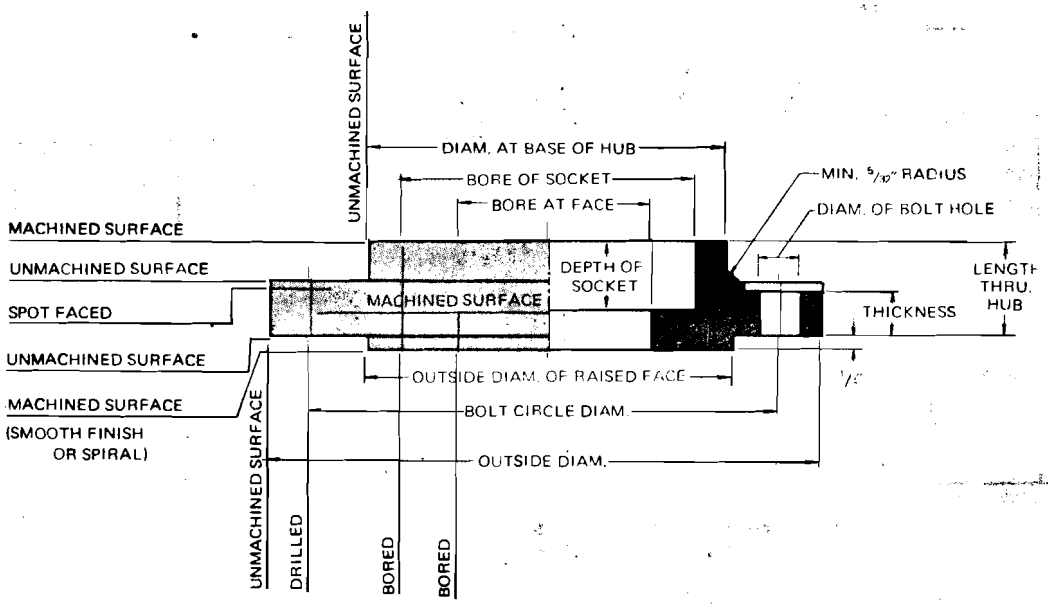
150 lbs. SOCKET WELDING FLANGES

NOMINAL PIPE SIZE	OUTSIDE DIAM.	THICK-NESS (MIN.)	O.D. OF RAISED FACE	DIAM. AT BASE OF HUB	LENGTH THRU. HUB	DEPTH OF SOCKET	BORE OF SOCKET	BORE AT FACE	BOLT CIRCLE DIAM.	NUMBER OF HOLES	DIAM. OF HOLE	UNIT WEIGHT (kg) (APPROX)	PRICE (FOB)
1/2	3 1/2	7/16	1 3/8	1 3/16	5/8	3/8	0.88	0.62	2 3/8	4	5/8	0.5	
3/4	3 7/8	1/2	1 11/16	1 1/2	5/8	7/16	1.09	0.82	2 3/4	4	5/8	0.9	
1	4 1/4	9/16	2	1 15/16	11/16	1/2	1.36	1.05	3 1/8	4	5/8	0.9	
1 1/4	4 5/8	5/8	2 1/2	2 5/16	13/16	9/16	1.70	1.38	3 1/2	4	5/8	1.3	
1 1/2	5	11/16	2 7/8	2 9/16	7/8	5/8	1.95	1.61	3 7/8	4	5/8	1.3	
2	6	3/4	3 5/8	3 1/16	1	11/16	2.44	2.07	4 3/4	4	3/4	2.2	
2 1/2	7	7/8	4 1/8	3 9/16	1 1/8	3/4	2.94	2.47	5 1/2	4	3/4	3.1	
3	7 1/2	15/16	5	4 1/4	1 3/16	13/16	3.57	3.07	6	4	3/4	3.6	
3 1/2	8 1/2	15/16	5 1/2	4 13/16	1 1/4	7/8	4.07	3.55	7	8	3/4	4.9	
4	9	15/16	6 3/16	5 5/16	1 5/16	15/16	4.57	4.03	7 1/2	8	3/4	5.8	
5	10	15/16	7 5/16	6 7/16	1 7/16	15/16	5.66	5.05	8 1/2	8	7/8	6.8	
6	11	1	8. 1/2	7 9/16	1 9/16	1 1/16	6.72	6.07	9 1/2	8	7/8	8.6	
8	13 1/2	1 1/8	10 5/8	9 11/16	1 3/4	1 1/4	8.72	7.98	11 3/4	8	7/8	13.6	
10	16	1 3/16	12 3/4	12	1 15/16	1 5/16	10.88	10.02	14 1/4	12	1	19.5	
12	19	1 1/4	15	14 3/8	2 3/16	1 9/16	12.88	12.00	17	12	1	29.0	
14	21	1 3/8	16 1/4	15 3/4	2 1/4	1 5/8	14.14	13.25	18 3/4	12	1 1/8	40.8	
16	23 1/2	1 7/16	18 1/2	18	2 1/2	1 3/4	16.16	15.25	21 1/4	16	1 1/8	44.4	
18	25	1 9/16	21	19 7/8	2 11/16	1 15/16	18.18	17.25	22 3/4	16	1 1/4	58.9	
20	27 1/2	1 11/16	23	22	2 7/8	2 1/8	20.20	19.25	25	20	1 1/4	74.8	
22	29 1/2	1 13/16	25 1/4	24 1/4	3 1/8	2 3/8	22.22	21.25	27 1/4	20	1 3/8	83.9	
24	32	1 7/8	27 1/4	26 1/8	3 1/4	2 1/2	24.25	23.25	29 1/2	20	1 3/8	99.7	

300 lbs. SOCKET WELDING FLANGES

NOMINAL PIPE SIZE	OUTSIDE DIAM.	THICK-NESS (MIN.)	O.D. OF RAISED FACE	DIAM. AT BASE OF HUB	LENGTH THRU. HUB	DEPTH OF SOCKET	BORE OF SOCKET	BORE AT FACE	BOLT CIRCLE DIAM.	NUMBER OF HOLES	DIAM. OF HOLE	UNIT WEIGHT (kg) (APPROX)	PRICE (FOB)
1/2	3 3/4	9/16	1 3/8	1 1/2	7/8	3/8	0.88	0.62	2 5/8	4	5/8	0.9	
3/4	4 5/8	5/8	1 11/16	1 7/8	1	7/16	1.09	0.82	3 1/4	4	3/4	1.3	
1	4 7/8	11/16	2	2 1/8	1 1/16	1/2	1.36	1.05	3 1/2	4	3/4	1.3	
1 1/4	5 1/4	3/4	2 1/2	2 1/2	1 1/16	9/16	1.70	1.38	3 7/8	4	3/4	1.8	
1 1/2	6 1/8	13/16	2 7/8	2 3/4	1 3/16	5/8	1.95	1.61	4 1/2	4	7/8	2.7	
2	6 1/2	7/8	3 5/8	3 5/16	1 5/16	11/16	2.44	2.07	5	8	3/4	3.1	
2 1/2	7 1/2	1	4 1/8	3 15/16	1 1/2	3/4	2.94	2.47	5 7/8	8	7/8	4.5	
3	8 1/4	1 1/8	5	4 5/8	1 11/16	13/16	3.57	3.07	6 5/8	8	7/8	5.8	

UNLESS OTHER MATERIAL IS SPECIFIED, FUTAWA'S FLANGES ARE FORGED FROM STEEL BILLETS COVERED BY ASTM A181.
22" SIZE NOT COVERED BY USAS B16.5.



600 lbs. SOCKET WELDING FLANGES

NOMINAL PIPE SIZE	OUTSIDE DIAM.	THICK-NESS (MIN.)	O.D. OF RAISED FACE	DIAM. AT BASE OF HUB	LENGTH THRU. HUB	DEPTH OF SOCKET	BORE OF SOCKET	BORE AT FACE	BOLT CIRCLE DIAM.	NUMBER OF HOLES	DIAM. OF HOLE	UNIT WEIGHT (kg) (APPROX)	PRICE (FOB)
1/2	3 3/4	9/16	1 3/8	1 1/2	7/8	3/8	0.88	TO BE	2 5/8	4	5/8	0.9	
3/4	4 5/8	5/8	1 11/16	1 7/8	1	7/16	1.09	SPECI-	3 1/4	4	3/4	1.3	
1	4 7/8	11/16	2	2 1/8	1 1/16	1/2	1.36	FIED	3 1/2	4	3/4	1.8	
1 1/4	5 1/4	13/16	2 1/2	2 1/2	1 1/8	9/16	1.70	BY PUR-	3 7/8	4	3/4	2.2	
1 1/2	6 1/8	7/8	2 7/8	2 3/4	1 1/4	5/8	1.95	CHASER	4 1/2	4	7/8	3.1	
2	6 1/2	1	3 5/8	3 5/16	1 7/16	11/16	2.44		5	8	3/4	4.0	
2 1/2	7 1/2	1 1/8	4 1/8	3 15/16	1 5/8	3/4	2.94		5 7/8	8	7/8	5.8	
3	8 1/4	1 1/4	5	4 5/8	1 13/16	13/16	3.57		6 5/8	8	7/8	7.2	

1500 lbs. SOCKET WELDING FLANGES

NOMINAL PIPE SIZE	OUTSIDE DIAM.	THICK-NESS (MIN.)	O.D. OF RAISED FACE	DIAM. AT BASE OF HUB	LENGTH THRU. HUB	DEPTH OF SOCKET	BORE OF SOCKET	BORE AT FACE	BOLT CIRCLE DIAM.	NUMBER OF HOLES	DIAM. OF HOLE	UNIT WEIGHT (kg) (APPROX)	PRIC (FOB
1/2	4 3/4	7/8	1 3/8	1 1/2	1 1/4	3/8	0.88	TO BE	3 1/4	4	7/8	1.8	
3/4	5 1/8	1	1 11/16	1 3/4	1 3/8	7/16	1.09	SPECI-	3 1/2	4	7/8	2.2	
1	5 7/8	1 1/8	2	2 1/16	1 5/8	1/2	1.36	FIED	4	4	1	3.6	
1 1/4	6 1/4	1 1/8	2 1/2	2 1/2	1 5/8	9/16	1.70	BY PUR-	4 3/8	4	1	4.0	
1 1/2	7	1 1/4	2 7/8	2 3/4	1 3/4	5/8	1.95	CHASER	4 7/8	4	1 1/8	5.4	
2	8 1/2	1 1/2	3 5/8	4 1/8	2 1/4	11/16	2.44		6 1/2	8	1	11.3	
2 1/2	9 5/8	1 5/8	4 1/8	4 7/8	2 1/2	3/4	2.94		7 1/2	8	1 1/8	16.3	

UNLESS OTHER MATERIAL IS SPECIFIED, FUTAWA'S FLANGES ARE FORGED FROM STEEL BILLETS COVERED BY ASTM A105.

1500 lbs. LAP JOINT FLANGES

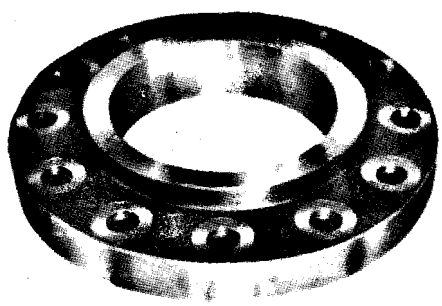
NOMINAL PIPE SIZE	OUTSIDE DIAM.	THICK-NESS (MIN.)	DIAM. AT BASE OF HUB	BORE	LENGTH THRU. HUB	RADIUS OF FILLET	BOLT CIRCLE DIAM.	NUMBER OF HOLES	DIAM. OF HOLE	UNIT WEIGHT (kg) (APPROX)	PRICE (FOB)
				DIMENSION ON SIZES ½ " THROUGH 2 ½" ARE THE SAME WITH FOR 900 lbs. FLANGES							
3	10 1/2	1 7/8	5 1/4	3.60	2 7/8	3/8	8	8	1 1/4	21.3	
4	12 1/4	2 1/8	6 3/8	4.60	3 9/16	7/16	9 1/2	8	1 3/8	34.0	
5	14 3/4	2 7/8	7 3/4	5.69	4 1/8	7/16	11 1/2	8	1 5/8	63.5	
6	15 1/2	3 1/4	9	6.75	4 11/16	1/2	12 1/2	12	1 1/2	77.1	
8	19	3 5/8	11 1/2	8.75	5 5/8	1/2	15 1/2	12	1 3/4	129.2	
10	23	4 1/4	14 1/2	10.92	7	1/2	19	12	2	219.9	
12	26 1/2	4 7/8	17 3/4	12.92	8 5/8	1/2	22 1/2	16	2 1/8	285.7	
14	29 1/2	5 1/4	19 1/2	14.18	9 1/2	1/2	25	16	2 3/8	403.7	
16	32 1/2	5 3/4	21 3/4	16.19	10 1/4	1/2	27 3/4	16	2 5/8	521.6	
18	36	6 3/8	23 1/2	18.20	10 7/8	1/2	30 1/2	16	2 7/8	671.0	
20	38 3/4	7	25 1/4	20.25	11 1/2	1/2	32 3/4	16	3 1/8	807.0	
24	46	8	30	24.25	13	1/2	39	16	3 5/8	1,284.0	

UNLESS OTHER MATERIAL IS SPECIFIED, FUTAWA'S FLANGES ARE FORGED FROM STEEL BILLETS COVERED BY ASTM A105.

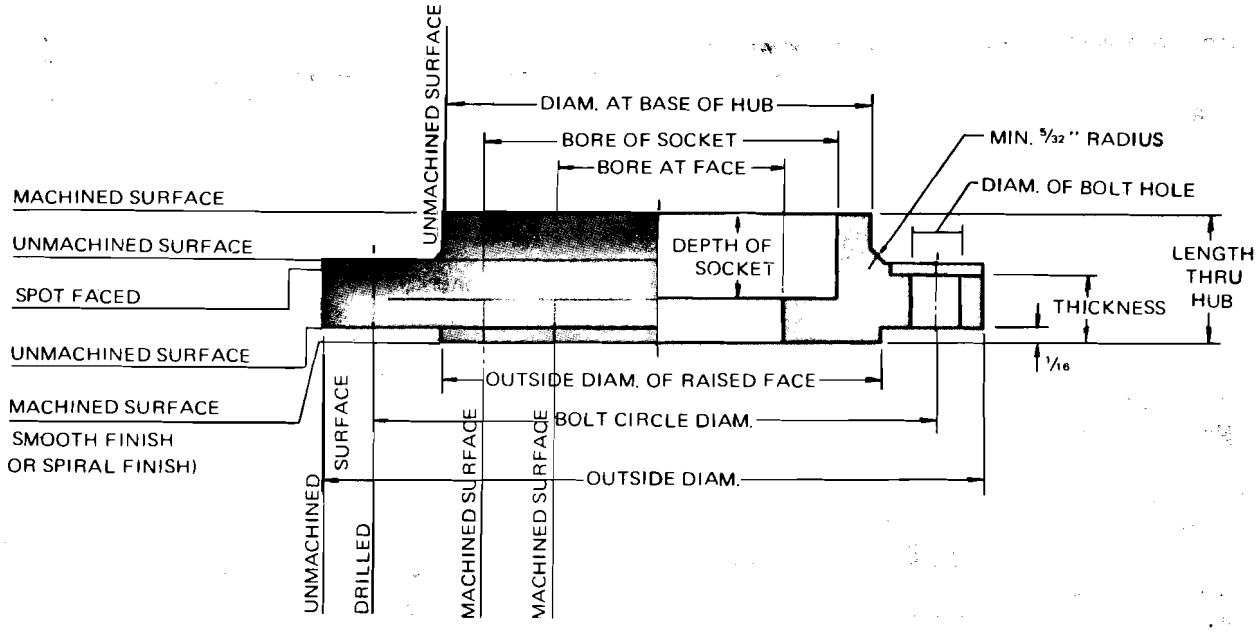
2500 lbs. LAP JOINT FLANGES

NOMINAL PIPE SIZE	OUTSIDE DIAM.	THICK-NESS (MIN.)	DIAM. AT BASE OF HUB	BORE	LENGTH THRU. HUB	RADIUS OF FILLET	BOLT CIRCLE DIAM.	NUMBER OF HOLES	DIAM. OF HOLE	UNIT WEIGHT (kg) (APPROX)	PRICE (FOB)
1/2	5 1/4	1 3/16	1 11/16	0.90	1 9/16	1/8	3 1/2	4	7/8	3.1	
3/4	5 1/2	1 1/4	2	1.11	1 11/16	1/8	3 3/4	4	7/8	3.6	
1	6 1/4	1 3/8	2 1/4	1.38	1 7/8	1/8	4 1/4	4	1	4.9	
1 1/4	7 1/4	1 1/2	2 7/8	1.72	2 1/16	3/16	5 1/8	4	1 1/8	7.2	
1 1/2	8	1 3/4	3 1/8	1.97	2 3/8	1/4	5 3/4	4	1 1/4	9.9	
2	9 1/4	2	3 3/4	2.46	2 3/4	5/16	6 3/4	8	1 1/8	16.7	
2 1/2	10 1/2	2 1/4	4 1/2	2.97	3 1/8	5/16	7 3/4	8	1 1/4	24.0	
3	12	2 5/8	5 1/4	3.60	3 5/8	3/8	9	8	1 3/8	36.2	
4	14	3	6 1/2	4.60	4 1/4	7/16	10 3/4	8	1 5/8	54.4	
5	16 1/2	3 5/8	8	5.69	5 1/8	7/16	12 3/4	8	1 7/8	92.9	
6	19	4 1/4	9 1/4	6.75	6	1/2	14 1/2	8	2 1/8	142.8	
8	21 3/4	5	12	8.75	7	1/2	17 1/4	12	2 1/8	213.1	
10	26 1/2	6 1/2	14 3/4	10.92	9	1/2	21 1/4	12	2 5/8	408.2	
12	30	7 1/4	17 3/8	12.92	10	1/2	24 3/8	12	2 7/8	498.9	

UNLESS OTHER MATERIAL IS SPECIFIED, FUTAWA'S FLANGES ARE FORGED FROM STEEL BILLETS COVERED BY ASTM A105.



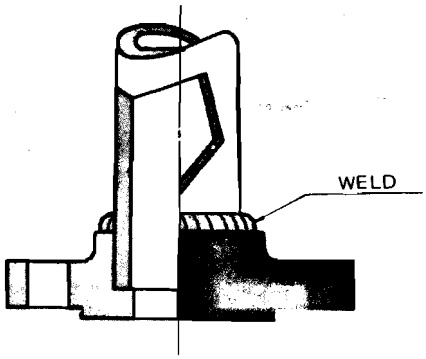
SOCKET WELDING FLANGES



TOLERANCES:

O.D. OF 1/16" RAISED FACE:		± 1/32"
FLANGE THICKNESS:	18" & SMALLER	+ 1/8", −0"
	20" & LARGER	+ 3/16", −0"
BORE:	10" & SMALLER	+ 1/32", −0"
	12" & LARGER	+ 1/16", −0"
BOLT CIRCLE DIAM.		+ 1/16"

METHODS OF ATTACHMENT



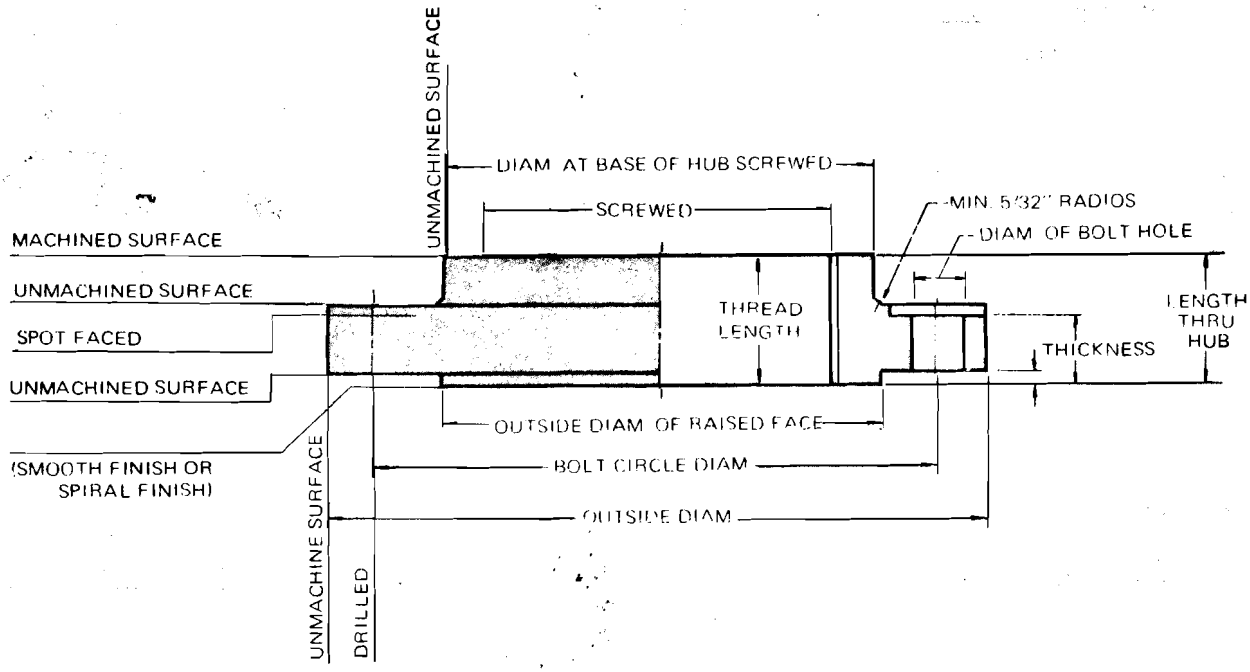
In attaching Socket Welding Flanges, the pipe end is inserted into the socket and then welded at the flange hub. An inside weld at the pipe frequently made for greater strength or, with grinding, to provide a smooth bore without pockets or recesses.

THREADED FLANGES (SCREWED FLANGES)

THREAD: This type of flanges shall be tapped with

A) American Standard Taper Pipe Threads in accordance with UASA B2.1 Table 2. (N.P.T.).

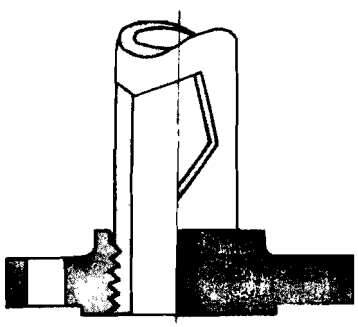
B) British Standard Taper Pipe Threads in accordnace with BS21 Part 1, Section 1 (BSP-Tr).



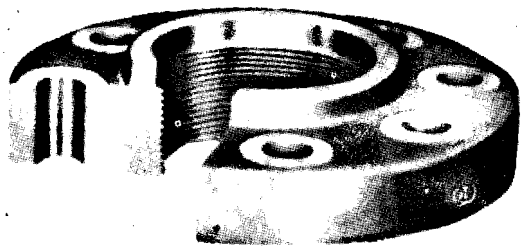
TOLERANCES:

O.D. OF 1/16" RAISED FACE:		+1/32"
FLANGE THICKNESS:	18" & SMALLER	+1/8", 0"
	20" & LARGER	+3/16", 0"
BORE:	10" & SMALLER	+1/32", 0"
	12" & LARGER	+1/16" 0"
BOLT CIRCLE DIAM.		+1/16"

METHODS OF ATTACHMENT



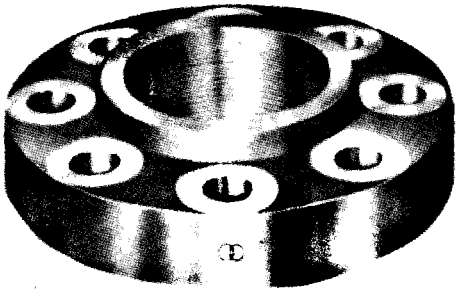
Threaded flanges are, of course, attached by screwing to threaded pipe ends. The clean, sharp threads and great precision of Futawa's Threaded Flanges assure the greatest possible ease in making up strong, tight joints.



150 lbs. THREADED FLANGES

NOMINAL PIPE SIZE	OUTSIDE DIAM.	THICK-NESS (MIN.)	O.D. OF RAISED FACE	DIAM. AT BASE OF HUB	THREAD LENGTH (MIN.)	LENGTH THRU. HUB	BOLT CIRCLE DIAM.	NUMBER OF HOLES	DIAM. OF HOLE	UNIT WEIGHT (kg) (APPROX)	PRICE (FOB)
1/2	3 1/2	7/16	1 3/8	1 3/16	5/8	5/8	2 3/8	4	5/8	0.4	
3/4	3 7/8	1/2	1 11/16	1 1/2	5/8	5/8	2 3/4	4	5/8	0.6	
1	4 1/4	9/16	2	1 15/16	11/16	11/16	3 1/8	4	5/8	0.8	
1 1/4	4 5/8	5/8	2 1/2	2 5/16	13/16	13/16	3 1/2	4	5/8	1.0	
1 1/2	5	11/16	2 7/8	2 9/16	7/8	7/8	3 7/8	4	5/8	1.3	
2	6	3/4	3 5/8	3 1/16	1	1	4 3/4	4	3/4	2.1	
2 1/2	7	7/8	4 1/8	3 9/16	1 1/8	1 1/8	5 1/2	4	3/4	3.2	
3	7 1/2	15/16	5	4 1/4	1 3/16	1 3/16	6	4	3/4	3.9	
3 1/2	8 1/2	15/16	5 1/2	4 13/16	1 1/4	1 1/4	7	8	3/4	4.9	
4	9	15/16	6 3/16	5 5/16	1 5/16	1 5/16	7 1/2	8	3/4	5.3	
5	10	15/16	7 5/16	6 7/16	1 7/16	1 7/16	8 1/2	8	7/8	6.2	
6	11	1	8 1/2	7 9/16	1 9/16	1 9/16	9 1/2	8	7/8	7.7	
8	13 1/2	1 1/8	10 5/8	9 11/16	1 3/4	1 3/4	11 3/4	8	7/8	12.5	
10	16	1 3/16	12 3/4	12	1 15/16	1 15/16	14 1/4	12	1	17.5	
12	19	1 1/4	15	14 3/8	2 3/16	2 3/16	17	12	1	27.4	
14	21	1 3/8	16 1/4	15 3/4	2 1/4	2 1/4	18 3/4	12	1 1/8	34.7	
16	23 1/2	1 7/16	18 1/2	18	2 1/2	2 1/2	21 1/4	16	1 1/8	44.4	
18	25	1 9/16	21	19 7/8	2 11/16	2 11/16	22 3/4	16	1 1/4	51.9	
20	27 1/2	1 11/16	23	22	2 7/8	2 7/8	25	20	1 1/4	61.7	
22	29 1/2	1 13/16	25 1/4	24 1/4	3 1/8	3 1/8	27 1/4	20	1 3/8	83.9	
24	32	1 7/8	27 1/4	26 1/8	3 1/4	3 1/4	29 1/2	20	1 3/8	87.4	

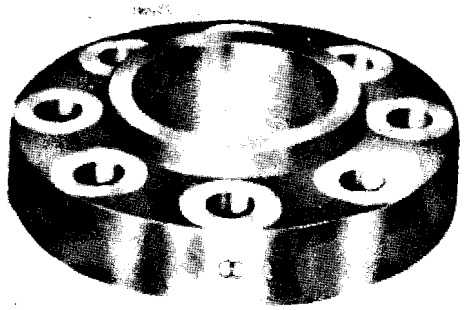
UNLESS OTHER MATERIAL IS SPECIFIED, FUTAWA'S FLANGES ARE FORGED FROM STEEL BILLETS COVERED BY ASTM A181. 22" SIZE NOT COVERED BY USAS B16.5.

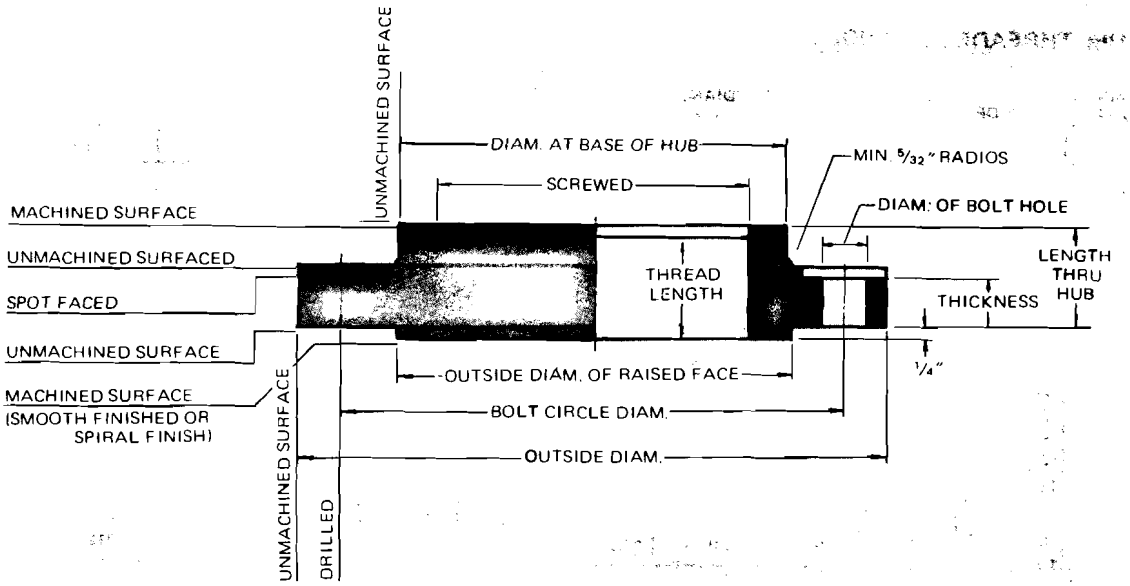


300 lbs. THREADED FLANGES

NOMINAL PIPE SIZE	OUTSIDE DIAM.	THICK-NESS (MIN.)	O.D. OF RAISED FACE	DIAM. AT BASE OF HUB	THREAD LENGTH (MIN.)	LENGTH THRU. HUB	BOLT CIRCLE DIAM.	NUMBER OF HOLES	DIAM. OF HOLE	UNIT WEIGHT (kg) (APPROX)	PRICE (FOB)
1/2	3 3/4	9/16	1 3/8	1 1/2	5/8	7/8	2 5/8	4	5/8	0.6	
3/4	4 5/8	5/8	1 11/16	1 7/8	5/8	1	3 1/4	4	3/4	1.1	
1	4 7/8	11/16	2	2 1/8	11/16	1 1/16	3 1/2	4	3/4	1.4	
1 1/4	5 1/4	3/4	2 1/2	2 1/2	13/16	1 1/16	3 7/8	4	3/4	1.7	
1 1/2	6 1/8	13/16	2 7/8	2 3/4	7/8	1 3/16	4 1/2	4	7/8	2.5	
2	6 1/2	7/8	3 5/8	3 5/16	1 1/8	1 5/16	5	8	3/4	2.9	
2 1/2	7 1/2	1	4 1/8	3 15/16	1 1/4	1 1/2	5 7/8	8	7/8	4.2	
3	8 1/4	1 1/8	5	4 5/8	1 1/4	1 11/16	6 5/8	8	7/8	5.9	
3 1/2	9	1 3/16	5 1/2	5 1/4	1 7/16	1 3/4	7 1/4	8	7/8	7.4	
4	10	1 1/4	6 3/16	5 3/4	1 7/16	1 7/8	7 7/8	8	7/8	9.7	
5	11	1 3/8	7 5/16	7	1 11/16	2	9 1/4	8	7/8	12.3	
6	12 1/2	1 7/16	8 1/2	8 1/8	1 13/16	2 1/16	10 5/8	12	7/8	15.9	
8	15	1 5/8	10 5/8	10 1/4	2	2 7/16	13	12	1	24.7	
10	17 1/2	1 7/8	12 3/4	12 5/8	2 3/16	2 5/8	15 1/4	16	1 1/8	35.7	
12	20 1/2	2	15	14 3/4	2 3/8	2 7/8	17 3/4	16	1 1/4	51.6	
14	23	2 1/8	16 1/4	16 3/4	2 1/2	3	20 1/4	20	1 1/4	69.8	
16	25 1/2	2 1/4	18 1/2	19	2 11/16	3 1/4	22 1/2	20	1 3/8	87.6	
18	28	2 3/8	21	21	2 3/4	3 1/2	24 3/4	24	1 3/8	108.7	
20	30 1/2	2 1/2	23	23 1/8	2 7/8	3 3/4	27	24	1 3/8	134.5	
22	33	2 5/8	25 1/4	25 1/4	3 1/16	4	29 1/4	24	1 5/8	167.8	
24	36	2 3/4	27 1/4	27 5/8	3 1/4	4 3/16	32	24	1 5/8	203.0	

UNLESS OTHER MATERIAL IS SPECIFIED, FUTAWA'S FLANGES ARE FORGED FROM STEEL BILLETS COVERED BY ASTM A181. 22" SIZE NOT COVERED BY USAS B16.5.





400lbs. THREADED FLANGES

NOMINAL PIPE SIZE	OUTSIDE DIAM.	THICK-NESS (MIN.)	O.D. OF RAISED FACE	DIAM. AT BASE OF HUB	THREAD LENGTH (MIN.)	LENGTH THRU HUB	BOLT CIRCLE DIAM.	NUMBER OF HOLES	DIAM. OF HOLE	UNIT WEIGHT (kg) (APPROX)	PRICE (FOB)
1/2	3 3/4	9/16	1 3/8	1 1/2	5/8	7/8	2 5/8	4	5/8	0.8	
3/4	4 5/8	5/8	1 11/16	1 7/8	5/8	1	3 1/4	4	3/4	1.3	
1	4 7/8	11/16	2	2 1/8	11/16	1 1/16	3 1/2	4	3/4	1.5	
1 1/4	5 1/4	13/16	2 1/2	2 1/2	13/16	1 1/8	3 7/8	4	3/4	2.0	
1 1/2	6 1/8	7/8	2 7/8	2 3/4	7/8	1 1/4	4 1/2	4	7/8	3.0	
2	6 1/2	1	3 5/8	3 5/16	1 1/8	1 7/16	5	8	3/4	3.6	
2 1/2	7 1/2	1 1/8	4 1/8	3 15/16	1 1/4	1 5/8	5 7/8	8	7/8	5.2	
3	8 1/4	1 1/4	5	4 5/8	1 3/8	1 13/16	6 5/8	8	7/8	7.0	
3 1/2	9	1 3/8	5 1/2	5 1/4	1 9/16	1 15/16	7 1/4	8	1	8.8	
4	10	1 3/8	6 3/16	5 3/4	1 7/16	2	7 7/8	8	1	11.7	
5	11	1 1/2	7 5/16	7	1 11/16	2 1/8	9 1/4	8	1	14.0	
6	12 1/2	1 5/8	8 1/2	8 1/8	1 13/16	2 1/4	10 5/8	12	1	19.9	
8	15	1 7/8	10 5/8	10 1/4	2	2 11/16	13	12	1 1/8	30.3	
10	17 1/2	2 1/8	12 3/4	12 5/8	2 3/16	2 7/8	15 1/4	16	1 1/4	41.2	
12	20 1/2	2 1/4	15	14 3/4	2 3/8	3 1/8	17 3/4	16	1 3/8	58.9	
14	23	2 3/8	16 1/4	16 3/4	2 1/2	3 5/16	20 1/4	20	1 3/6	81.6	
16	25 1/2	2 1/2	18 1/2	19	2 11/16	3 11/16	22 1/2	20	1 1/2	106.5	
18	28	2 5/8	21	21	2 3/4	3 7/8	24 3/4	24	1 1/2	129.2	
20	30 1/2	2 3/4	23	23 1/8	2 7/8	4	27	24	1 5/8	156.4	
22	33	2 7/8	25 1/4	25 1/4	3 1/16	4 1/4	29 1/4	24	1 3/4	183.7	
24	36	3	27 1/4	27 5/8	3 1/4	4 1/2	32	24	1 7/8	231.3	

UNLESS OTHER MATERIAL IS SPECIFIED, FUTAWA'S FLANGES ARE FORGED FROM STEEL BILLETS COVERED BY ASTM A105. 22" SIZE NOT COVERED BY USAS B16.5.

600 lbs. THREADED FLANGES

NOMINAL PIPE SIZE	OUTSIDE DIAM.	THICK-NESS (MIN.)	O.D. OF RAISED FACE	DIAM. AT BASE OF HUB	THREAD LENGTH MIN.	LENGTH THRU. HUB	BOLT CIRCLE DIAM.	NUMBER OF HOLES	DIAM. OF HOLE	UNIT WEIGHT (kg) (APPROX)	PRICE (FOB)
	DIMENSIONS OF SIZES "1/2" THROUGH 3 1/2"" ARE THE SAME WITH FOR 400 lbs. FLANGES.										
4	10 3/4	1 1/2	6 3/16	6	1 5/8	2 1/8	8 1/2	8	1	14.6	
5	13	1 3/4	7 5/16	7 7/16	1 7/8	2 3/8	10 1/2	8	1 1/8	24.7	
6	14	1 7/8	8 1/2	8 3/4	2	2 5/8	11 1/2	12	1 1/8	29.6	
8	16 1/2	2 3/16	10 5/8	10 3/4	2 1/4	3	13 3/4	12	1 1/4	44.1	
10	20	2 1/2	12 3/4	13 1/2	2 9/16	3 3/8	17	16	1 3/8	71.9	
12	22	2 5/8	15	15 3/4	2 3/4	3 5/8	19 1/4	20	1 3/8	95.4	
14	23 3/4	2 3/4	16 1/4	17	2 7/8	3 11/16	20 3/4	20	1 1/2	98.7	
16	27	3	18 1/2	19 1/2	3 1/16	4 3/16	23 3/4	20	1 5/8	143.0	
18	29 1/4	3 1/4	21	21 1/2	3 1/8	4 5/8	25 3/4	20	1 3/4	174.0	
20	32	3 1/2	23	24	3 1/4	5	28 1/2	24	1 3/4	222.0	
22	34 1/4	3 3/4	25 1/4	26 1/4	3 7/16	5 1/4	30 5/8	24	1 7/8	267.6	
24	37	4	27 1/4	28 1/4	3 5/8	5 1/2	33	24	2	312.2	

UNLESS OTHER MATERIAL IS SPECIFIED, FUTAWA'S FLANGES ARE FORGED FROM STEEL BILLETS COVERED BY ASTM A105. 22" SIZE NOT COVERED BY USAS B16.5.

900 lbs. THREADED FLANGES

NOMINAL PIPE SIZE	OUTSIDE DIAM.	THICK-NESS (MIN.)	O.D. OF RAISED FACE	DIAM. AT BASE OF HUB	THREAD LENGTH MIN.	LENGTH THRU. HUB	BOLT CIRCLE DIAM.	NUMBER OF HOLES	DIAM. OF HOLE	UNIT WEIGHT (kg) (APPROX)	PRICE (FOB)
1/2	4 3/4	7/8	1 3/8	1 1/2	7/8	1 1/4	3 1/4	4	7/8	1.8	
3/4	5 1/8	1	1 11/16	1 3/4	1	1 3/8	3 1/2	4	7/8	2.3	
1	5 7/8	1 1/8	2	2 1/16	1 1/8	1 5/8	4	4	1	3.4	
1 1/4	6 1/4	1 1/8	2 1/2	2 1/2	1 3/16	1 5/8	4 3/8	4	1	4.0	
1 1/2	7	1 1/4	2 7/8	2 3/4	1 1/4	1 3/4	4 7/8	4	1 1/8	5.4	
2	8 1/2	1 1/2	3 5/8	4 1/8	1 1/2	2 1/4	6 1/2	8	1	10.0	
2 1/2	9 5/8	1 5/8	4 1/8	4 7/8	1 7/8	2 1/2	7 1/2	8	1 1/8	13.6	
3	9 1/2	1 1/2	5	5	1 5/8	2 1/8	7 1/2	8	1	11.7	
4	11 1/2	1 3/4	6 3/16	6 1/4	1 7/8	2 3/4	9 1/4	8	1 1/4	19.9	
5	13 3/4	2	7 5/16	7 1/2	2 1/8	3 1/8	11	8	1 3/8	32.3	
6	15	2 3/16	8 1/2	9 1/4	2 1/4	3 3/8	12 1/2	12	1 1/4	41.8	
8	18 1/2	2 1/2	10 5/8	11 3/4	2 1/2	4	15 1/2	12	1 1/-	72.3	
10	21 1/2	2 3/4	12 3/4	14 1/2	2 13/16	4 1/4	18 1/2	16	1 1/2	102.7	
12	24	3 1/8	15	16 1/2	3	4 5/8	21	20	1 1/2	136.7	
14	25 1/4	3 3/8	16 1/4	17 3/4	3 1/4	5 1/8	22	20	1 5/8	153.9	
16	27 3/4	3 1/2	18 1/2	20	3 3/8	5 1/4	24 1/4	20	1 3/4	184.8	
18	31	4	21	22 1/4	3 1/2	6	27	20	2	261.2	
20	33 3/4	4 1/4	23	24 1/2	3 5/8	6 1/4	29 1/2	20	2 1/8	317.9	
24	41	5 1/2	27 1/4	29 1/2	4	8	35 1/2	20	2 5/8	607.7	

UNLESS OTHER MATERIAL IS SPECIFIED, FUTAWA'S FLANGES ARE FORGED FROM STEEL BILLETS COVERED BY ASTM A105.

1500 lbs. THREADED FLANGES

NOMINAL PIPE SIZE	OUTSIDE DIAM.	THICK-NESS (MIN.)	O.D. OF RAISED FACE	DIAM. AT BASE OF HUB	THREAD LENGTH (MIN.)	LENGTH THRU. HUB	BOLT CIRCLE DIAM.	NUMBER OF HOLES	DIAM. OF HOLE	UNIT WEIGHT (kg) (APPROX)	PRICE (FOB)
1/2	4 3/4	7/8	1 3/8	1 1/2	7/8	1 1/4	3 1/4	4	7/8	1.8	
3/4	5 1/8	1	1 11/16	1 3/4	1	1 3/8	3 1/2	4	7/8	2.3	
1	5 7/8	1 1/8	2	2 1/16	1 1/8	1 5/8	4	4	1	3.4	
1 1/4	6 1/4	1 1/8	2 1/2	2 1/2	1 3/16	1 5/8	4 3/8	4	1	4.0	
1 1/2	7	1 1/4	2 7/8	2 3/4	1 1/4	1 3/4	4 7/8	4	1 1/8	5.4	
1	8 1/2	1 1/2	3 5/8	4 1/8	1 1/2	2 1/4	6 1/2	8	1	10.0	
2	9 5/8	1 5/8	4 1/8	4 7/8	1 7/8	2 1/2	7 1/2	8	1 1/8	13.6	
2 1/2	10 1/2	1 7/8	5	5 1/4	2	2 7/8	8	8	1 1/4	18.0	
3	12 1/4	2 1/8	6 3/16	6 3/8	2 1/4	3 9/16	9 1/2	8	1 3/8	27.8	
4	14 3/4	2 7/8	7 5/16	7 3/4	2 1/2	4 1/8	11 1/2	8	1 5/8	52.6	
5	15 1/2	3 1/4	8 1/2	9	2 3/4	4 11/16	12 1/2	12	1 1/2	62.2	
6	19	3 5/8	10 5/8	11 1/2	3	5 5/8	15 1/2	12	1 3/4	104.5	
8	23	4 1/4	12 3/4	14 1/2	3 5/16	6 1/4	19	12	2	178.6	
10	26 1/2	4 7/8	15	17 3/4	3 5/8	7 1/8	22 1/2	16	2 1/8	267.8	

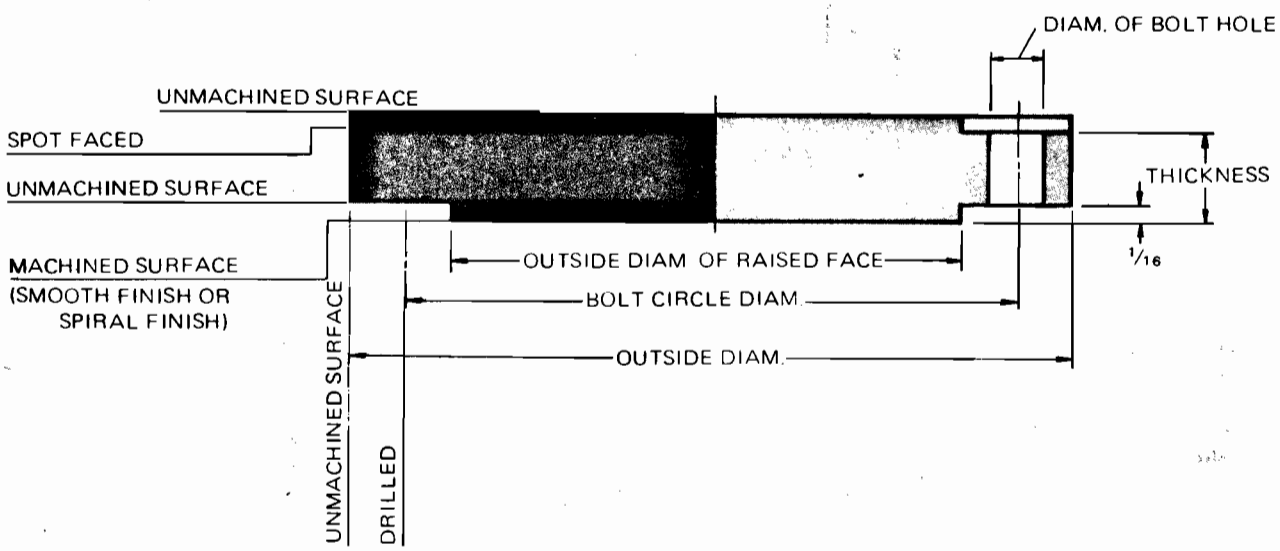
UNLESS OTHER MATERIAL IS SPECIFIED, FUTAWA'S FLANGES ARE FORGED FROM STEEL BILLETS COVERED BY ASTM A105.

2500. THREADED FLANGES

NOMINAL PIPE SIZE	OUTSIDE DIAM.	THICK-NESS (MIN.)	O.D. OF RAISED FACE	DIAM. AT BASE OF HUB	THREAD LENGTH (MIN.)	LENGTH THRU. HUB	BOLT CIRCLE DIAM.	NUMBER OF HOLES	DIAM. OF HOLE	UNIT WEIGHT (kg) (APPROX)	PRICE (FOB)
1/2	5 1/4	1 3/16	1 3/8	1 11/16	1 1/8	1 9/16	3 1/2	4	7/8	3.1	
3/4	5 1/2	1 1/4	1 11/16	2	1 1/4	1 11/16	3 3/4	4	7/8	3.6	
1	6 1/4	1 3/8	2	2 1/4	1 3/8	1 7/8	4 1/4	4	1	4.9	
1 1/4	7 1/4	1 1/2	2 1/2	2 7/8	1 1/2	2 1/16	5 1/8	4	1 1/8	7.2	
1 1/2	8	1 3/4	2 7/8	3 1/8	1 3/4	2 3/8	5 3/4	4	1 1/4	9.9	
2	9 1/4	2	3 5/8	3 3/4	2	2 3/4	6 3/4	8	1 1/8	16.7	
2 1/2	10 1/2	2 1/4	4 1/8	4 1/2	2 1/4	3 1/8	7 3/4	8	1 1/4	24.0	
3	12	2 5/8	5	5 1/4	2 1/2	3 5/8	9	8	1 3/8	36.2	
4	14	3	6 3/16	6 1/2	2 3/4	4 1/4	10 3/4	8	1 5/8	54.4	
5	16 1/2	3 5/8	7 5/16	8	3	5 1/8	12 3/4	8	1 7/8	92.9	
6	19	4 1/4	8 1/2	9 1/4	3 1/4	6	14 1/2	8	2 1/8	142.8	
8	21 3/4	5	10 5/8	12	3 3/4	7	17 1/4	12	2 1/8	213.1	
10	26 1/2	6 1/2	12 3/4	14 3/4	4 1/4	9	21 1/4	12	2 5/8	408.2	
12	30	7 1/4	15	17 3/8	4 3/4	10	24 3/8	12	2 7/8	498.9	

UNLESS OTHER MATERIAL IS SPECIFIED, FUTAWA'S FLANGES ARE FORGED FROM STEEL BILLETS COVERED BY ASTM A105.

BLIND FLANGES

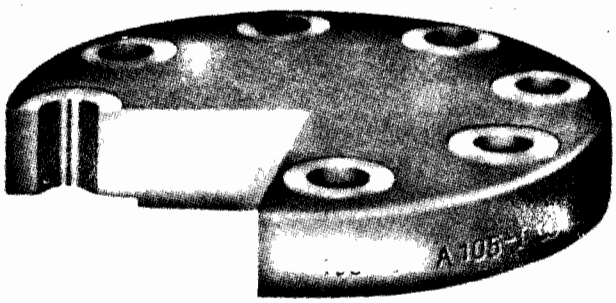


TOLERANCES:

O.D. OF 1/16" RAISED FACE:		$\pm 1/32''$
FLANGE THICKNESS:	**18" & SMALLER**	$+1/8'', -0''$
	20" & LARGER	$+3/16'', -0''$
BOLT CIRCLE DIAM.		$\pm 1/16''$

METHODS OF ATTACHMENT

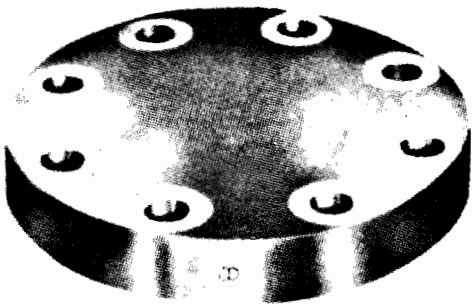
Thjs type of flange is fixed with bolts & nuts to the other flange to stop the fluid at the end of pipes.



150 lbs. BLIND FLANGES

NOMINAL PIPE SIZE	OUTSIDE DIAM.	THICK-NESS (MIN.)	O.D. OF RAISED FACE	BOLT CIRCLE DIAM	NUMBER OF HOLES	DIAM. OF HOLE	UNIT WEIGHT (kg) (APPROX)	PRICE (FOB)
1/2	3 1/2	7/16	1 3/8	2 3/8	4	5/8	0.5	
3/4	3 7/8	1/2	1 11/16	2 3/4	4	5/8	0.9	
1	4 1/4	9/16	2	3 1/8	4	5/8	0.9	
1 1/4	4 5/8	5/8	2 1/2	3 1/2	4	5/8	1.4	
1 1/2	5	11/16	2 7/8	3 7/8	4	5/8	1.8	
2	6	3/4	3 5/8	4 3/4	4	3/4	2.3	
2 1/2	7	7/8	4 1/8	5 1/2	4	3/4	3.2	
3	7 1/2	15/16	5	6	4	3/4	4.1	
3 1/2	8 1/2	15/16	5 1/2	7	8	3/4	5.9	
4	9	15/16	6 3/16	7 1/2	8	3/4	7.7	
5	10	15/16	7 5/16	8 1/2	8	7/8	9.1	
6	11	1	8 1/2	9 1/2	8	7/8	11.8	
8	13 1/2	1 1/8	10 5/8	11 3/4	8	7/8	20.4	
10	16	1 3/16	12 3/4	14 1/4	12	1	31.8	
12	19	1 1/4	15	17	12	1	49.9	
14	21	1 3/8	16 1/4	18 3/4	12	1 1/8	63.5	
16	23 1/2	1 7/16	18 1/2	21 1/4	16	1 1/8	81.6	
18	25	1 9/16	21	22 3/4	16	1 1/4	99.8	
20	27 1/2	1 11/16	23	25	20	1 1/4	129.3	
22	29 1/2	1 13/16	25 1/4	27 1/4	20	1 3/8	161.0	
24	32	1 7/8	27 1/4	29 1/2	20	1 3/8	195.0	

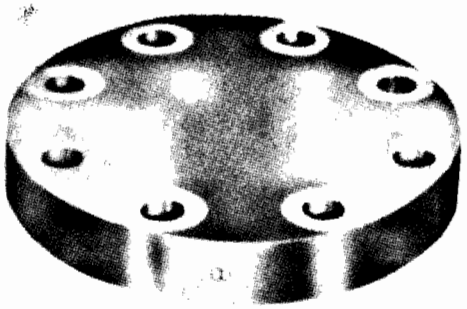
UNLESS OTHER MATERIAL IS SPECIFIED, FUTAWA'S FLANGES ARE FORGED FROM STEEL BILLETS COVERED BY ASTM A181.
22" SIZE NOT COVERED BY USAS B16.5.

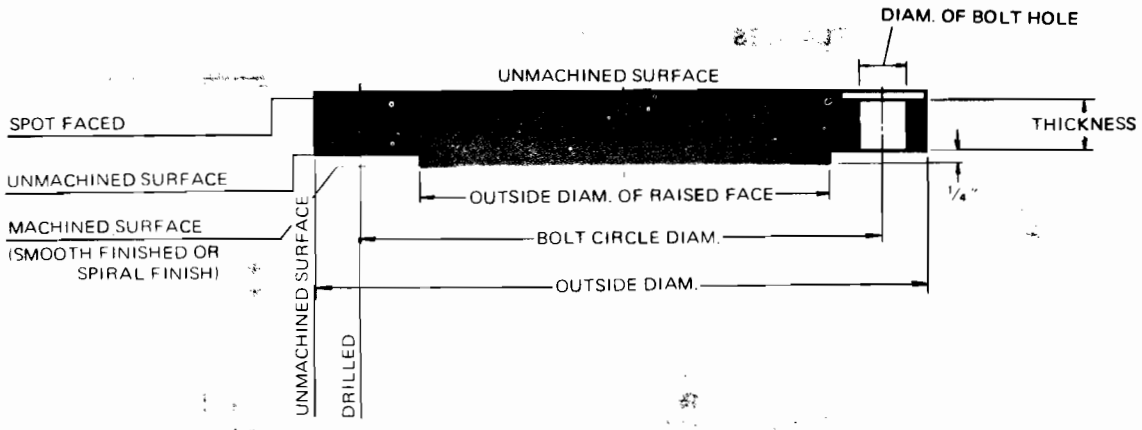


300 lbs. BLIND FLANGES

NOMINAL PIPE SIZE	OUTSIDE DIAM.	THICK-NESS (MIN.)	O.D. OF RAISED FACE	BOLT CIRCLE DIAM.	NUMBER OF HOLES	DIAM. OF HOLE	UNIT WEIGHT (kg) (APPROX)	PRICE (FOB)
1/2	3 3/4	9/16	1 3/8	2 5/8	4		0.9	
3/4	4 1/8	5/8	1 11/16	3 1/4	4	3/4	1.4	
1	4 7/8	11/16	2	3 1/2	4	3/4	1.4	
1 1/4	5 1/4	3/4	2 1/2	3 7/8	4	3/4	2.0	
1 1/2	6 1/8	13/16	2 7/8	4 1/2	4	7/8	2.7	
2	6 1/2	7/8	3 5/8	5	8	3/4	3.6	
2 1/2	7 1/2	1	4 1/8	5 7/8	8	7/8	5.4	
3	8 1/4	1 1/8	5	6 5/8	8	7/8	7.3	
3 1/2	9	1 3/16	5 1/2	7 1/4	8	7/8	10.0	
4	10	1 1/4	6 3/16	7 7/8	8	7/8	12.3	
5	11	1 3/8	7 5/16	9 1/4	8	7/8	17.1	
6	12 1/2	1 7/16	8 1/2	10 5/8	12	7/8	22.7	
8	15	1 5/8	10 5/8	13	12	1	36.7	
10	17 1/2	1 7/8	12 3/4	15 1/4	16	1 1/8	56.7	
12	20 1/2	2	15	17 3/4	16	1 1/4	83.9	
14	23	2 1/8	16 1/4	20 1/4	20	1 1/4	113.4	
16	25 1/2	2 1/4	18 1/2	22 1/2	20	1 3/8	133.8	
18	28	2 3/8	21	24 3/4	24	1 3/8	179.2	
20	30 1/2	2 1/2	23	27	24	1 3/8	229.1	
22	33	2 5/8	25 1/4	29 1/4	24	1 5/8	290.3	
24	36	2 3/4	27 1/4	32	24	1 5/8	358.3	

UNLESS OTHER MATERIAL IS SPECIFIED, FUTAWA'S FLANGES ARE FORGED FROM STEEL BILLETS COVERED BY ASTM A181.
22" SIZE NOT COVERED BY USAS B16.5.





400 lbs. BLIND FLANGES

NOMINAL PIPE SIZE	OUTSIDE DIAM.	THICK-NESS (MIN.)	O.D. OF RAISED FACE	BOLT CIRCLE DIAM.	NUMBER OF HOLES	DIAM. OF HOLE	UNIT WEIGHT (kg) (APPROX)	PRICE (FOB)
1/2	3 3/4	9/16	1 3/8	2 5/8	4	5/8	0.9	
3/4	4 5/8	5/8	1 11/16	3 1/4	4	3/4	1.4	
1	4 7/8	11/16	2	3 1/2	4	3/4	1.8	
1 1/4	5 1/4	13/16	2 1/2	3 7/8	4	3/4	2.6	
1 1/2	6 1/8	7/8	2 7/8	4 1/2	4	7/8	3.6	
2	6 1/2	1	3 5/8	5	8	3/4	4.5	
2 1/2	7 1/2	1 1/8	4 1/8	5 7/8	8	7/8	6.8	
3	8 1/4	1 1/4	5	6 5/8	8	7/8	9.1	
3 1/2	9	1 3/8	5 1/2	7 1/4	8	1	14.0	
4	10	1 3/8	6 3/16	7 7/8	8	1	14.9	
5	11	1 1/2	7 5/16	9 1/4	8	1	19.9	
6	12 1/2	1 5/8	8 1/2	10 5/8	12	1	27.6	
8	15	1 7/8	10 5/8	13	12	1 1/8	45.3	
10	17 1/2	2 1/8	12 3/4	15 1/4	16	1 1/4	70.3	
12	20 1/2	2 1/4	15	17 3/4	16	1 3/8	102.0	
14	23	2 3/8	16 1/4	20 1/4	20	1 3/8	131.5	
16	25 1/2	2 1/2	18 1/2	22 1/2	20	1 1/2	167.8	
18	28	2 5/8	21	24 3/4	24	1 1/2	206.3	
20	30 1/2	2 3/4	23	27	24	1 5/8	265.3	
22	33	2 7/8	25 1/4	29 1/4	24	1 3/4	326.5	
24	36	3	27 1/4	32	24	1 7/8	403.7	

UNLESS OTHER MATERIAL IS SPECIFIED, FUTAWA'S FLANGES ARE FORGED FROM STEEL BILLETS COVERED BY ASTM A105. 22" SIZE NOT COVERED BY USAS B16.5.

600 lbs. BLIND FLANGES

NOMINAL PIPE SIZE	OUTSIDE DIAM.	THICK-NESS (MIN.)	O.D. OF RAISED FACE	BOLT CIRCLE DIAM.	NUMBER OF HOLES	DIAM. OF HOLE	UNIT WEIGHT (kg) (APPROX)	PRICE (FOB)
	DIMENSIONS OF SIZES 1/2" THROUGH 3 1/2" ARE THE SAME AS FOR 40016 FLANGES							
4	10 3/4	1 1/2	6 3/16	8 1/2	8	1	18.6	
5	13	1 3/4	7 5/16	10 1/2	8		28.0	
6	14	1 7/8	8 1/2	11 1/2	12	1 1/8	39.0	
8	16 1/2	2 3/16	10 5/8	13 3/4	12	1 1/4	63.5	
10	20	2 1/2	12 3/4	17	16	1 3/8	104.2	
12	22	2 5/8	15	19 1/4	20	1 3/8	133.8	
14	23 3/4	2 3/4	16 1/4	20 3/4	20	1 1/2	161.1	
16	27	3	18 1/2	23 3/4	20	1 5/8	224.6	
18	29 1/4	3 1/4	21	25 3/4	20	1 3/4	285.8	
20	32	3 1/2	23	28 1/2	24	1 3/4	367.4	
22	34 1/4	3 3/4	25 1/4	30 5/8	24	1 7/8	453.5	
24	37		27 1/4	33	24	2	566.7	

UNLESS OTHER MATERIAL IS SPECIFIED, FUTAWA'S FLANGES ARE FORGED FROM STEEL BILLETS COVERED BY ASTM A105. 22" SIZE NOT COVERED BY USAS B16.5.

900 lbs. BLIND FLANGES

NOMINAL PIPE SIZE	OUTSIDE DIAM.	THICK-NESS (MIN.)	O.D. OF RAISED FACE	BOLT CIRCLE DIAM.	NUMBER OF HOLES	DIAM. OF HOLE	UNIT WEIGHT (kg) (APPROX)	PRICE (FOB)
1/2	4 3/4	7/8	1 3/8	3 1/4	4	7/8	1.8	
3/4	5 1/8	1	1 11/16	3 1/2	4	7/8	2.7	
1	5 7/8	1 1/8	2	4	4	1	3.6	
1 1/4	6 1/4	1 1/8	2 1/2	4 3/8	4	1	4.7	
1 1/2	7	1 1/4	2 7/8	4 7/8	4	1 1/8	5.9	
2	8 1/2	1 1/2	3 5/8	6 1/2	8	1	11.3	
2 1/2	9 5/8	1 5/8	4 1/8	7 1/2	8	1 1/8	15.9	
3	9 1/2	1 1/2	5	7 1/2	8	1	13.2	
4	11 1/2	1 3/4	6 3/16	9 1/4	8	1 1/4	24.5	
5	13 3/4	2	7 5/16	11	8	1 3/8	38.0	
6	15	2 3/16	8 1/2	12 1/2	12	1 1/4	52.2	
8	18 1/2	2 1/2	10 5/8	15 1/2	12	1 1/2	90.7	
10	21 1/2	2 3/4	12 3/4	18 1/2	16	1 1/2	131.5	
12	24	3 1/8	15	21	20	1 1/2	188.3	
14	25 1/4	3 3/8	16 1/4	22	20	1 5/8	235.9	
16	27 3/4	3 1/2	18 1/2	24 1/4	20	1 3/4	272.2	
18	31	4	21	27	20	2	385.6	
20	33 3/4	4 1/4	23	29 1/2	20	2 1/8	487.6	
24	41	5 1/2	27 1/4	35 1/2	20	2 5/8	918.3	

UNLESS OTHER MATERIAL IS SPECIFIED FUTAWA'S FLANGES ARE FORGED FROM STEEL BILLETS COVERED BY ASTM A105.

1500 lbs. BLIND FLANGES

NOMINAL PIPE SIZE	OUTSIDE DIAM.	THICK-NESS (MIN.)	O.D. OF RAISED FACE	BOLT CIRCLE DIAM.	NUMBER OF HOLES	DIAM. OF HOLE	UNIT WEIGHT (kg) (APPROX)	PRICE (FOB)
	4 3/4	7/8	1 3/8	3 1/4	4	7/8	1.8	
	5 1/8	1	1 11/16	3 1/2	4	7/8	2.7	
1	5 7/8	1 1/8	2	4	4	1	3.6	
1 1/4	6 1/4	1 1/8	2 1/2	4 3/8	4	1	4.7	
1 1/2	7	1 1/4	2 7/8	4 7/8	4	1 1/8	5.9	
2	8 1/2	1 1/2	3 5/8	6 1/2	8	1	11.3	
2 1/2	9 5/8	1 5/8	4 1/8	7 1/2	8	1 1/8	15.9	
3	10 1/2	1 7/8	5	8	8	1 1/4	21.8	
4	12 1/4	2 1/8	6 8/16	9 1/2	8	1 3/8	33.1	
5	14 3/4	2 7/8	7 5/16	11 1/2	8	1 5/8	60.4	
6	15 1/2	3 1/4	8 1/2	12 1/2	12	1 1/2	72.6	
8	19	3 5/8	10 5/8	15 1/2	12	1 3/4	136.1	
10	23	4 1/4	12 3/4	19	12	2	231.3	
12	26 1/2	4 7/8	15	22 1/2	16	2 1/8	313.0	

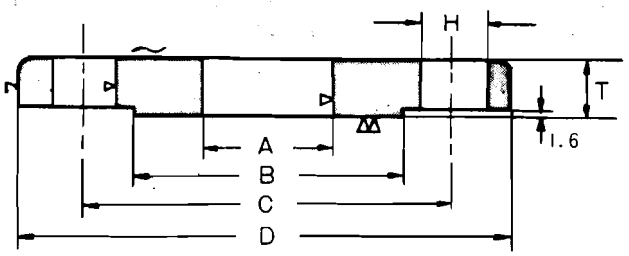
UNLESS OTHER MATERIAL IS SPECIFIED FUTAWA'S FLANGES ARE FORGED FROM STEEL BILLETS COVERED BY ASTM A105.

2500 lbs. BLIND FLANGES

NOMINAL PIPE SIZE	OUTSIDE DIAM.	THICK-NESS (MIN.)	O.D. OF RAISED FACE	BOLT CIRCLE DIAM.	NUMBER OF HOLES	DIAM. OF HOLE	UNIT WEIGHT (kg) (APPROX)	PRICE (FOB)
1/2	5 1/4	1 3/16	1 3/8	3 1/2	4	7/8	3.1	
3/4	5 1/2	1 1/4	1 11/16	3 3/4	4	7/8	3.6	
1	6 1/4	1 3/8	2	4 1/4	4	1	4.9	
1 1/4	7 1/4	1 1/2	2 1/2	5 1/8	4	1 1/8	7.7	
1 1/2	8	1 3/4	2 7/8	5 3/4	4	1 1/4	10.4	
2	9 1/4	2	3 5/8	6 3/4	8	1 1/8	17.6	
2 1/2	10 1/2	2 1/4	4 1/8	7 3/4	8	1 1/4	25.4	
3	12	2 5/8	5	9	8	1 3/8	39.0	
4	14	3	6 3/16	10 3/4	8	1 5/8	61.2	
5	16 1/2	3 5/6	7 5/16	12 3/4	8	1 7/8	102.0	
6	19	4 1/4	8 1/2	14 1/2	8	2 1/8	156.4	
8	21 3/4	5	10 5/8	17 1/4	12	2 1/8	240.4	
10	26 1/2	6 1/2	12 3/4	21 1/4	12	2 5/8	467.0	
12	30	7 1/4	15	24 3/8	12	2 7/8	589.5	

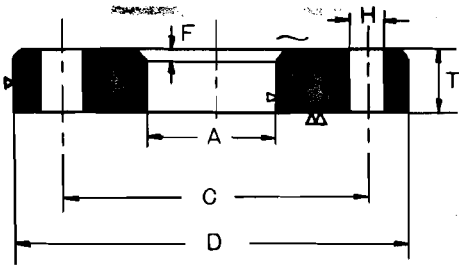
UNLESS OTHER MATERIAL IS SPECIFIED, FUTAWA'S FLANGES ARE FORGED FROM STEEL BILLETS COVERED BY ASTM A105.

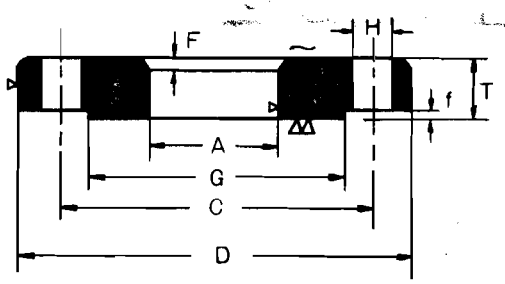
PLATE FLANGES covered by API Spec.



PIPE SIZE (B)	O.D. D	BORE A	THICKNESS T	O.D. of RF G	BOLT CIRCLE C	O.D. of HOLE H	No. of HOLES	O.D. of BOLT	WEIGHT kg
1/2	88.9	22.2	11.1	34.9	60.3	15.9	4	1/2	0.4
3/4	98.4	27.7	12.7	42.9	69.9	15.9	4	1/2	0.8
1	108.0	34.5	14.3	50.8	79.4	15.9	4	1/2	0.8
1 1/4	117.5	43.2	15.9	63.5	88.9	15.9	4	1/2	1.2
1 1/2	127.0	49.1	17.5	73.0	98.4	15.9	4	1/2	1.6
2	152.4	61.1	19.1	92.1	120.7	19.1	4	5/8	1.9
2 1/2	177.8	77.1	22.2	104.8	139.9	19.1	4	5/8	2.4
3	190.5	90.0	23.8	127.0	152.4	19.1	4	5/8	3.0
3 1/2	215.9	102.6	23.8	139.7	177.8	19.1	8	5/8	4.4
4	228.6	115.4	23.8	157.2	190.5	19.1	8	5/8	5.8
5	254.0	141.2	23.8	185.7	215.9	22.2	8	3/4	6.2
6	279.4	166.6	25.4	215.9	241.3	22.2	8	3/4	7.4
8	342.9	218.0	28.6	269.9	298.5	22.2	8	3/4	12.0
10	406.4	269.5	30.2	323.9	362.0	25.4	12	7/8	19.0
12	482.6	321.0	31.8	381.0	431.8	25.4	12	7/8	30.0
14	533.4	358.1	34.9	421.8	476.3	28.6	12	1	31.0
16	596.9	409.0	36.5	469.9	539.8	28.6	16	1	39.0
18	635.0	459.0	39.7	533.4	577.9	31.8	16	1 1/8	44.0
20	698.5	510.0	42.9	584.2	635.0	31.8	20	1 1/8	56.0
22	749.3	561.0	46.0	641.3	692.1	34.9	20	1 1/4	63.0
24	812.8	612.0	47.6	692.2	749.3	34.9	20	1 1/4	75.0

PLATE FLANGES for WATERWORKS

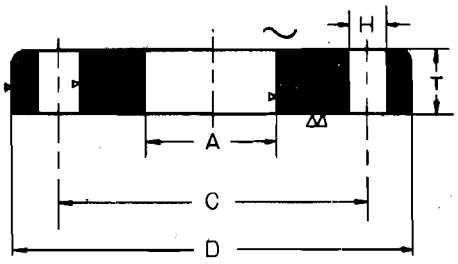




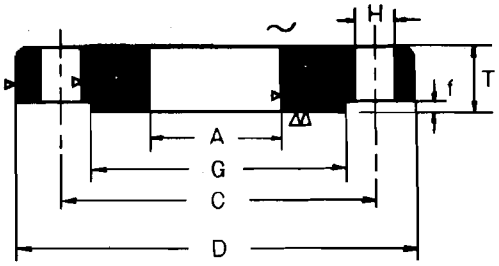
PIPE SIZE (m/m)	BORE A	O.D. D	THICK T	CUT for WELD F	THICK of RF f	O.F. of RF G	BOLT CIRCLE DIA. C	DRILLING DIA. H	DRILLING No. N	WEIGHT (kg) PLATE	WEIGHT (kg) BLIND
50	61.5	184	18	4	2	97	140	18	4	3.0	3.65
65	77.5	193	18	4	2	111	155	18	4	3.0	3.85
80	90.0	211	18	4	3	125	168	18	4	4.1	4.5
100	115.4	238	18	4	3	152	195	18	4	4.8	5.55
125	141.2	263	19	5	3	177	220	18	6	5.7	7.2
150	166.6	290	20	6	3	204	247	18	6	7.0	9.3
200	218.0	342	21	6	3	256	299	18	8	9.2	13.5
250	269.5	410	23	6	3	308	360	21	8	13.5	21.5
300	321.0	464	26	6	4	362	414	21	10	18.0	30.0
350	358.1	530	26	6	4	414	472	24	10	24.0	39.8
400	409.0	582	26	6	4	466	524	24	12	28.0	47.0
450	459.0	652	28	6	4	518	585	28	12	36.5	65.6
500	510.0	706	28	6	4	572	639	28	12	41.0	80.0
600	612.0	810	30	6	4	676	743	28	16	52.0	105.0
700	713.0	928	30	6	4	780	854	31	16	70.0	141.0
800	815.0	1,034	32	7	4	886	960	31	20	80.0	190.0
900	917.0	1,156	32	8	4	990	1,073	34	20	90.0	233.0
1,000	1,018.0	1,262	34	9	4	1,096	1,179	34	24	115.0	296.0
1,100	1,120.0	1,366	36	10	4	1,200	1,283	34	24	140.0	365.0
1,200	1,221.0	1,470	38	11	4	1,304	1,387	34	28	165.0	452.0
1,350	1,374.0	1,642	40	12	4	1,462	1,552	38	28	220.0	580.0
1,500	1,526.0	1,800	42	13	4	1,620	1,710	38	32	240.0	760.0

PLATE FLANGES for JIS 5kg/cm²

Flat Face



Raised Face

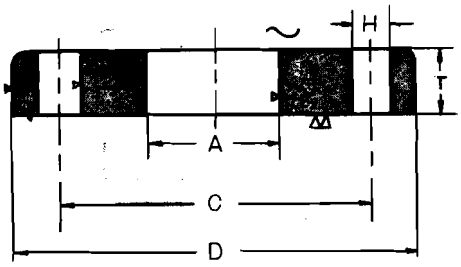


JIS Standard B2211

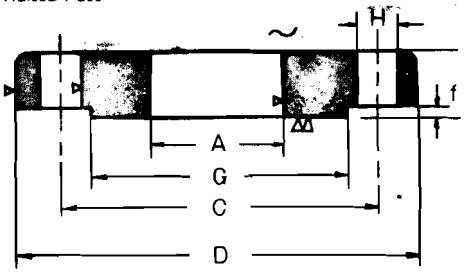
PIPE SIZE	I.D.	O.D.	THICK-NESS	THICK of RF	O.D. of RF	BOLT CIRCLE	DRILLING		WEIGHT (kg)	
	A	D	T	f	G	C	H	N	Plate	Blind
3/8	18.0	75	9	1	42	55	12	4	0.27	0.29
1/2	22.5	80	9	1	48	60	12	4	0.3	0.33
3/4	28.0	85	10	1	52	65	12	4	0.37	0.42
1	34.5	95	10	1	62	75	12	4	0.45	0.53
1 1/4	43.5	115	12	2	72	90	15	4	0.8	0.94
1 1/2	50.0	120	12	2	78	95	15	4	0.83	1.1
2	61.5	130	14	2	88	105	15	4	1.1	1.5
2 1/2	77.5	155	14	2	112	130	15	4	1.5	2.1
3	90.5	180	14	2	125	145	19	4	2.0	2.7
3 1/2	103.0	190	14	2	135	155	19	4	2.2	3.1
4	116.0	200	16	2	145	165	19	8	2.4	3.8
5	142.0	235	16	2	180	200	19	8	3.3	5.3
6	167.0	265	18	2	210	230	19	8	4.5	7.7
7	192.0	300	18	2	235	260	23	8	5.6	9.8
8	218.0	320	20	2	255	280	23	8	6.4	12.2
9	244.0	345	20	2	280	305	23	12	8.5	15.9
10	270.0	385	22	2	320	345	23	12	9.0	19.0
12	320.0	430	22	3	365	390	23	12	10.7	24.7
14	358.0	480	24	3	405	435	25	12	15.0	37.0
16	409.0	540	24	3	465	495	25	16	18.0	43.0
18	459.0	605	24	3	525	555	25	16	23.0	54.0
20	510.0	655	24	3	575	605	25	20	26.0	63.0
22	561.0	720	26	3	630	655	27	20	32.0	82.0
24	612.0	770	26	3	680	715	27	20	35.0	95.0

PLATE FLANGES for JIS 10kg/cm²

Flat Face



Raised Face

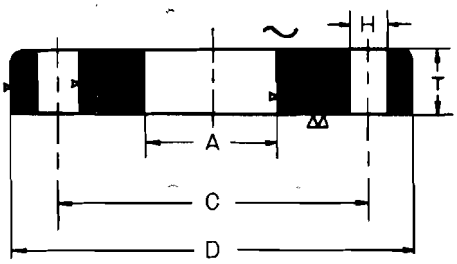


JIS Standard B2212

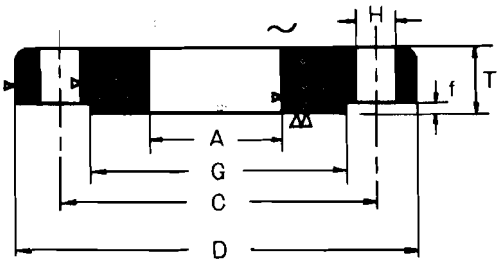
PIPE SIZE	I.D.	O.D.	THICK-NESS	THICK of RF	O.D. of RF	BOLT CIRCLE	DRILLING		WEIGHT (kg)	
	A	D	T	f	G	C	H	N	Plate	Blind
3/8	18.0	90	12	1	48	65	15	4	0.52	0.55
1/2	22.5	95	12	1	52	70	15	4	0.57	0.61
3/4	28.0	100	14	1	58	75	15	4	0.74	0.8
1	34.5	125	14	1	70	90	19	4	1.2	1.4
1 1/4	43.5	135	16	2	80	100	19	4	1.5	1.7
1 1/2	50.0	140	16	2	85	105	19	4	1.6	1.9
2	61.5	155	16	2	100	120	19	4	1.9	2.3
2 1/2	77.5	175	18	2	120	140	19	4	2.6	3.3
3	90.5	185	18	2	130	150	19	8	2.65	3.6
3 1/2	103.0	195	18	2	140	160	19	8	2.8	4.0
4	116.0	210	18	2	155	175	19	8	3.2	4.7
5	142.0	250	20	2	185	210	23	8	4.9	7.4
6	167.0	280	22	2	215	240	23	8	6.3	10.1
7	192.0	305	22	2	240	265	23	12	7.3	12.3
8	218.0	330	22	2	265	290	23	12	8.6	15.0
9	244.0	350	22	2	285	310	23	12	10.5	19.3
10	270.0	400	24	2	325	355	25	12	11.0	22.0
12	320.0	445	24	3	370	400	25	16	12.0	27.0
14	358.0	490	26	3	415	445	25	16	17.5	35.5
16	409.0	560	28	3	475	510	27	16	25.0	58.0
18	459.0	620	30	3	530	565	27	20	33.0	70.0
20	510.0	675	30	3	585	620	27	20	36.0	84.0
22	561.0	745	32	3	640	680	33	20	49.0	110.0
24	612.0	795	32	3	690	730	33	24	52.0	125.0

PLATE FLANGES for 20kg/cm²

Flat Face



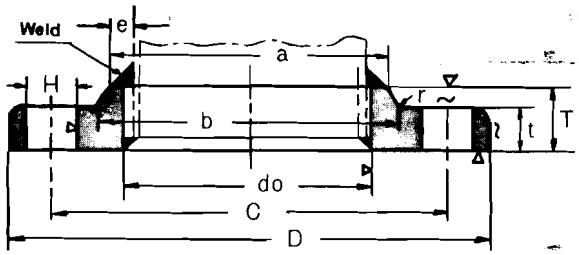
Raised Face



JIS Standard B2214

PIPE SIZE	I.D.	O.D.	THICK-NESS	THICK of RF	O.D. of RF	BOLT CIRCLE	DRILLING		WEIGHT (kg)	
	A	D	T	f	G	C	H	N	Plate	Blind
3/8	18.0	90	14	1	48	65	15	4	0.57	0.6
1/2	22.5	95	14	1	52	70	15	4	0.63	0.68
3/4	28.0	100	16	1	58	75	15	4	0.78	0.85
1	34.5	125	16	1	70	90	19	4	1.2	1.34
1 1/4	43.5	135	18	2	80	100	19	4	1.6	1.72
1 1/2	50.0	140	18	2	85	105	19	4	1.65	1.9
2	61.5	155	18	2	100	120	19	8	2.1	2.3
2 1/2	77.5	175	20	2	120	140	19	8	2.5	3.2
3	90.5	200	22	2	135	160	23	8	3.7	4.4
3 1/2	103.0	210	24	2	145	170	23	8	4.2	5.7
4	116.0	225	24	2	160	185	23	8	4.9	6.8
5	142.0	270	26	2	195	225	25	8	7.35	10.5
6	167.0	305	28	2	230	260	25	12	9.8	14.5
7	192.0	325	30	2	250	280	25	12	11.1	17.9
8	218.0	350	30	2	275	305	25	12	12.2	20.8
9	244.0	410	34	2	325	360	27	12	19.0	29.7
10	270.0	430	34	2	345	380	27	12	21.0	34.0
12	320.0	480	36	3	395	430	27	16	24.0	47.0
14	358.0	540	40	3	440	480	33	16	36.0	68.0
16	409.0	605	46	3	495	540	33	16	51.0	94.0
18	459.0	675	48	3	560	605	33	20	67.0	120.0
20	510.0	730	50	3	615	660	33	20	78.0	148.0
22	561.0	795	52	3	670	720	39	20	93.0	180.0
24	612.0	845	54	3	720	770	39	24	103.0	210.0

BOSS FLANGES for JIS 10kg/cm² and 5kg/cm²



BOSS FLANGES for 5kg/cm² covered by JIS B 2221. 1)

PIPE SIZE (MM) (A)	O.D. of PIPE	PIPE SIZE (IN.) (B)	BORE	O.D.	THICK			BOSS DIMENSIONS			DRILLING			DIA. of BOLT	WEIGHT (kg)
			do	D	t	T	e	a	b	r	C	No. N	H		
225	241.8	9	243.7	345	20	30	7	–	–	–	305	12	23	M20	6.64
250	267.4	10	269.5	385	22	32	–	286	290	5	345	12	23	M20	10.1
300	318.5	12	321.0	430	22	34	–	338	342	5	390	12	23	M20	11.3
350	355.6	14	358.1	480	24	36	–	378	382	5	435	12	25	M22	12.8
400	406.4	16	409.0	540	24	36	–	432	436	5	495	16	25	M22	18.3

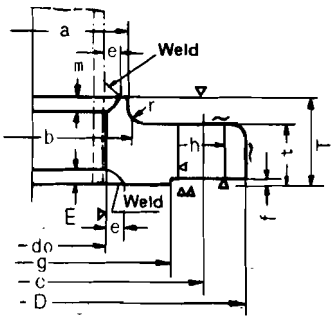
BOSS FLANGES for 10kg/cm² covered by JIS B2224. 2)

(A)	O.D. of	(B)	do	D	t	T	e	a	b	r	C	N	H	DIA. of BOLT	WEIGHT (kg)
175	190.7	7	192.1	305	22	32	7	208	212	6	265	12	23	M20	7.28
200	216.3	8	218.0	330	22	32	7	234	238	6	290	12	23	M20	8.04
225	241.8	9	243.7	350	22	34	7	260	264	6	310	12	23	M20	8.44
250	267.4	10	269.5	400	24	36	–	288	292	6	355	12	25	M22	12.7
300	318.5	12	321.0	445	24	38	–	340	346	6	400	16	25	M22	13.8
350	355.6	14	358.1	490	26	42	–	380	386	6	445	16	25	M22	18.2
400	406.4	16	409.0	560	28	44	–	436	442	6	510	16	27	M24	25.2

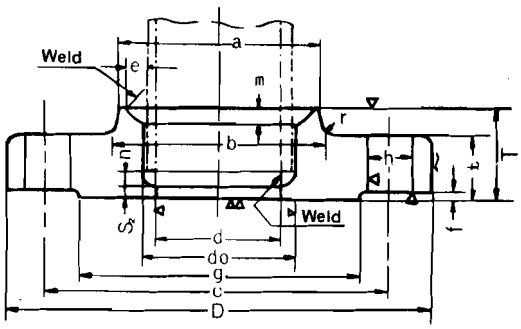
NOTE: 1. DIMENSIONS OF SIZES 3/8" THROUGH 8" ARE THE SAME AS FOR PLATE FLANGES FOR 5kg/cm² COVERED BY JIS B2211.
2. DIMENSIONS OF SIZES 3/8" THROUGH 6" ARE THE SAME AS FOR PLATE FLANGES FOR 10kg/cm² COVERED BY JIS B2212.

BOSS FLANGES for JIS 20kg/cm²

3/8" to 2"



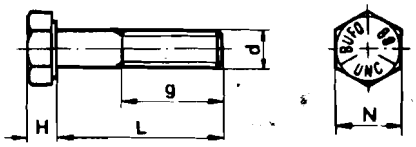
2½" to 16"



JIS Standard B2224

PIPE SIZE		O.D. of PIPE	BORE	O.D.	FLANGE DIMENSIONS								DRILLING			O.D. of BOLT					W
							HUB														
(B)	(A)		do	D	t	T	a	b	r	f	g	d	C	No.	h		e	m	S2	n	kg
3/8	10	17.3	17.8	90	14	20	30	32	4	1	48	–	65	4	15	M12	5	4	–	–	0.59
1/2	15	21.7	22.2	95	14	20	34	36	4	1	52	–	70	4	15	M12	5	4	–	–	0.66
3/4	20	27.2	27.7	100	16	22	40	42	4	1	58	–	75	4	15	M12	5	4	–	–	0.82
1	25	34.0	34.5	125	16	24	48	50	4	1	70	–	90	4	19	M16	5	4	–	–	1.28
1 1/4	32	42.7	43.2	135	18	26	56	60	5	2	80	–	100	4	19	M16	6	5	–	–	1.60
1 1/2	40	48.6	49.1	140	18	26	62	66	5	2	85	–	105	4	19	M16	6	5	–	–	1.69
2	50	60.5	61.1	155	18	26	76	80	5	2	100	–	120	8	19	M16	6	5	–	–	1.92
2 1/2	65	76.3	76.9	175	20	30	94	98	5	2	120	65.9	140	8	19	M16	7	6	5	6	2.70
3	80	89.1	89.7	200	22	34	108	112	6	2	135	78.1	160	8	23	M20	7	6	5	6	3.86
(3 1/2)	(90)	101.6	102.2	210	24	36	120	124	6	2	145	90.2	170	8	23	M20	8	7	5	6	4.47
4	100	114.3	114.9	225	24	36	134	138	6	2	160	102.3	185	8	23	M20	8	7	5	7	5.03
5	125	139.8	140.4	270	26	40	164	170	6	2	195	126.6	225	8	25	M22	9	8	5	7	7.98
6	150	165.2	166.0	305	28	42	196	202	6	2	230	151.0	260	12	25	M22	10	8	5	8	10.5
8	200	216.3	217.1	350	30	46	244	252	6	2	275	199.9	305	12	25	M22	11	9	5	9	13.3
10	250	267.4	268.4	430	34	52	304	312	6	2	345	248.8	380	12	27	M24	12	10	5	10	22.1
12	300	318.5	319.5	480	36	56	354	364	8	3	395	297.9	430	16	27	M24	13	11	5	11	27.2
14	350	355.6	356.6	540	40	62	398	408	8	3	440	333.4	480	16	33	M30	14	12	5	11	39.1
16	400	406.4	407.4	605	46	70	446	456	10	3	495	381.0	540	16	33	M30	15	13	5	12	54.0

NOTE: 1. UNLESS OTHERWISE SPECIFIED, ABOVE FLANGES ARE BOREED TO THESE DIMENSIONS 'D' (TO MATCH SCH. 40 PIPE).



HEXAGON HEAD BOLTS

UNC - thread

Thread d	1/4 UNC	5/16 UNC	3/8 UNC	7/16 UNC	7/16 UNC	1/2 UNC	9/16 UNC	5/8 UNC	3/4 UNC	7/8 UNC	1 UNC	1 1/8 UNC	1 1/4 UNC	1 1/2 UNC
Number of threads per inch	20	18	16	14	13	13	12	11	10	9	8	7	7	6
Ninch	7/16	1/2	9/16	5/8	3/4	3/4	13/16	15/16	1 1/8	1 5/16	1 1/2	1 11/16	1 7/8	2 1/4
H mm	11.1	12.7	14.3	15.9	19	19	20.6	23.8	28.6	33.3	38.1	42.9	47.6	57.2
	4	5.2	6	7.1	7.9	7.9	9.1	9.9	11.9	13.9	15.5	17.5	19.8	23.8
Thread lenght g for L up to 152 over 152	19	22	25	28	32 38	32 38	35 41	38 44	44 51	51 57	57 64	64 70	70 76	83 89
Length L inch mm					Approximate weights in kgs per 100 pccs.									
1/2	13	0.545	0.906	1.42										
5/8	16	0.605	1.00	1.56										
3/4	19	0.663	1.10	1.70	2.29	3.35								
7/8	22	0.723	1.19	1.84	2.48	3.61								
1	25	0.823	1.29	1.99	2.68	3.87	5.08	6.81						
1 1/4	32	0.982	1.57	2.27	3.07	4.38	5.74	7.62						
1 1/2	38	1.14	1.81	2.70	3.61	4.89	6.39	3.42	13.3					
1 3/4	45	1.30	2.06	3.05	4.09	5.63	7.04	9.22	14.4					
2	51	1.46	2.31	3.41	4.57	6.27	8.06	10.4	15.6	22.8	31.3			
2 1/4	57	1.61	2.55	3.77	5.06	6.90	8.87	11.4	17.3	24.4	33.4			
2 1/2	64	1.77	2.80	4.12	5.54	7.53	9.66	12.4	18.7	26.0	35.5		61.2	
2 3/4	70	1.93	3.04	4.47	6.02	8.16	10.5	13.3	20.1	28.6	37.7	49.1	64.6	
3	76	2.09	3.29	4.83	6.51	8.79	11.3	14.3	21.6	30.5	41.0	52.8	68.0	
3 1/4	83			5.19	6.99	9.43	12.1	15.3	23.0	32.5	43.5	56.0	72.5	111
3 1/2	89		3.78	5.54	7.47	10.1	12.9	16.3	24.4	34.4	46.1	59.2	76.5	116
3 3/4	95		4.03	5.89	8.44	10.7	14.5	17.3	25.8					
4	102		4.28	6.25		11.3	16.1	18.3	27.3	38.3	51.1	65.5	84.4	128
4 1/2	114			6.96		12.6		20.2	30.1	42.1	56.2	71.9	92.3	139
5	127		5.26	7.67	10.4	13.8		22.2	33.0	46.0	61.2	78.3	100	151
5 1/2	140			8.38		15.1		24.2	35.8	49.9	66.3	84.7	108	162
6	152			9.09		16.4		26.1	38.6	53.8	71.3	91.1	116	174
6 1/2	165					17.5		27.9	41.2	57.3	75.9		123	184
7	178					18.8		29.9	44.1	61.2	81.0		131	196
7 1/2	191					20.0		31.9	46.9	65.1	86.1			
8	203					21.3		33.8	49.8	69.0	91.1		147	218
9	229									76.7	101		163	241
10	254									84.4	111		179	264
11	279													
12	304												194	286
													210	309
Nut		0.323	0.488	0.671	1.29	1.70	2.67	3.34	5.39	8.61	12.9	17.5	24.7	42.9
Washer		0.26	0.35	0.71		1.41		3.01	5.79	6.73	7.80			

Bolt lengths within the coloured panel are fully threaded

Standard packing Number per box	1/4 UNC	5/16 UNC	3/8 UNC	7/16 UNC	1/2 UNC	9/16 UNC	5/8 UNC	3/4 UNC	7/8 UNC	1 UNC	1 1/8 UNC	1 1/4 UNC	1 1/2UNC
						Length L							
100	13-76	13-127	13-76	19-51									
50			83-152	57-127	19-203								
25													
10						25-203	25-203	3P-203	51-102 114-254	51-102 114-254	70-152	64-305	83-305

TABLE OF GAUGES

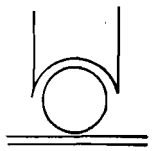
S.W.G. Standard Wire Gauges
B.W.Q. Birmingham (or Stubs Iron) Wire Gauge
B.G. Birmingham Gauge
B.S American Brown and Sharpe's Gauge
U.S.G. United Standard Gauge
M.S.G. United States Manufacturers' Standard Gauge

No.	S.W.G.		B.W.G.		B.G.		B.S.		U.S.G.		M.S.G.	
	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm
0/7	.500	12.700							.5000	12.70		
0/6	.464	11.785							.4688	11.91		
0/5	.432	10.973							.4375	11.11		
0/4	.400	10.160	.454	11.532			.460	11.684	.4063	10.32		
0/3	.372	9.449	.425	10.795	.500	12.700	.410	10.404	.3750	9.53		
0/2	.348	8.839	.380	9.652	.445	11.308	.365	9..266	.3438	8.73		
0	.324	8.230	.340	8.636	.396	10.068	.325	8.252	.3125	7.94		
1	.300	7.620	.300	7.620	.353	8.971	.289	7.348	.2813	7.15		
2	.278	7.010	.294	7.214	.315	7.993	.258	6.543	.2656	6.75		
3	.252	6.401	.259	6.579	.280	7.122	.229	5.827	.2500	6.35		
4	.232	5.893	.238	6.045	.250	6.350	.204	5.189	.2344	5.95		
5	.212	5.385	.220	5.588	.223	5.651	.182	4.620	.2188	5.56		
6	.192	4.877	.203	5.156	.198	5.032	.162	4.115	.2031	5.16		
7	.176	4.470	.180	4.572	.176	4.480	.144	3.665	.1875	4.76		
8	.160	4.064	.165	4.191	.157	3.988	.129	3.264	.1719	4.37		
9	.144	3.658	.148	3.759	.140	3.551	.114	2.906	.1563	3.97	.1496	3.80
10	.128	3.251	.134	3.404	.125	3.157	.102	2.588	.1406	3.57	.1347	3.42
11	.116	2.946	.120	3.048	.111	2.827	.091	2.304	.1250	3.18	.1197	3.04
12	.104	2.642	.109	2.769	.099	2.517	.081	2.052	.1094	2.78	.1048	2.66
13	.092	2.337	.095	2.413	.088	2.240	.072	1.829	.0938	2.38	.0898	2.28
14	.080	2.032	.083	2.108	.079	1.994	.084	1.628	.0781	1.98	.0748	1.90
15	.072	1.829	.072	1.829	.070	1.775	.057	1.450	.0703	1.79	.0673	1.71
16	.064	1.626	.065	1.651	.063	1.587	.051	1.290	.0625	1.59	.0598	1.52
17	.056	1.422	.058	1.473	.056	1.412	.045	1.151	.0563	1.43	.0540	1.37
18	.048	1.219	.049	1.245	.050	1.257	.040	1.024	.0500	1.27	.0478	1.214
19	.040	1.016	.042	1.067	.0440	1.118	.0359	.912	.0438	1.11	.0418	1.262
20	.036	.914	.035	.889	.0392	.996	.0320	.813	.0375	.953	.359	.912
21	.032	.813	.032	.813	.0349	.886	.0285	.724	.0344	.873	.0329	.836
22	.028	.711	.028	.711	.0313	.94	.0253	.643	.0313	.794	.0299	.760
23	.024	.610	.025	.635	.0278	.707	.0226	.574	.0281	.714	.0269	.683
24	.022	.559	.022	.559	.0248	.629	.0201	.511	.0250	.635	.0239	.607
25	.020	.508	.020	.508	.0220	.560	.0179	.455	.0219	.556	.0209	.531
26	.0180	.457	.018	.457	.0196	.498	.0159	.404	.0188	.478	.0179	.455
27	.0164	.417	.016	.406	.0175	.443	.0142	.361	.0172	.437	.0164	.417
28	.0148	.376	.014	.356	.0156	.397	.0126	.320	.0126	.396	.0149	.378
29	.0136	.345	.013	.330	.0139	.353	.0113	.287	.0141	.358	.0135	.343
30	.0124	.315	.012	.305	.0123	.312	.0100	.254	.0125	.318		
31	.0116	.295	.010	.254	.0110	.279	.0089	.227	.0109	.277		
32	.0108	.274	.009	.229	.0098	.249	.0080	.202	.0102	.259		
33	.0100	.254	.008	.203	.0087	.221	.0071	.180	.0094	.239		
34	.0092	.234	.007	.178	.0077	.196	.0063	.160	.0086	.218		
35	.0084	.213	.005	.127	.0069	.175	.0056	.143	.0078	.198		
36	.0078	.193	.004	.102	.0061	.155	.0050	.127	.0070	.178		
37	.0068	.173			.0045	.137	.0045	.113	.0066	.168		
38	.0060	.152			.0048	.122	.0040	.101	.0063	.160		
39	.0052	.132					.0035	.090				
40	.0048	.122					.0031	.060				

COMPARATIVE LIST OF MESHES

Count of Lines			Diameter		Weight		count of Lines			Diameter		Weight	
B.W.G.	B.&.S.	S.W.G.	(mm)	saclional area	gr/m	m/kg	B.W.G.	B.&.S.	S.W.G.	(mm)	saclional area	gr/m	m/kg
			11.67	106.907	848.841	1.18			20	0.91	0.6500	5.16	193.76
			11.52	104.177	827.165	1.21		19		0.91	0.6500	5.16	193.76
			10.78	91.223	724.310	1.38	20			0.89	0.6217	4.93	202.60
			10.39	84.742	672.851	1.49	21		21	0.81	0.5150	4.08	244.55
			10.15	80.872	642.123	1.56		20		0.81	0.5150	4.08	244.55
			9.64	72.949	579.215	1.73		21		0.72	0.4069	3.23	309.59
			9.44	69.954	555.403	1.80	22		22	0.71	0.3957	3.14	318.36
			9.24	67.201	532.146	1.88		22		0.64	0.3215	2.55	381.84
			8.82	61.067	484.871	2.06	23			0.63	0.3115	2.47	404.36
			8.63	59.646	464.204	2.15			23	0.16	0.2920	2.30	431.40
			8.24	53.299	423.194	2.36		23		0.57	0.2540	2.01	486.03
			8.22	53.041	421.145	2.37	24		24	0.56	0.2732	2.16	451.04
1		1	7.61	45.460	360.952	2.77		24		0.51	0.2041	1.62	617.28
	1		7.34	42.292	335.798	2.98	25		25	0.51	0.2041	1.62	617.26
2			7.21	40.807	324.007	3.09	26		26	0.46	0.1661	1.31	758.72
		2	7.01	38.574	306.277	3.27		25		0.46	0.16610	1.31	758.72
3			5.57	33.884	269.038	3.72			27	0.42	0.13847	1.09	909.81
	2		6.53	33.473	265.775	3.76	27			0.41	0.13195	1.04	955.10
		3	6.39	32.053	254.500	3.93		26		0.40	0.12560	0.99	1.003.60
4			6.14	28.638	227.385	4.40			28	0.38	0.11335	0.899	1.112.30
		4	5.89	27.233	216.230	4.62		27		0.36	0.10173	0.807	1.239.10
	3		5.82	26.589	211.116	4.74	28			0.36	0.10173	0.807	1.239.10
5			5.58	24.442	194.069	5.15			29	0.34	0.09074	0.720	1.388.40
		5	5.38	22.713	180.341	5.55	29			0.33	0.08548	0.678	1.474.90
	4		5.18	21.063	167.240	5.98		28		0.32	0.08038	0.638	1.576.73
6			5.18	20.820	165.310	6.05			30	0.31	0.07543	0.598	1.672.20
		6	4.87	18.617	147.818	6.77	30			0.30	0.07065	0.560	1.785.70
	5		4.61	16.682	132.45	7.55			31	0.29	0.06601	0.524	1.908.30
7			4.57	16.394	130.16	7.68		29		0.285	0.06376	0.506	1.975.20
		7	4.47	15.685	124.53	8.03			32	0.274	0.05893	0.467	2,141.30
8			4.19	13.781	109.42	9.14		30		0.253	0.05024	0.398	2,512.50
	6		4.11	13.260	105.28	9.50	31		33	0.253	0.05024	0.398	2,512.50
		8	4.06	12.939	102.73	9.73			34	0.233	0.04261	0.338	2,545.50
9			3.75	11.039	87.64	11.41	32			0.228	0.04080	0.323	3,095.90
	7		3.66	10.515	83.48	11.98		31		0.226	0.04009	0.318	3,144.50
		9	3.65	10.458	83.03	12.04			35	0.213	0.03561	0.282	3,546.60
10			3.40	9.076	72.06	13.88	33			0.203	0.03234	0.256	3,906.20
	8		3.25	8.291	65.83	15.19		32		0.201	0.03171	0.251	3,984.00
		10	3.24	8.240	65.42	15.29			36	0.193	0.02931	0.232	4,310.30
11			3.04	7.254	57.59	17.36		33		0.18	0.02543	0.201	4,975.10
		11	2.97	6.924	54.97	18.19	34			0.177	0.02559	0.195	5,128.20
	9		2.90	6.601	52.41	19.08			37	0.172	0.02322	0.184	5,434.70
12			2.76	5.979	47.47	21.07		34		0.162	0.02060	0.1635	6,113.
		12	2.64	5.492	43.60	22.94			38	0.152	0.01813	0.1440	6.944.
	10		2.59	5.265	41.80	13.92		35		0.142	0.01582	0.1256	7,957.
13			2.41	4.559	36.19	27.63			39	0.132	0.01367	0.1086	9,208.
		13	2.33	4.261	33.83	29.56	35	36		0.127	0.01266	0.1005	9,948.
	11		2.30	4.152	32.96	30.34			40	0.121	0.01149	0.09125	10,958.
14			2.11	3.494	27.74	36.05		37		0.113	0.01002	0.07958	12,565.
	12		2.03	3.234	25.67	38.96			41	0.111	0.00967	0.07679	13,022.
		14	2.03	3.234	25.67	38.96	36		42	0.101	0.00800	0.06358	1,729.
15		15	1.83	2.628	20.86	47.93		38		0.101	0.00800	0.06358	15,728.
	13		1.82	2.600	20.64	48.45			43	0.091	0.00650	0.05161	19,376.
16			1.65	2.137	16.96	58.96		39		0.090	0.00635	0.05048	19,809.
	14		1.63	2.0856	16.55	60.38			44	0.081	0.00515	0.04089	24,455.
		16	1.63	2.0856	16.55	60.38		40		0.080	0.00502	0.03989	25,068.
		17	1.47	1.0963	13.46	74.25			45	0.071	0.00395	0.03141	31,836.
	15		1.45	1.6504	13.10	76.31			46	0.061	0.00292	0.02319	43,122.
		17	1.42	1.5828	12.56	79.57			47	0.051	0.00294	0.01621	61,686.
	16		1.29	1.3063	10.37	96.41			48	0.041	0.00131	0.01047	95,456.
18			1.24	1.2070	9.58	104.35			49	0.030	0.00070	0.00060	178,570.
		18	1.22	1.1683	9.27	107.80			50	0.025	0.00049	0.00349	257,060.
	17		1.15	1.0381	8.24	121.32							
19			1.07	0.8987	7.13	140.15							
	18		1.02	0.8167	6.48	154.22							
		19	1.02	0.8167	6.48	154.22							

HARDNESS CONVERSION TABLE



Brinell		Shore	Rock well		Vickers	Brinell		Shore	Rock well		Vickers
Diarneter of ball 10 mm	Load 3,000 kg		B Scale	C Scale		Diarneter of ball 10 mm	Load 3,000 kg		B Scale	C Scale	
Standard ball	Tungsten Carbidebll	Hardness No.	Load 100kg	Load 150kg	Hardness No.	Standard ball	Tungsten Carbidebll	Hardness No.	Load 100kg	Load 150kg	Hardness No.
-	-	97	-	68.0	940	388	388	-	-	41.8	410
-	-	96	-	67.5	920	379	379	55	-	40.8	400
-	-	95	-	67.0	900	369	369	-	-	39.8	390
-	767	93	-	66.4	880	360	360	52	(110.0)	38.8	380
-	757	92	-	65.9	860	350	350	-	-	37.7	370
-	745	91	-	65.3	840	341	341	50	(109.0)	36.6	360
-	733	90	-	64.7	820	331	331	-	-	35.5	350
-	722	88	-	64.0	800	322	322	47	(108.0)	34.4	340
-	710	87	-	63.3	780	313	313	-	-	33.3	330
-	698	86	-	62.5	760	303	303	45	(107.0)	32.2	320
-	684	84	-	61.8	740	294	294	-	-	31.0	310
-	670	83	-	61.0	720	284	284	42	(105.5)	29.8	300
-	656	81	-	60.1	700	280	280	-	-	29.2	295
-	647	-	-	59.7	690	275	275	42	(104.5)	28.5	290
-	638	80	-	59.2	680	270	270	-	-	27.8	285
-	630	-	-	58.8	670	265	265	40	(103.5)	27.1	280
-	620	79	-	58.3	660	261	261	-	-	26.4	275
-	611	-	-	57.8	650	256	256	38	(102.0)	25.6	270
-	601	77	-	57.3	640	252	252	-	-	24.8	265
-	591	-	-	56.8	630	247	247	37	(101.0)	24.0	260
-	582	75	-	56.3	620	243	243	-	-	23.1	255
-	573	-	-	55.7	610	238	238	36	99.5	22.2	250
-	564	74	-	55.2	600	233	233	-	-	21.3	245
-	554	-	-	54.7	590	228	228	34	98.1	20.3	240
-	545	72	-	54.1	580	219	219	33	96.7	(18.0)	230
-	535	-	-	53.6	570	209	209	32	95.0	(15.7)	220
-	525	71	-	53.0	560	200	200	30	93.4	(13.4)	210
505	517	-	-	52.3	550	190	190	29	91.5	(11.0)	200
496	507	69	-	51.7	540	181	181	28	89.5	(8.5)	190
488	497	-	-	51.1	530	171	171	26	87.1	(6.0)	180
480	488	67	-	50.5	520	162	162	25	85.0	(3.0)	170
473	479	-	-	49.8	510	152	152	24	81.7	(0.0)	160
465	471	66	-	49.1	500	143	143	22	78.7	-	150
456	460	-	-	48.4	490	133	133	-	75.0	-	140
448	452	64	-	47.7	480	124	124	20	71.2	-	130
441	442	-	-	46.9	470	114	114	-	66.7	-	120
433	433	62	-	46.1	460	105	105	-	62.3	-	110
425	425	-	-	45.3	450	95	95	-	56.2	-	100
415	415	59	-	44.5	440	90	90	-	52.0	-	95
405	405	-	-	43.6	430	86	86	-	48.0	-	90
397	397	57	-	42.7	420	81	81	-	41.0	-	85

CONVERSION TABLE :

inch, fractions, decimals and millimeters

inches		mm	inches		mm	inches		mm	inches		mm
fractions	decimals		fractions	decimals		fractions	decimals		fractions	decimals	
-	.0004	.01	25/32	.781	19.844	-	2.165	55.	311/16	3.6875	93.663
-	.004	.10		.7874	20.	2 3/16	2.1875	55.563	-	3.7008	94.
-	.01	.25	51/64	.797	20.241	-	2.2047	56.	3 23/32	3.719	94.456
1/64	.0156	.397	13/16	.8125	20.638	2 7/32	2.219	56.356	-	3.7401	95.
-	.0197	.50	-	.8268	21.	-	2.244	57.	3 3/4	3.750	95.250
-	.0295	.75	53/64	.828	21.034	2 1/4	2.250	57.150	-	3.7795	96.
1/32	.03125	.794	27/32	.844	21.431	2 9/32	2.281	57.944	3 25/32	3.781	96.044
-	.0394	1.	55/64	.850	21.828	-	2.7835	58.	3 13/16	3.8125	96.838
3/64	.0469	1.191	-	.8661	22.	2 5/16	2.312	58.738	-	3.8189	97.
-	.059	1.5	7/8	.875	22.225	-	2.3226	59.	3 27/32	3.844	97.631
1/16	.062	1.588	57/64	.8906	22.622	2 11/32	2.344	59.531	-	3.8583	98.
5/64	.0781	1.984	-	.9055	23.	-	2.3622	60.	3 7/8	3.875	98.425
-	.0787	2.	29/32	.9062	23.019	2 3/8	2.375	60.325	-	3.8976	99.
3/32	.094	2.381	59/64	.922	23.416	-	2.4016	61.	3 29/32	3.9062	99.219
7/64	.0984	2.5	15/16	.9375	23.813	2 13/32	2.406	61.119	-	3.9370	100.
-	.109	2.778	-	.9449	24.	2 7/16	2.438	61.913	3 15/16	3.9375	100.018
1/8	.1181	3.	61/64	.953	24.209	-	2.4409	62.	3 31/32	3.969	100.806
-	.125	3.175	31/32	.969	24.606	2 15/32	2.469	62.706	-	3.9764	101.
9/64	.1378	3.5	-	.9843	25.	-	2.4803	63.	4	4.000	101.600
5/32	.141	3.572	63/64	.9844	25.003	2 1/2	2.500	63.500	4 1/16	4.062	103.183
-	.156	3.969	1	1.000	25.400	-	2.5197	64.	4 1/8	4.125	104.775
11/64	.1575	4.	-	1.0236	26.	2 17/32	2.531	64.294	-	4.1338	105.
-	.172	4.366	1 1/32	1.0312	26.194	-	2.559	65.	4 3/16	4.1875	106.363
3/16	.177	4.5	1 1/6	1.082	26.988	2 9/16	2.562	65.088	4 1/4	4.250	107.950
-	.1875	4.763	-	1.063	27.	2 19/32	2.594	65.881	4 5/16	4.312	109.588
13/64	.1969	5.	1 3/32	1.094	27.781	-	2.5984	66.	-	4.2307	110.
-	.203	5.159	-	1.1024	28.	2 5/8	2.625	66.675	4 3/8	4.375	111.125
7/32	.2165	5.5	1 1/8	1.125	28.575	-	2.638	67.	4 7/16	4.438	112.713
18/64	.219	5.556	-	1.1417	29.	2 21/32	2.656	67.469	4 1/2	4.500	114.300
-	.234	5.953	1 5/32	1.156	29.369	-	2.6772	68.	-	4.5275	115.
1/4	.2362	6.	-	1.1811	30.	2 11/16	2.6875	68.263	4 9/16	4.562	115.888
-	.250	6.350	1 3/16	1.1875	30.163	-	2.7165	69.	4 5/8	4.625	117.475
17/64	.2559	6.5	1 7/32	1.219	30.956	2 23/32	2.719	69.056	4 11/16	4.6875	119.063
-	.2656	6.747	-	1.2205	31.	2 3/4	2.750	69.850	-	4.7244	120.
9/32	.2756	7.	1 1/4	1.250	31.750	-	2.7559	70.	4 3/4	4.750	120.650
-	.281	7.144	-	1.2598	32.	2 25/32	2.781	70.6439	4 13/16	4.8125	122.238
19/64	.2953	7.5	1 9/32	1.281	32.544	-	2.7953	71.	4 7/8	4.875	123.825
5/16	.297	7.541	-	1.2992	33.	2 13/16	2.8125	71.4376	-	4.9212	125.
-	.312	7.938	1 5/16	1.312	33.338	-	2.8346	72.	4 15/16	4.9375	125.413
21/64	.315	8.	-	1.3386	34.	2 27/32	2.844	72.2314	5	5.000	127.000
-	.328	8.334	1 11/32	1.344	34.131	-	2.8740	73.	-	5.1161	130.
11/32	.335	8.5	1 3/8	1.375	34.925	2 7/8	2.875	73.025	5 1/4	5.250	133.350
-	.344	8.731	-	1.3779	35.	2 29/32	2.9062	73.819	5 1/2	5.500	139.700
23/64	.3543	9.	1 13/32	1.406	35.719	-	2.9134	74.	-	5.5118	140.
-	.359	9.128	-	1.4173	36.	2 15/16	2.9375	74.613	5 3/4	5.750	146.050
3/8	.374	9.5	1 7/16	1.438	36.513	-	2.952	75.	-	5.9055	150.
25/64	.375	9.525	-	1.4567	37.	2 31/32	2.969	75.406	6	6.000	152.400
-	.391	9.922	1 15/32	1.469	37.306	-	2.9921	76.	6 1/4	6.250	158.750
13/32	.3937	10.	-	1.4961	38.	3	3.000	76.200	-	6.2992	160.
-	.406	10.319	1 1/2	1.500	38.100	3 1/32	3.0312	76.994	6 1/2	6.500	165.100
27/64	.413	10.5	1 17/32	1.531	38.894	-	3.0315	77.	-	6.6929	170.
-	.422	10.716	-	1.5354	39.	3 1/16	3.062	77.788	6 3/4	6.750	171.450
7/16	.4331	11.	19/16	1.562	39.688	-	3.0709	78.	7	7.000	177.800
29/64	.438	11.113	-	1.5746	40.	3 3/32	3.094	78.581	-	7.0866	180.
15/32	.453	11.509	1 19/32	1.594	40.481	-	3.1102	79.	-	7.4803	190.
-	.469	11.906	-	1.6142	41.	3 1/8	3.125	79.375	7 1/2	7.500	190.500
31/64	.4724	12.	1 5/8	1.625	41.275	-	3.1496	80.	-	7.8740	200.
-	.484	12.303	-	1.6535	42.	3 5/32	3.156	80.169	8	8.000	203.200
1/2	.492	12.5	1 21/32	1.6562	42.069	3 3/16	3.1875	80.963	-	8.2677	210.
-	.500	12.700	1 11/16	1.6875	42.863	-	3.1890	81.	8 1/2	8.500	215.900
33/64	.5118	13.	-	1.6929	43.	3 7/32	3.219	81.756	-	8.6614	220.
17/32	.5156	13.097	1 23/32	1.719	43.565	-	3.2283	82.	9	9.000	228.600
35/64	.531	13.494	-	1.7323	44.	3 1/4	3.250	82.550	-	9.0551	230.
-	.547	13.891	1 3/4	1.750	44.450	-	3.2677	83.	-	9.4488	240.
9/16	.5512	14.	-	1.7717	45.	3 9/32	3.281	83.344	9 1/2	9.500	241.300
-	.563	14.288	1 25/32	1.781	45.244	-	3.3071	84.	-	9.8425	250.
37/64	.571	14.5	-	1.8110	46.	3 5/16	3.312	84.1377	10	10.000	254.001
-	.578	14.684	1 13/16	1.8125	46.038	3 11/32	3.344	84.9314	-	10.2362	260.
19/32	.5906	15.	1 27/32	1.844	46.831	-	3.3464	85.	-	10.6299	270.
39/64	.594	15.081	-	1.8504	47.	3 3/8	3.375	85.725	11	11.000	279.401
5/8	.609	15.478	1 7/8	1.875	47.625	-	3.3858	86.	-	11.0236	280.
-	.625	15.875	-	1.8898	48.	3 13/32	3.406	86.519	-	11.4173	290.
41/64	.6299	16.	1 29/32	1.9062	48.419	-	3.4252	87.	-	11.8110	300.
-	.6406	16.272	-	1.9291	49.	3 7/16	3.438	87.313	12	12.000	304.801
21/32	.6496	16.5	1 15/16	1.9375	49.213	-	3.4646	88.	13	13.000	330.201
-	.656	16.669	-	1.9685	50.	3 15/32	3.649	88.106	-	13.7795	350.
43/64	.6693	17.	1 31/32	1.969	50.006	1 1/2	3.500	88.900	14	14.000	355.601
11/16	.672	17.066	2	2.000	50.800	-	3.5039	89.	15	15.000	381.001
45/64	.6875	17.463	-	2.0079	51.	3 17/32	3.531	89.694	-	15.4780	400.
-	.703	17.859	2 1/32	2.03125	51.594	-	3.5433	90.	16	16.000	406.401
-	.7087	18.	-	2.0472	52.	3 9/16	3.562	90.487	17	17.000	431.801
23/32	.719	18.256	2 1/16	2.052	52.388	-	3.5827	91.	-	17.7165	450.
-	.7283	18.5	-	2.0866	53.	3 19/32	3.594	91.281	18	18.000	457.201
47/64	.734	18.653	2 3/32	2.094	53.181	-	3.622	92.	19	19.000	482.601
-	.7480	19.	2 1/8	2.125	53.975	3 5/8	3.625	92.075	-	19.6850	500.
3/4	.750	19.050	-	2.126	54.	3 21/32	3.656	92.869	20	20.000	506.001
40/64	.7658	19.447	2 5/32	2.156	54.769	-	3.6614	93.	-	-	-

APPLICATION AND MATERIAL SPECIFICATION WITH EQUIVALENT STANDARD

Mill Facilities

The plate production facilities are approved by all ship classification socieities.
Plate Mill includes the following:

- O Two Slab reheating furnace.
- O Two 4-high reversing mill.
- O Shot Blast
- O Side trimming shear and end cutter
- O Flame cutting equipment.
- O Normalizing furnace.
- O Heavy cold leveller.
- O Uitrasonic tester.
- O Onenching & Tempering Equipment.

Specification

	NO. 1 MILL	No. 2 MILL
THICKNESS	8-200 m/m	6-200 m/m
WIDTH	1.200-3.100 m/m	1.000-4.500 m/m
LENGTH	22 M(MAX)	25M (MAX)

Qualities

APPLICATION	KOREA	JAPAN	U.S.A.	U.K	GERMANY	OTHERS
GENERAL STRUCTURE	KS SB 34 SB 41 SB 50 SB 55	JIS G 3101 SS 34 SS 41 SS 50 SS 55	ASTM A36 A113 A131 A283 A284 A529 A570	BS4360 40-ABC 43-ABC 50-ABC 55-CE BS-1449 HR-1,2,3,4 HS-1,2,3,4	DIN 17100 ST33-1,2 UST34-1,2 RST34-1,2 UST37-1,2 RST37-1,2 UST42-1,2 RST42-1,2 ST50-1 ST52	 ISOR 630 Fe 33 37 44 52 IS 226- ST 42-S ST 42-SC
WELDED STRUCTURE HIGH-STRENTH	SWS 41 ABC SWS 50 ABC SWS 50 YA YB	JIS G 3106 SM 41 ABC 50 ABC 50 YA YB 53 BC JIS G 3114 SMA 41 A SMA 50 A	A242-1,2	BS4360		IS961 ST55 ST58 IS2062 ST42
BOILER AND OTHER PRESSURE VESSEL	SBB 35 SBB 42 SBB 46	JIS G 3103 SB 35 42 46 46 M	A285 ABC A515 A516	BS-1501-151.154 161,211,221,223	DIN 17155- HI H2	IS 2002, 1 2A,2B
SHIP BUILDING	KR-RA KR-RB KR-RC KR-RD KR-RE	NK-A NK-B NK-D NK-E	ABS AB-A AB-B AB-D AB-E	LR-A LR-B LR-D LR-E	GL-A GL-B GL-D	NV-ALINA-A CR-A NV-BLINA-B CR-B NV-DLINA-D CR-D
MACHINE		JIS G 4051	ASTM A284 A575	BS	DIN	
STRUCTURAL USE		S10C	AISI 1010 040A10	045A10 080A10	DIN C10 CK10	
		~	~	~	DIN C15,C15K	
		S20C	" 1020 040A20	045A20 060A20	DIN C20	
		S22C	" 1022 040A22	045A22 060A22	DIN C22	
		S25C	" 1025 040A25	080A25		
		S28C	" 1028 060A27	080A27		
		S30C	" 1030 060A30	080A30 080M30		
		S33C	" 1033 060A32	080A32		
		S35C	" 1035 060A35		DIN C35,CK35	
		S38C	" 1038 060A37	080A37 080M37		
		S40C	" 1040 060A40	080A40 080M40		
		S43C	" 1043 060A43	080A43		
		S45C	" 1045		DIN C45,CK45	
		S50C	" 1050			
		S55C	" 1055			

Products

The products are used for structural, drawing and cold formed parts in the manutacturing and fabricating industries.
-Automobile parts, Storage tanks, trailers water heaters and large containers, etc
The products can be supplied with skin passed.

Mill Facilities

Hot Strip Mill Facilities include the following:

- O Two Slab Reheating Furnace
- O One Scale Breaker
- O One Roughing Mill with vertical edger
- O Six Finishing Stands in, computer control
- O Two Down Coilers
- O Shearing Line
- O Hot Skin Pass Mill with on line ultrasonic tester

Qualities

APPLICATION	KOREA	JAPAN	U.S.A.	U.K	GERMANY	OTHERS
	KS	JIS G 3131	ASTM	BS 1449		AP15L-A.B.
COMMERCIAL	SHP 1	SPHC	A 569	HR5 HR6 HR1 5		AP15LX-X42
DRAWING	SHP 2	SPHD	A 621	HR3 HR4 HR1 4		AP15LX-X46
DEEP DRAWING	SHP 3	SPHE	A 622	HR1 HR2 HR1 3		
PLATE IN COIL			A 635			
		JIS G 3132		BS 1387	DIN 17172	
TUBE	HRS 1	SPHT 1	A 120		UST 34.7	
	HRS 2	SPHT 2			RST 34.7	
	HRS 3	SPHT 3	A 53 AB		RRST 34.7	
		SPHT 4			UST 38.7	
					RST 38.7	
					RRST 38.7	
					ST 43.7	
					DIN1623 BL-2	
		JIS G 3101		BA 4360	ST42 ST50 ST52	
STRUCTURES	SB 34	SS 34	A 36	GRADE 40 A-E	DIN 17100	
	SB 41	SS 41	A 113 ABC	GRADE 43 A-E	ST 33-1.2	
	SB 50	SS 50	A 131 ABC	GRADE 50 A-D	UST 34-1.2	
		SS 55	A 245	GRADE 55 C-E	RST 34-1.2	
			A 283 AB		UST 37-1.	
					RST 37-1.2	
		JIS G 31206			UST 42-1.2	
	SWS 41 ABC	SM 41 ABC	A 570 ABC		RST 42-1.2	
	SWS 50 ABC	SM 50 ABC	A 529		RST 46-2	
	SWS 53 BC	SM 50 YA YB			ST 50-1	
		SM 53 BC			ST 52-3	
HIGH PRESSURE VESSEI		JIS G 3116 SG 26 SG 30 JIS G 3115 SP V-24				
AUTOMOBILE STRUCTURAL USE		JIS G 3113 SAPH 32 SAPH 38 SAPH 41 SAPH 45				
MACHINE STRUCTURAL USE		JIS 4051 S 10 C-S 55 C	A 575 A 284 AISI 1010-1055		DIN 17210. 17200 C 10 C 15	
SHIP BUILDING	KR-RA	NK-A	AB-A	LR-A	GL-A	NV-27 CR-A LINA-A
	KR-RB	NK-B	AB-B	LR-B	GL-B	NV-32 CR-B LINA-B
	KR-RC	NK-D	AB-D	LR-D	GL-D	NV-36 CR-D
	KR-RD	NK-E	AB-E	LR-E		LINA-D
	KR-RE					

* *For other Commercial Quality, negotiation is required.*
The permissble tolerances and general specifications are according to general requirements of each standards.

Comparison of JIS specification with other's

Bars, Shapes and Steel Plates

Japanese Industrial Standards			Related foreign standards		
Std. No.	Title	Material symbol	Std. No.	Title	Material symbol. Grade. Class
JIS G 3101	Rolled Steel for general structure	SS 34 41. 50. 55			
JIS G 3106	Rolled steel for welde structure	SM 41A, 41B, 41C, 50A, 50B, 50C, 50YA, 50YB, 53B, 53C, 58	ASTM A 529-75	Spec. for structural steel with 42,000 psi (290 MPa) Minimum yield point (1/2 in) (12 7 mm) Maximum thickness)	
			ASTM A 570-78	Spec. for hot-rolled carbon steel sheet and strip,structural quality	30, 36, 40, 45, 50
			ASTM A 572-78	Spec, for high-strength low-alloy columbium vanadium steels of structural quality	42, 50, 60, 65
			ASTM A 678-75	Spec. for quenched and tempered carbon steel plates for structural applications	A, B, C
			BS4360-79	Weldable structural steels	40A 40B, 40C, 40D, 40E, 43A1, 43A, 43B, 43C 43D, 43E, 50A, 50B, 50C, 50D, 50D1, 50E, 50F, 55C, 55E, 55F
			DIN 17100-66	Steels for general structural purposes; quality	ST 33, 34, 37, 42, 46, 50, 52, 60, 70
			NF A 35-501-77	Structural steels, Grades nd types. Sheets, medium and heavy plates, universal plates, bars and sections	A33, A34, E24, E26, E30, E36, A50, A60, A70
			ISO R 630-67	Structural steels	Fe 33, 37, 42, 44, 52
JIS G 3114	Hot-rolled atmospheric corrosion resisting steel for welded structure	SMA 41A, 41B, 41C, 50A, 50B, 50C, 58	ASTM A-242-75	Spec, for high strength low-alloy structural steel	1,2
			ASTM A-588-77 a	Spec, for high-strength low-alloy structural steel with 50,000 psi minimum yield point to 4 in, thick.	A,B,C,D,E,F,G,H,J
			BS 4360-79	Weldable structural steels	WR50, A1, A, B, C
			VDEh 087-70	Wetterfeste Baustahle	Wt St 37-2, 37-3, 52-3
			ASTM A 204-78	Spec. for molybdenum alloy steel plates forpressure vessels	A, B, C
			ASTM A 285-78	Spec. for low and intermediate tensile strength carbon-steel plates of flange and firebox qualities for pressure vessels	A, B, C
			ASTM A 414-71	Spec. for carbon steel sheets for pressure vessels	A, B, C, D, E, F, G
			ASTM A 515-78	Spec. for carbon steel plates of intermediate tensile strength for pressure vessel for intermediate and higher temperature service	55, 60, 65, 70
JIS G 3103	Carbon steel and molybdenum alloy steel plates for boilers and other pressure vessels	SB 42, 46, 49, 46M, 49M	ASTM A 516-78	Spec. for carbon steel plates for pressure vessels for moderate and lower temperature service	55, 60, 65, 70
JIS G 3115	Steel plates for pressure vesels for intermediate temperature service	SPV 24, 32, 36, 46, 50	ASTM A 612-76	Spec. for pressure vessel plates, carbon steel, high strength, for moderate and lower temperature service	
JIS G 3116	Steel sheets, plates and strip for gas cylinders	SG 26, 30, 33, 37	ASTM A 662-78	Spec. for pressure vessel plates, carbonmaganese for moderate and lower temperature service	A, B, C,
JIS G 3118	Carbon ssteel plates for pressure vessels for intermediate and moderate temperature service	SGV 42, 46, 49	BS 1501-Pt. 1-64	Steel for fired and unifred pressure vessels plates	151, 161, 211, 213, 221, 224
			DIN 17155 (1) (2)-59	Boiler plate	HI, HII, HIII, HIV. 17Mn4, 19Mn5, 15Mo3
			NF A 36-205-79	Iron and steel. Steel plates for boilers and pressure vessels. Carbon and carbon manganese steel. Grades and types	A37, 42, 48, 52
			ISO 2604 (IV)-75	Steel, oducts for pressure purposes...quality requirements-Part IV: plates	P7, 9, 11,.13, 15, 16, s18, 26, 28

Japanese Industrial Standards			Related foreign standards		
Std. No.	Title	Material symbol	Std. No.	Title	Material symbol. Grade. Class
JIS G 3112	Steel bars for concrete reinforcement	SR 24, 30 SD 24, 30, 35, 40, 50	ASTM A 615-78	Spec. for deformed billet-steel bars for concrete reinforcement	40, 60
			BS 4449-78	Hot rolled steel bars for the reinforcement of concrete	
			DIN 488-72	Reinforcing steel: reinforcing bars	
			NF A 35-015-78	Iron and steel product. Concrete reinforcing round bars	FeE 22, 24
			NF A 35-016-78	Iron and steel product. Concrete reinforcing bars with improved adherence	FeE 40, 50
JIS G 3192	Dimensions, weight and permissible variations of hot rolled steel sections		BS 4 Pt.1-72	Structural steel sections; Hot rolled sections	
			DIN 1019-77	Bar Steel; hot-rolled bulb plate; dimensions weights static properties, permissible deviations	HP
			DIN 1025(1)-63	Steel sections; hot-rolld narrow I-beams, I range, dimensions, weights, static properties	I
			DIN 1025(2)-63	Steel sections; hot-rolled wide I-beams (I-section wide flange beams), IPB Range and IB Range, dimensions, weights, static properties	IPB,IB
			DIN 1025(3)-63	Steel sections; hot-rolled I-beams, wide flange I-beams; light pattern, IP Bl-series, dimensions, weights, tolerances, static values	IPBl
			DIN 1025(4)-63	Steel sections; hot-rolled I-beams; wide flange I-beams, heavy pattern, IP Bv-series, dimensions, weights, tolerances, static values	IPBV
			DIN 1025(5)-65	Steel sections; hot-rolled I-beams; medium-flange I-beams, IPE-series, dimensions, weights, tolerances, static values	IPE
			DIN 1026-63	Bars, steel sections; hot-rolled rounded-edge channels, dimensions, weights, static properties	U
			DIN 1028-76	Bar steel; hot-rolled rounded-edge equal angles, dimensions, weights, static properties	
			DIN 1029-63	Bar steel; hot-rolled rounded-edge unequal angles, dimensions, weights, static properties	
			ISO 657(V)-76	Hot-rolled steel sections-Part V: Equal-by angles and unequal-by angles-Tolerances for metric and inch series	
JIS G 3350	Light gauge steels for general structure	SSC 41	BS 2994-76	Cold rolled steel sections	
			DIN 17116-76	Cold rolled steel sections; technical conditions of delivery	
			NF A 37-101-77	Steel cold formed sections, for common purposes	

Steel Pipes

Japanese Industrial Standards			Related foreign standards		
Std. No.	Title	Material symbol	Std. No.	Title	Material symbol. Grade. Class
JIS G 3452	Carbon steel pipes for ordinary piping	SGP	ASTM A 120-76	Spec. for black and hot-dipped zinc-coated (galvanized) welded and seamless steel pipe for ordinary uses	
			ASTM A 53-76	Spec. for welede and seamless steel pipe	Type F
			API 5l-78	Spec. for line pipe	Gr. A25
			Bs 1387-67	Steel tubes and tubulars suitable for screwing to B.S. 21 pipe threads	Light, medium, heavy
			DIN 2440-78	Steel tubes medium weight type suitable for screwing	St 33-1
			DIN 2441-76	Steel tubes, heavy-weight suitable for screwing	St 33-1

Japanese Industrial Standards			Related foreign standards		
Std. No.	Title	Material symbol	Std. No.	Title	Material symbol. Grade. Class
JIS G 3454	Carbon steel pipes for pressure service	STPG 38, 42	ASTM A 135-73a	Spec. for electric-resistance-welded steel pipe	A, B
			ASTM A 53-78	Spec. for welded eand seamless steel pipe	E(A,B), S(A,B)
			API 5L-78	Spec. for line pipe	Gr. A,B
			BS 3601-74	Steel pipes and tubes for pressure purposes, Carbon steel: Ordinary duties	ERW (320,360,410), S(320,360,410)
			BS 3602 (1)-78	Steel pipes and tubes for pressure purposes, Carbon steel: High duties	ERW (360,410,460) S (360,410,460,490 Nb)
			DIN 1626(1)-65	Steel pipes, welded, of unalloyed and lowalloy steels for piping, apparatus and containers; general specifications, lay-out and instructions for application	
			DIN 1626(2)-65	Steel pipes, welded, of unalloyed and lowalloy steels for piping, apparatus and containers; pipes for general use (commercial quality); technical terms of delivery	St. 33, 37, 42
			DIN 1626(3)-65	Steel pipes, welded, of unalloyed and lowalloy steels for piping, apparatus and containers; pipes with special quality specifications; technical terms of delivery	St. 34-2, 37-2, 42-2, 52-3
			DIN 1626(4)-65	Steel pipes, welded, of unalloyed and lowalloy steels for piping, apparatus and containers; pipes with quality specifications; subjected to special tests; technical terms of delivery	St. 34-2, 37-2, 42-2, 52-3
			DIN 1629(1)-61	Seamless tubes in unalloyed steels for supply purposes, process plant and tanks, survey, technical conditions of delivery, general data	
			DIN 1629(2)-61	Seamless tubes in unalloyed steels for supply purposes, process plant and tanks, tubes of commercial quality, technical conditions of delivery	St 00
			DIN 1629(3)-61	Seamless tubes in unalloyed steels for supply purposes, process plant and tanks, tubes with quality, specifications, technical conditions of delivery	St 35, 45, 55, 52
			DIN 1629(4)-61	Seamless tubes in unalloyed steels for supply purposes, process plant and tanks, tubes with special quality specifications, technical conditions of delivery	St 35.4, 45.4, 55.4, 52.4
			DIN 2448-66	Seamless steel tubes, dimensions and weights	
			DIN 2442-63	Steel tubes of specified quality suitable for screwing, nominal pressure 1 to 100 kg/cm²	St 35, St 37-2
			ISO 2604(II)-75	Steel products for pressure purposes-quality requirements - Part II: Wroughtseamless tubes	
			ISO 2604(III)-75	Steel products for pressure purposes-quality requirements - Part III: Electric resistance and induction-welded tubes	
JIS G 3455	Carbon steel pipes for hight pressure service	STS 35, 38, 42, 49	BS 778-66	Steel pipes and joints for hydraulic purposes	Seamless, ERW
			ISO 2604 (II)-75	Steel products for pressure purposes-quality requirements-Part II: Wrought seamless tubes	
JIS G 3456	Carbon steel pipes for high temperature service	SIPT 38, 42, 49	ASTM A 106-76	Spec. for seamless carbon-steel pipe for high-temperature service	A,B,C
			DIN 17175-79	Seamless tubes of high-temperature steels; technical conditions of delivery	St 35.8, St 45.8
			DIN 17177-79	Electrically resistance of induction welded steel tubes for elevated temperatures; technical terms of delivery	St 37.8 St 42.8

Japanese Industrial Standards			Related foreign standards		
Std. No.	Title	Material symbol	Std. No.	Title	Material symbol. Grade. Class
JIS G 3457	Arc welded carbon steel pipes	STPY 41	ASTM A 134-74	Spec. for electric-fusion(arc)-welded steel plate pipe (sizes in 16 in and over)	A 245 (A, B, C, D) ASTM A 283, 285
			ASTM A 139-74	Spec. for electric-fusion (arc)-welded steel pipe (sizes in 4 in and over)	A, B , C, D, E,
			ASTM A 211-75	Spec. for spiral-welded steel or iron pipe	ASTM A 570
JIS G 3458	Alloy steel pipes	STPA 12, 22, 23, 24, 25, 26	ASTM A 335-76	Spec. for seamless ferritic alloy steel pipe for high-temperature service	P1, P2, P5, P5b, P5C, P7, P9, P11, P12, P15, P21, P22
			BS 3604-78	Steel pipes and tubes for pressure purposes Low and medium alloy steel	CD 620, 621, 622, 625, 660, 629, 762 HF 620, 621, 622, 625, 660,629, 762
			DIN 17175-79	Seamless tubes fo high-temperature steels; technical conditions of delivery	15 Mo3, 13CrMo44, 10CrMo910
			DIN 17177-79	Electrically resistance of induction welded steel tubes for elevated temperatures; technical terms of delivery	15 Mo 3
			ISO 2604(II)-75	Steel products for pressure purposes - quality requirements-Part II: Wroughtseamless tubes	
			ISO 2604(III)-75	Steel products for pressure purposes-quality requirements-Part III: Electric resistance and induction-welded tubes	
JIS G 3459	Stainless steel pipes	SUS304TP, 304HTP, 304LTP, 321TP, 321HTP, 316TP, 316HTP, 316LTP, 309STP, 310STP, 347TP, 347HTP, 329J1TP	ASTM A 312-77	Spec. for seamless and welded austenitic stainless steel pipe	TP304, TP304H, TP304L,TP304N,TP309, TP310,TP316,TP316H, TP316L,TP316N, TP317,TP321,TP312H,TP347,TP347H, TP348,TP348H TPXM-10,TPXM-11, TPXM-15,TPXM-29
			ASTM A 358-78	Spec. for electric-fusion -welded austenitic chromium-nickel alloy steel pipe for high temperature service	304,304N,316,316N,347,321,309,310, 348,304H,316H
			ASTM A 376-77	Spec. for seamless austenitic steel pipe for high temperature central-station service	TP304,TP304H,PT304N,TP316,TP316H, TP316N,TP321,TP321H,TP347,TP347H, TP348,16-8-2H
			BS 3605-73	Steel pipes and tubes for pressure purposes Austenitic stainless steel	W: 304S22,304S25,316S22,316S26, 321S22,347S17 S: 304S14,304S18,304S59,316S14, 316S18,316S59,321S18,321S59, 347S18,347S59
JIS G 3460	Steel pipes for low temperature service	STPL 39, 46, 70	ASTM A 333-77	Spec. for seamless and welded steel pipe for low temperature service	1,3,4,6,7,8,9
			BS 3603-77	Steel pipes and tubes for pressure purposes, carbon and alloy steel: low temperature duties	410LT50,503LT100,509LT196
			ISO 2604(II)-75	Steel products for pressure purposes-quality requirements-Part II: Wrought seamless tubes	
			ISO 2604(III)-75	Steel products for pressure purposes-quality requirements-Part III: Electric resistance and induction-Welded tubes	
JIS G 3466	Carbon steel square pipes for general structural purposes	STKR 41, 50	ASTM A 500-78	Spec. for cold-formed welded and seamless carbon steel structural tubing in rounds and shapes	Shaped (A,B,C)

Carbon and Alloy Steels for Machine Structural Use

Std. No, Title	Superseded by	Old symbol	Related foreign standard steels
JIS G 4051	S10C	S10C	AISI 1010, BS040A10, 045A10, 060A10, DIN C10, Ck10, NF XC10
	S12C	S12C	AISI 1012, BS040A12, 045A12, 060A12, NF XC12
Carbon steel for machine structural use	S15C	S15C	AISI 1015, BS040A15, 050A15, 060A15, 080A 15, DIN C15, Ck15, rOCT15
	S17C	S17C	AISI 1017, BS040A17, 050A17, 060A17, 080A17, NFXC18

Std. No, Title	Superseded by	Old symbol	Related foreign standard steels
	S20C	S20C	AISI 1020, BS 040A20, 050A20, 060A20, 070A20, 080A20, DIN C22, rOCT 20
	S22C	S22C	AISI 1023, BS 040A22, 050A22, 060A22, 080A22, DIN C22, Ck22 rOCT 20
	S25C	S25C	AISI 1025, BS 060A25, 080A25, rOCT 25, NF XC25
	S28C	S28C	AISI 1029, BS 060A27, 080A27, rOCT 30,30r
	S30C	S30C	AISI 1030, BS 060A30, 080A30, 080M30, rOCT 30, 30r, NF XC32
	S33C	S33C	BS 060A32, 080A32, rOCT35, 35r
	S35C	S35C	AISI 1035, 1037,BS 060A35, 080A35, DIN C35, rOCT35, 35r, ISO R 683/I C35e
	S38C	S38C	AISI 1038, BS 060A37, 080A37, DIN C35, Ck 35,rOCT 40, 40r, NF XC 38
	S40C	S40C	AISI 1040, 1039, BS 060A40, 080A40, 080M40, rOCT40, 40r
	S43C	S43C	AISI 1042, 1043, BS 060A42, 080A42, 8 K, rOCT45, 45r, NF XC 42
	S45C	S45C	AISI 1045, 1046, BS 080M46, DIN C45, CK45, rOCT45, 45r
	S48C	S48C	AISI 1045, 1046, 1049, BS 060A47, 060A47, DIN C45, CK45, rOCT50, 50r NF XC 48
	S50C	S50C	AISI 1050, 1053, BS 080M50, rOCT 50, 50r
	S53C	S53C	AISI 1055, BS 060A52, 080A52, rOCT55, 50r
	S55C	S55C	AISI 1055, 1053, BS 070M55, rOST55, 55r, NF XC 55, DIN C55, Ck55

orrosion and heat-resisting steels

Japanese Industrial Standards	Related foreign standard steels						
Std. No, Title	Symbo	ISO 683/XIII ISO 683/XVI	AISI ASTM	BS 970 Part 4 BS 1449 Part 4	DIN 17440 DIN 17224	NF A 35-572 NF A 35-576~581	ГОСТ 5632
JIS G 4303 to 4309, 4313 to 4315,4317	SUS201	A-2	AISI 201				
Stainless steel bars	SUS202	A-3	AISI 202	BS 284S16			ГОСТ 12X17r9AH4
Hot rolled stainless steel sheets and plates	SUS301	14	AISI 301	BS 301S21		NF Z12CN17-07	
Cold rolled stainless steel sheets and plates	SUS302	12	AISI 302	BS 302S25	DIN X 12CrNi188	NF Z10CN18-09	
Hot rolled stainless steel strips	SUS303	17	AISI 303	BS 303S21	DIN X 12CrNis188	NF Z10CNF18-09	
Cold rolled stainless steel strips	SUS 303Se	17	AISI 303Se	BS 303S41			ГОСТ 12X18H10E
Stainless steel wire rods	SUS 304	11	AISI 304	BS 304S15	DIN X 5CrNi189	NF Z6CN18-09	ГОСТ 08X18H10
Stainless steel wires	SUS 304L	10	AISI 304L	BS 304S12	DIN X 2CrNI189	NF Z6CN18-10	ГОСТ 03X18H11
Cold rolled stainless steel strips for springs	SUS 305	13	AISI 305	BS 305S19	DIN X 5CrNI1911	NF Z8CN18-12	
Stainless steel wires for springs	SUS 305J 1						
Hot rolled stainless steel equal leg angles	SUS 308		AISI 308				
	SUS 309S		AISI 309S				
	SUS 310S		AISI 310S				
	SUS 316	20, 20a	AISI 316	BS 316S16	DIN X 5CrNIMo1610	NF Z6CND17-12	
	SUS 316L	19, 19a	AISI 316L	BS 316S12	DIN X 2CrNi Mo1810	NF Z2CND17-12	ГОСТ 03X17H13M2
	SUS 316J 1						
	SUS 316J 1 L						
	SUS 317	25	AISI 317	BS 317S16			
	SUS 317L	24	AISI 317L	BS 317S12		NF Z2CND 19-15	
	SUS 321	15	AISI 321	BS 321S12	DIN X 10CrNiTI189	NF Z6CNT18.10	ГОСТ 08X18H10T
	SUS 347	16	AISI 347	BS 347S17	DIN X 10CrNiNb189	NF Z6CNb18.10	ГОСТ 08X18H12B
	SUS 384		AISI 384			NF Z6NC18.18	
	SUS 385		AISI 385				
	SUS XM7		ASTM XM7			NF Z6CNU18.10	

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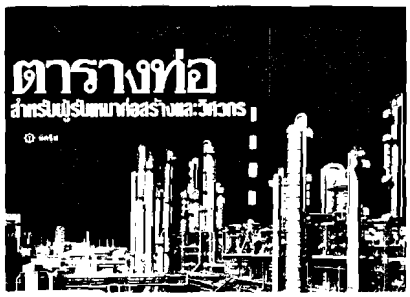

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ตารางเหล็กเล่มนี้เป็นที่นิยมแพร่หลายอย่างกว้างขวาง และใช้เป็นคู่มือประกอบอาชีพ เหมาะสำหรับ:-

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- วิศวกรคำนวณออกแบบ
- นักเขียนแบบ
- ร้านค้าเหล็กและวัสดุก่อสร้าง
- พนักงานจัดซื้อ
- อาจารย์ นิสิต นักศึกษา
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- วิศวกรซ่อมบำรุง
- ช่างก่อสร้างชาอุดิอาระเบีย
- ผู้จัดการโครงการ
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