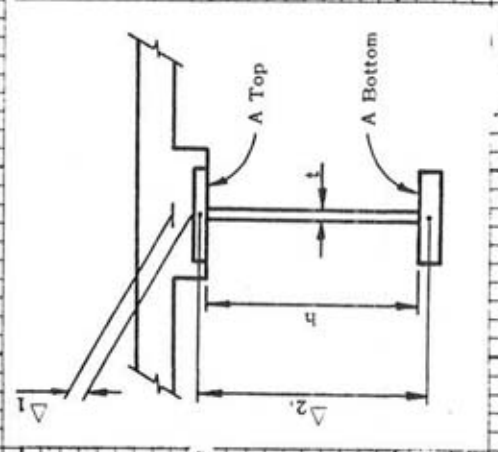
COMPOSITE GIRDER APPROXIMATE FLANGE AREAS



Area Bottom Flange

Area Top Flange

C.G. of Steel Flange

$d = \Delta_1 + \Delta_2$

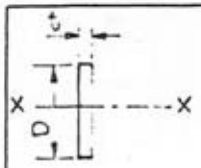
C.G. of Steel Flange

Flange Area "a"

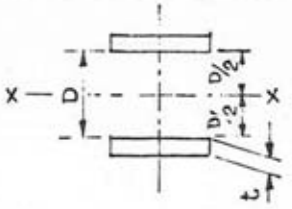
$$A_o = \frac{(M_{DL}^{1K} + M_{L+I}^{1K})12{,}000}{F_s\, d}$$

50 45 40 35 30 25 20 15

0 5 10 15 20 25 30 35 40 45

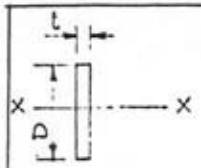


MOMENTS OF INERTIA OF ONE PLATE ABOUT AXIS X-X



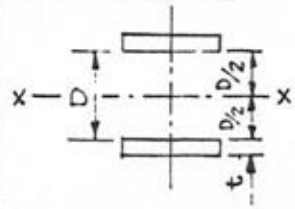
MOMENTS OF INERTIA OF TWO FLANGES PER INCH OF WIDTH ABOUT AXIS X-X FOR VARIOUS DEPTHS

D	Thickness t, inches								D	Thickness t, inches																				D
	3/8	7/16	1/2	9/16	5/8	3/4	7/8	1		3/8	1/2	5/8	3/4	7/8	1	1-1/8	1-1/4	1-3/8	1-1/2	1-5/8	1-3/4	1-7/8	2	2-1/8	2-1/4	2-3/8	2-1/2	2-5/8	2-3/4	2-7/8	3	
4									4	3.6	5.1	6.7	8.5	10.5	12.7	15.0	17.6	20.3	23.2													4
5									5	5.4	7.6	9.9	12.5	15.2	18.2	21.3	24.7	28.4	32.2	36.4												5
6									6	7.6	10.6	13.8	17.2	20.8	24.7	28.8	33.2	37.8	42.8	48.0	53.5											6
7									7	10.2	14.1	18.2	22.6	27.2	32.2	37.4	42.9	48.7	54.8	61.2	67.9	74.9										7
8									8	13.2	18.1	23.3	28.8	34.6	40.7	47.1	53.8	60.9	68.3	76.0	84.1	92.5	101									8
9									9	16.5	22.6	29.0	35.7	42.8	50.2	57.9	66.0	74.4	83.3	92.4	102	112	122									9
10	31.3	36.5	41.7	46.9	52.1	62.5	72.9	83.3	10	20.2	27.6	35.3	43.4	51.9	60.7	69.9	79.4	89.4	99.8	111	122	133	145	158								10
11	41.6	48.5	55.5	62.4	69.3	83.2	97.1	111	11	24.3	33.1	42.3	51.8	61.8	72.2	82.9	94.1	106	118	130	143	157	170	185	199							11
12	54.0	63.0	72.0	81.0	90.0	108	126	144	12	28.7	39.1	49.9	61.0	72.6	84.7	97.1	110	123	137	152	166	182	197	214	230	248						12
13	68.7	80.1	91.5	103	114	137	160	183	13	33.6	45.6	58.1	71.0	84.3	98.2	112	127	142	158	175	191	209	226	245	264	283	303					13
14	85.8	100	114	129	143	172	200	229	14	38.8	52.6	66.9	81.7	96.9	113	129	146	163	181	199	218	237	257	278	299	321	343					14
15	106	123	141	158	176	211	246	281	15	44.3	60.1	76.3	93.1	110	128	146	165	185	205	225	246	268	290	313	337	361	385	411				15
16	128	149	171	192	213	256	299	341	16	50.3	68.1	86.4	105	125	145	165	186	208	230	253	277	301	325	351	377	403	430	458	487			16
17	154	179	205	230	256	307	358	409	17	56.6	76.6	97.1	118	140	162	185	208	233	257	283	309	335	362	390	419	448	478	509	540	572		17
18	182	213	243	273	304	365	425	486	18	63.3	85.6	108	132	156	181	206	232	259	286	314	342	371	401	432	463	495	528	561	595	630	666	18
19	214	250	286	322	357	429	500	572	19	70.4	95.1	120	146	173	200	228	257	286	316	346	378	410	442	476	510	545	580	617	654	692	731	19
20	250	292	333	375	417	500	583	667	20	77.8	105	133	162	191	221	251	283	315	347	381	415	450	485	522	559	597	635	675	715	756	798	20
21	289	338	386	434	482	579	675	772	21	85.7	116	146	177	209	242	276	310	345	380	417	454	492	530	570	610	651	693	736	779	823	869	21
22	333	388	444	499	555	666	776	887	22	93.9	127	160	194	229	265	301	338	376	415	454	494	535	577	620	663	708	753	799	846	893	942	22
23	380	444	507	570	634	760	887	1014	23	102	138	174	212	249	288	328	368	409	451	493	537	581	626	672	719	767	815	865	915	966	1019	23
24	432	504	576	648	720	864	1008	1152	24	111	150	190	230	271	313	355	399	443	488	534	581	629	677	727	777	828	880	933	987	1042	1098	24
25	488	570	651	732	814	977	1139	1302	25	121	163	205	249	293	338	384	431	479	527	577	627	678	730	783	837	892	948	1005	1062	1121	1181	25
26	549	641	732	824	915	1099	1281	1465	26	130	176	222	268	316	365	414	464	516	568	621	675	730	785	842	900	958	1018	1078	1140	1203	1266	26
27	615	718	820	923	1025	1230	1435	1640	27	141	189	239	289	340	392	445	499	554	610	666	724	783	842	903	964	1027	1090	1155	1220	1287	1355	27
28	686	800	915	1029	1143	1372	1601	1829	28	151	203	256	310	365	421	477	535	594	653	714	775	838	901	966	1031	1098	1165	1234	1304	1374	1446	28
29	762	889	1016	1143	1270	1524	1778	2032	29	162	218	274	332	391	450	511	572	635	698	763	828	895	962	1031	1101	1171	1243	1316	1390	1464	1541	29
30	844	984	1125	1266	1406	1688	1969	2250	30	173	233	293	355	417	481	545	611	677	745	813	883	954	1025	1098	1172	1247	1323	1400	1478	1558	1638	30
31	931	1086	1241	1396	1552	1862	2172	2483	31	185	248	313	378	445	512	581	650	721	793	866	939	1014	1090	1167	1246	1325	1405	1487	1570	1654	1739	31
32	1024	1194	1365	1536	1707	2048	2389	2731	32	197	264	333	402	473	545	617	691	766	842	919	998	1077	1157	1239	1322	1405	1490	1577	1664	1752	1842	32
33	1123	1310	1497	1685	1872	2246	2620	2995	33	209	281	353	427	502	578	655	733	813	893	975	1058	1141	1226	1312	1400	1488	1578	1669	1761	1854	1949	33
34	1228	1433	1638	1842	2047	2457	2866	3275	34	222	298	375	453	532	613	694	777	861	946	1032	1119	1208	1297	1388	1480	1573	1668	1764	1860	1959	2058	34
35	1340	1563	1787	2010	2233	2680	3126	3573	35	235	315	397	479	563	648	734	822	910	1000	1091	1183	1276	1370	1466	1563	1661	1760	1861	1963	2066	2171	35
36	1458	1701	1944	2187	2430	2916	3402	3888	36	248	333	419	507	595	685	776	868	961	1055	1151	1248	1346	1445	1546	1648	1751	1855	1961	2068	2176	2286	36
37	1583	1847	2111	2374	2638	3166	3693	4221	37	262	352	442	534	628	722	818	915	1013	1112	1213	1315	1418	1522	1628	1735	1843	1953	2064	2176	2290	2405	37
38	1715	2001	2286	2572	2858	3430	4001	4573	38	276	371	466	563	661	761	861	963	1066	1171	1276	1383	1492	1601	1712	1824	1938	2053	2169	2287	2406	2526	38
39	1854	2163	2472	2781	3090	3707	4325	4943	39	291	390	491	593	696	800	906	1013	1121	1231	1342	1454	1567	1682	1799	1916	2035	2155	2277	2400	2525	2651	39
40	2000	2333	2667	3000	3333	4000	4667	5333	40	306	410	516	623	731	841	952	1064	1177	1292	1408	1526	1645	1765	1887	2010	2135	2260	2388	2516	2646	2778	40
41	2154	2513	2872	3231	3590	4308	5026	5743	41	321	431	541	654	767	882	998	1116	1235	1355	1477	1600	1724	1850	1978	2106	2236	2368	2501	2635	2771	2909	41
42	2315	2701	3087	3473	3859	4631	5402	6174	42	337	452	568	685	804	925	1046	1169	1294	1420	1547	1676	1806	1937	2070	2205	2341	2478	2617	2757	2899	3042	42



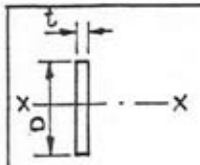
MOMENTS OF INERTIA OF ONE PLATE ABOUT AXIS X-X

D	Thickness t, inches								D
	3/8	7/16	1/2	9/16	5/8	3/4	7/8	1	
43	2485	2899	3313	3727	4141	4969	5797	6626	43
44	2662	3106	3549	3993	4437	5324	6211	7099	44
45	2848	3322	3797	4272	4746	5695	6645	7594	45
46	3042	3549	4056	4563	5070	6084	7097	8111	46
47	3245	3785	4326	4867	5407	6489	7570	8652	47
48	3456	4032	4608	5184	5760	6912	8064	9216	48
49	3677	4289	4902	5514	6128	7353	8579	9804	49
50	3906	4557	5208	5859	6510	7812	9115	10417	50
51	4145	4836	5527	6218	6909	8291	9672	11054	51
52	4394	5126	5859	6591	7323	8788	10253	11717	52
53	4652	5428	6203	6979	7754	9305	10856	12406	53
54	4921	5741	6561	7381	8201	9842	11482	13122	54
55	5199	6066	6932	7799	8665	10398	12131	13865	55
56	5488	6403	7317	8232	9147	10976	12805	14635	56
57	5787	6752	7716	8681	9645	11575	13504	15433	57
58	6097	7113	8130	9146	10162	12195	14227	16259	58
59	6418	7488	8556	9627	10697	12836	14976	17115	59
60	6750	7875	9000	10125	11250	13500	15750	18000	60
61	7093	8275	9458	10640	11822	14186	16551	18915	61
62	7448	8689	9930	11172	12413	14896	17378	19861	62
63	7814	9116	10419	11721	13023	15628	18233	20837	63
64	8192	9557	10923	12288	13653	16384	19115	21845	64
65	8582	10012	11443	12873	14303	17164	20025	22885	65
66	8984	10482	11979	13476	14974	17969	20963	23958	66
67	9399	10965	12532	14098	15665	18798	21931	25064	67
68	9826	11464	13101	14739	16377	19652	22927	26203	68
69	10266	11977	13688	15399	17110	20532	23954	27376	69
70	10719	12505	14292	16078	17865	21438	25010	28583	70
71	11185	13049	14913	16777	18641	22369	26098	29826	71
72	11664	13608	15552	17496	19440	23328	27216	31104	72
73	12157	14183	16209	18235	20261	24314	28366	32418	73
74	12663	14774	16884	18995	21105	25327	29548	33769	74
75	13184	15381	17578	19775	21973	26367	30762	35156	75
76	13718	16004	18291	20577	22863	27436	32009	36581	76
77	14267	16644	19022	21400	23778	28533	33289	38044	77
78	14830	17301	19773	22245	24716	29660	34603	39546	78
79	15407	17975	20543	23111	25679	30815	35951	41087	79
80	16000	18667	21333	24000	26667	32000	37333	42667	80
81	16608	19375	22143	24911	27679	33215	38751	44287	81

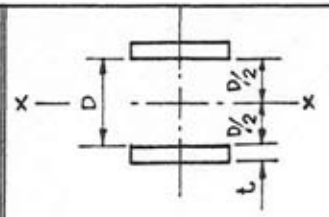


MOMENTS OF INERTIA OF TWO FLANGES PER INCH OF WIDTH ABOUT AXIS X-X FOR VARIOUS DEPTHS

D	Thickness t, inches																										D
	3/8	1/2	5/8	3/4	7/8	1	1-1/8	1-1/4	1-3/8	1-1/2	1-5/8	1-3/4	1-7/8	2	2-1/8	2-1/4	2-3/8	2-1/2	2-5/8	2-3/4	2-7/8	3	
43	353	473	595	718	842	968	1095	1224	1354	1486	1619	1753	1889	2026	2165	2305	2447	2590	2735	2881	3029	3179	43
44	369	495	622	751	881	1013	1146	1280	1416	1553	1692	1832	1974	2117	2262	2408	2556	2705	2856	3009	3163	3318	44
45	386	518	651	785	921	1058	1197	1337	1479	1622	1767	1913	2061	2210	2361	2514	2667	2823	2980	3139	3299	3461	45
46	403	541	679	820	961	1105	1249	1396	1543	1693	1844	1996	2150	2305	2462	2621	2781	2943	3106	3271	3438	3606	46
47	421	564	709	855	1003	1152	1303	1455	1609	1765	1922	2080	2241	2402	2566	2731	2897	3065	3235	3407	3580	3755	47
48	439	588	739	891	1045	1201	1358	1516	1676	1838	2002	2167	2333	2501	2671	2843	3016	3190	3367	3545	3725	3906	48
49	457	613	770	928	1088	1250	1414	1578	1745	1913	2083	2255	2428	2602	2779	2957	3137	3318	3501	3686	3872	4061	49
50	476	638	801	966	1132	1301	1470	1642	1815	1990	2166	2344	2524	2705	2888	3073	3260	3448	3638	3829	4023	4218	50
51	495	663	833	1004	1177	1352	1529	1707	1886	2068	2251	2436	2622	2810	3000	3192	3385	3580	3777	3976	4176	4379	51
52	514	689	865	1044	1223	1405	1588	1773	1959	2147	2337	2529	2722	2917	3114	3313	3513	3715	3919	4125	4333	4542	52
53	534	716	899	1083	1270	1458	1648	1840	2033	2228	2425	2624	2824	3026	3230	3436	3644	3853	4064	4277	4492	4709	53
54	554	743	933	1124	1315	1513	1710	1908	2109	2311	2515	2720	2928	3137	3348	3561	3776	3993	4211	4432	4654	4878	54
55	575	770	967	1166	1366	1568	1772	1978	2185	2395	2606	2819	3034	3250	3469	3689	3911	4135	4361	4589	4819	5051	55
56	596	798	1002	1208	1417	1625	1836	2049	2264	2480	2699	2919	3141	3365	3591	3819	4049	4280	4514	4749	4987	5226	56
57	617	827	1038	1251	1466	1682	1901	2121	2343	2567	2793	3021	3251	3482	3716	3951	4189	4428	4669	4912	5157	5405	57
58	639	856	1074	1294	1517	1741	1967	2194	2424	2656	2889	3125	3362	3601	3843	4086	4331	4578	4827	5078	5331	5586	58
59	661	885	1111	1339	1569	1800	2034	2269	2506	2746	2987	3230	3475	3722	3971	4222	4475	4730	4987	5246	5507	5771	59
60	683	915	1149	1384	1621	1861	2102	2345	2590	2837	3086	3337	3590	3845	4102	4361	4622	4885	5151	5418	5687	5958	60
61	706	946	1187	1430	1675	1922	2171	2422	2675	2930	3187	3446	3707	3970	4235	4502	4772	5043	5316	5592	5869	6149	61
62	730	977	1226	1477	1730	1985	2242	2501	2762	3025	3290	3557	3826	4097	4371	4646	4923	5203	5485	5768	6054	6342	62
63	753	1008	1265	1524	1785	2048	2313	2580	2850	3121	3394	3669	3947	4226	4508	4792	5077	5365	5655	5948	6242	6539	63
64	777	1040	1305	1572	1841	2113	2386	2661	2939	3218	3500	3784	4069	4357	4647	4940	5234	5530	5829	6130	6433	6738	64
65	801	1073	1346	1621	1899	2178	2460	2743	3029	3317	3607	3900	4194	4490	4789	5090	5393	5698	6005	6315	6627	6941	65
66	826	1106	1387	1671	1957	2245	2535	2827	3121	3418	3716	4017	4320	4625	4933	5242	5554	5868	6184	6502	6823	7146	66
67	851	1139	1429	1721	2016	2312	2611	2912	3215	3520	3827	4137	4448	4762	5079	5397	5718	6040	6366	6693	7023	7355	67
68	877	1173	1472	1773	2076	2381	2688	2998	3309	3623	3939	4258	4578	4901	5226	5554	5883	6215	6550	6886	7225	7566	68
69	902	1208	1515	1824	2136	2450	2766	3085	3405	3728	4053	4381	4710	5042	5377	5713	6052	6393	6736	7082	7430	7781	69
70	929	1243	1559	1877	2198	2521	2846	3173	3503	3835	4169	4505	4844	5185	5529	5874	6223	6573	6926	7281	7638	7998	70
71	955	1278	1603	1931	2260	2592	2926	3263	3602	3943	4286	4632	4980	5330	5683	6038	6396	6755	7118	7482	7849	8219	71
72	982	1314	1648	1985	2324	2665	3008	3354	3702	4052	4405	4760	5118	5477	5840	6204	6571	6940	7312	7686	8063	8442	72
73	1009	1351	1694	2040	2388	2738	3091	3446	3803	4163	4525	4890	5257	5626	5998	6372	6749	7128	7509	7893	8280	8669	73
74	1037	1388	1740	2095	2453	2813	3175	3539	3906	4276	4648	5022	5398	5777	6159	6543	6929	7318	7709	8103	8499	8898	74
75	1065	1425	1787	2152	2519	2888	3260	3634	4011	4390	4771	5155	5542	5930	6322	6715	7112	7510	7912	8315	8722	9131	75
76	1094	1463	1835	2209	2586	2965	3346	3730	4116	4505	4897	5290	5687	6085	6487	6890	7297	7705	8117	8531	8947	9366	76
77	1123	1502	1883	2267	2653	3042	3433	3827	4224	4622	5024	5427	5834	6242	6654	7068	7484	7903	8324	8749	9175	9605	77
78	1152	1541	1932	2326	2722	3121	3522	3926	4332	4741	5152	5566	5982	6401	6823	7247	7674	8103	8535	8969	9406	9846	78
79	1181	1580	1981	2385	2791	3200	3612	4025	4442	4861	5282	5706	6133	6562	6994	7429	7866	8305	8748	9193	9640	10091	79
80	1211	1620	2031	2445	2862	3281	3702	4126	4553	4982	5414	5849	6286	6725	7168	7613	8060	8510	8963	9419	9877	10338	80
81	1242	1661	2082	2506	2933	3362	3794	4228	4666	5105	5548	5993	6440	6890	7343	7799	8257	8718	9182	9648	10117	10589	81

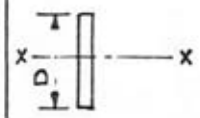


MOMENTS OF INERTIA OF ONE PLATE ABOUT AXIS X-X

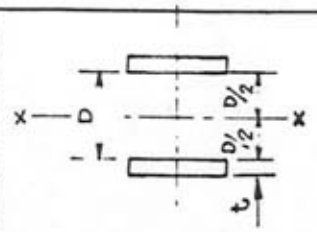


MOMENTS OF INERTIA OF TWO FLANGES PER INCH OF WIDTH ABOUT AXIS X-X FOR VARIOUS DEPTHS

D	Thickness t, inches								D	Thickness t, inches																				D
	3/8	7/16	1/2	9/16	5/8	3/4	7/8	1		3/8	1/2	5/8	3/4	7/8	1	1-1/8	1-1/4	1-3/8	1-1/2	1-5/8	1-3/4	1-7/8	2	2-1/8	2-1/4	2-3/8	2-1/2	2-5/8	2-3/4	2-7/8	3	
82	17230	20102	22974	25845	28717	34461	40204	45947	82	1272	1702	2133	2568	3005	3445	3887	4332	4780	5230	5683	6138	6596	7057	7521	7987	8456	8928	9402	9879	10359	10842	82
83	17868	20846	23825	26803	29781	35737	41693	47649	83	1303	1743	2185	2630	3078	3528	3981	4437	4895	5356	5819	6286	6755	7226	7701	8178	8658	9140	9626	10114	10605	11099	83
84	18522	21609	24696	27783	30870	37044	43218	49392	84	1335	1785	2238	2694	3152	3613	4076	4543	5012	5483	5958	6435	6915	7397	7883	8371	8862	9355	9852	10351	10853	11358	84
85	19191	22390	25589	28787	31986	38383	44780	51177	85	1367	1828	2291	2757	3226	3698	4173	4650	5130	5612	6098	6586	7077	7570	8067	8566	9068	9573	10081	10591	11104	11621	85
86	19877	23190	26502	29815	33128	39754	46379	53005	86	1399	1871	2345	2822	3302	3785	4270	4758	5249	5743	6239	6738	7240	7745	8253	8763	9277	9793	10312	10834	11358	11886	86
87	20578	24008	27438	30867	34297	41156	48016	54875	87	1431	1914	2399	2888	3378	3872	4369	4868	5370	5875	6382	6893	7406	7922	8441	8963	9488	10015	10546	11079	11615	12155	87
88	21296	24845	28395	31944	35493	42592	49691	56789	88	1464	1958	2455	2954	3456	3961	4468	4979	5492	6008	6527	7049	7574	8101	8632	9165	9701	10240	10782	11327	11875	12426	88
89	22030	25702	29374	33045	36717	44061	51404	58747	89	1498	2003	2510	3021	3534	4050	4569	5091	5616	6143	6674	7207	7743	8282	8824	9369	9917	10468	11022	11578	12138	12701	89
90	22781	26578	30375	34172	37969	45563	53156	60750	90	1531	2048	2567	3088	3613	4141	4671	5204	5741	6280	6822	7367	7915	8465	9019	9576	10135	10698	11263	11832	12404	12978	90
91	23549	27474	31399	35324	39248	47098	54948	62798	91	1566	2093	2624	3157	3693	4232	4774	5319	5867	6418	6971	7528	8088	8650	9216	9784	10356	10930	11508	12088	12672	13259	91
92	24334	28390	32445	36501	40557	48668	56779	64891	92	1600	2139	2681	3226	3774	4325	4878	5435	5995	6557	7123	7691	8263	8837	9415	9995	10579	11165	11755	12348	12943	13542	92
93	25136	29326	33515	37704	41894	50272	58651	67030	93	1635	2186	2739	3296	3856	4418	4984	5552	6124	6698	7276	7856	8440	9026	9616	10209	10804	11403	12005	12610	13217	13829	93
94	25956	30282	34608	38934	43260	51912	60563	69215	94	1670	2233	2798	3367	3938	4513	5090	5671	6254	6841	7430	8023	8619	9217	9819	10424	11032	11643	12257	12874	13495	14118	94
95	26793	31259	35724	40189	44655	53586	62517	71448	95	1706	2280	2856	3438	4022	4608	5198	5790	6386	6985	7587	8191	8799	9410	10024	10642	11262	11885	12512	13142	13775	14411	95
96	27648	32256	36864	41472	46080	55296	64512	73728	96	1742	2328	2918	3510	4106	4705	5306	5911	6519	7130	7744	8362	8982	9605	10232	10862	11494	12130	12770	13412	14057	14706	96
97	28521	33275	38028	42782	47535	57042	66549	76056	97	1778	2377	2978	3583	4191	4802	5416	6033	6654	7277	7904	8534	9166	9802	10441	11084	11729	12378	13030	13685	14343	15005	97
98	29412	34314	39216	44118	49020	58825	68629	78433	98	1815	2426	3040	3657	4277	4901	5527	6157	6790	7426	8065	8707	9353	10001	10653	11308	11966	12626	13293	13960	14632	15306	98
99	30322	35376	40429	45483	50536	60644	70751	80858	99	1852	2475	3102	3731	4364	5000	5639	6282	6927	7576	8228	8883	9541	10202	10867	11535	12206	12880	13558	14239	14923	15611	99
100	31250	36458	41667	46875	52083	62500	72917	83333	100	1889	2525	3164	3807	4452	5101	5753	6408	7066	7727	8392	9060	9731	10405	11083	11764	12448	13135	13826	14520	15217	15918	100
101	32197	37563	42929	48295	53662	64394	75126	85858	101	1927	2576	3227	3882	4541	5202	5867	6535	7206	7880	8558	9239	9923	10610	11301	11995	12692	13393	14097	14804	15515	16229	101
102	33163	38690	44217	49744	55271	66326	77380	88434	102	1965	2627	3291	3959	4630	5305	5982	6663	7347	8035	8725	9419	10117	10817	11521	12228	12939	13653	14370	15091	15815	16542	102
103	34148	39839	45530	51222	56913	68295	79678	91061	103	2004	2678	3356	4037	4721	5408	6099	6793	7490	8191	8895	9602	10312	11026	11744	12464	13188	13915	14646	15380	16118	16859	103
104	35152	41011	46869	52728	58587	70304	82021	93739	104	2043	2730	3421	4115	4812	5513	6217	6924	7634	8348	9065	9786	10510	11237	11968	12702	13440	14180	14925	15672	16423	17178	104
105	36176	42205	48234	54264	60293	72352	84410	96469	105	2082	2783	3486	4194	4904	5618	6335	7056	7780	8507	9238	9972	10709	11450	12195	12942	13693	14448	15206	15967	16732	17501	105
106	37219	43422	49626	55829	62032	74439	86845	99251	106	2122	2836	3553	4273	4997	5725	6455	7189	7927	8668	9412	10160	10911	11665	12423	13185	13950	14718	15490	16265	17044	17826	106
107	38283	44663	51044	57424	63804	76565	89326	102087	107	2162	2889	3620	4354	5091	5832	6576	7324	8075	8830	9588	10349	11114	11882	12654	13429	14208	14990	15776	16565	17358	18155	107
108	39366	45927	52488	59049	65610	78732	91854	104976	108	2202	2943	3687	4435	5186	5941	6699	7460	8225	8993	9765	10540	11319	12101	12887	13676	14469	15265	16065	16869	17676	18486	108
109	40470	47215	53960	60704	67449	80939	94429	107919	109	2243	2998	3756	4517	5282	6050	6822	7597	8376	9158	9944	10733	11526	12322	13122	13926	14732	15543	16357	17175	17996	18821	109
110	41594	48526	55458	62391	69323	83188	97052	110917	110	2284	3053	3824	4600	5378	6161	6946	7735	8528	9325	10125	10928	11735	12545	13359	14177	14998	15823	16651	17483	18319	19158	110
111	42739	49862	56985	64108	71231	85477	99723	113969	111	2326	3108	3894	4683	5476	6272	7072	7875	8682	9493	10307	11124	11946	12770	13599	14431	15266	16105	16948	17795	18645	19499	111
112	43904	51221	58539	65856	73173	87808	102443	117077	112	2368	3164	3964	4767	5574	6385	7199	8016	8837	9662	10491	11323	12158	12997	13840	14687	15537	16390	17248	18109	18974	19842	112
113	45091	52606	60121	67636	75151	90181	105211	120241	113	2410	3221	4035	4852	5673	6498	7327	8158	8994	9833	10676	11523	12373	13226	14084	14945	15810	16678	17550	18426	19305	20189	113
114	46298	54015	61731	69447	77164	92597	108029	123462	114	2453	3278	4106	4938	5773	6613	7455	8302	9152	10006	10863	11724	12589	13457	14329	15205	16085	16968	17855	18745	19640	20538	114
115	47527	55449	63370	71291	79212	95055	110897	126740	115	2496	3335	4178	5024	5874	6728	7586	8447	9311	10180	11052	11928	12807	13690	14577	15468	16362	17260	18162	19068	19977	20891	115
116	48778	56908	65037	73167	81297	97556	113815	130075	116	2539	3393	4250	5112	5976	6845	7717	8593	9472	10355	11242	12133	13027	13925	14827	15733	16642	17555	18472	19393	20318	21246	116
117	50050	58392	66734	75076	83417	100101	116784	133468	117	2583	3452	4324	5199	6079	6962	7849	8740	9634	10532	11434	12340	13249	14162	15079	16000	16925	17853	18785	19721	20661	21605	117
118	51345	59902	68460	77017	85575	102690	119804	136919	118	2627	3511	4398	5288	6183	7081	7983	8888	9798	10711	11628	12548	13473	14401	15333	16269	17209	18153	19100	20052	21007	21966	118
119	52661	61438	70215	78992	87769	105322	122876	140430	119	2672	3570	4472	5378	6287	7200	8117	9038	9962	10891	11823	12759	13699	14642	15590	16541	17496	18455	19418	20385	21356	22331	119
120	54000	63000	72000	81000	90000	108000	126000	144000	120	2717	3630	4547	5466	6392	7321	8253	9189	10129	11072	12020	12971	13926	14885	15848	16815	17786	18760	19739	20721	21708	22698	120



MOMENTS OF INERTIA OF ONE PLATE ABOUT AXIS X-X



MOMENTS OF INERTIA OF TWO FLANGES PER INCH OF WIDTH ABOUT AXIS X-X FOR VARIOUS DEPTHS

D	Thickness t, inches								D	Thickness t, inches																						D
	3/8	7/16	1/2	9/16	5/8	3/4	7/8	1		3/8	1/2	5/8	3/4	7/8	1	1-1/8	1-1/4	1-3/8	1-1/2	1-5/8	1-3/4	1-7/8	2	2-1/8	2-1/4	2-3/8	2-1/2	2-5/8	2-3/4	2-7/8	3	
121	55361	64588	73815	83042	92269	110723	129176	147630	121	2762	3691	4623	5559	6499	7442	8390	9341	10296	11255	12218	13185	14156	15130	16109	17091	18078	19068	20062	21060	22062	23069	121
122	56745	66203	75660	85118	94575	113491	132406	151321	122	2808	3752	4699	5650	6606	7565	8528	9494	10465	11440	12418	13401	14387	15377	16372	17370	18372	19378	20388	21402	22420	23442	122
123	58152	67844	77536	87228	96920	116304	135688	155072	123	2854	3813	4776	5743	6714	7688	8667	9649	10635	11626	12620	13618	14620	15626	16636	17650	18668	19690	20716	21746	22780	23819	123
124	59582	69512	79443	89373	99303	119164	139025	158885	124	2900	3875	4854	5836	6822	7813	8807	9805	10807	11813	12823	13837	14855	15877	16903	17933	18967	20005	21048	22094	23144	24198	124
125	61035	71208	81380	91553	101725	122070	142415	162760	125	2947	3938	4932	5930	6932	7938	8948	9962	10980	12002	13028	14058	15092	16130	17172	18219	19269	20323	21381	22444	23510	24581	125
126	62512	72930	83349	93768	104186	125024	145861	166698	126	2995	4001	5011	6025	7043	8065	9091	10121	11155	12193	13235	14281	15331	16385	17444	18506	19572	20643	21718	22796	23879	24966	126
127	64012	74681	85349	96018	106687	128024	149361	170699	127	3042	4064	5090	6120	7154	8192	9234	10280	11331	12385	13443	14505	15572	16642	17717	18796	19878	20965	22056	23152	24251	25355	127
128	65536	76459	87381	98304	109227	131072	152917	174763	128	3090	4128	5170	6216	7266	8321	9379	10441	11508	12578	13653	14732	15814	16901	17992	19088	20187	21290	22398	23510	24626	25746	128
129	67084	78265	89445	100626	111807	134168	156529	178891	129	3138	4193	5251	6313	7380	8450	9525	10603	11686	12773	13864	14960	16059	17162	18270	19382	20498	21618	22742	23871	25004	26141	129
130	68656	80099	91542	102984	114427	137313	160198	183083	130	3187	4256	5332	6411	7496	8581	9672	10767	11866	12970	14077	15189	16305	17425	18550	19678	20811	21948	23089	24234	25384	26538	130
131	70253	81962	93671	105379	117088	140506	163923	187341	131	3236	4323	5414	6509	7609	8712	9820	10932	12048	13168	14292	15421	16553	17690	18832	19977	21127	22280	23439	24601	25768	26939	131
132	71874	83853	95832	107811	119790	143748	167706	191664	132	3286	4389	5497	6609	7725	8845	9969	11098	12230	13367	14508	15654	16803	17957	19115	20278	21444	22615	23791	24970	26154	27342	132
133	73520	85773	98027	110280	122533	147040	171546	196053	133	3335	4456	5580	6708	7841	8978	10119	11265	12414	13568	14726	15889	17055	18226	19402	20581	21765	22953	24145	25342	26543	27749	133
134	75191	87723	100254	112786	125318	150382	175445	200509	134	3386	4523	5664	6809	7959	9113	10271	11433	12600	13771	14946	16125	17309	18497	19690	20886	22088	23293	24503	25717	26935	28158	134
135	76887	89701	102516	115330	128145	153773	179402	205031	135	3436	4590	5748	6911	8077	9248	10423	11603	12787	13975	15167	16364	17565	18770	19980	21194	22413	23635	24863	26094	27330	28571	135
136	78608	91709	104811	117912	131013	157216	183419	209621	136	3487	4658	5833	7013	8197	9385	10577	11774	12975	14180	15390	16604	17823	19045	20273	21504	22740	23980	25225	26474	27728	28986	136
137	80355	93747	107140	120532	133925	160710	187495	214279	137	3538	4727	5919	7116	8317	9522	10732	11946	13164	14387	15614	16846	18082	19322	20567	21816	23070	24328	25590	26857	28129	29405	137
138	82127	95815	109503	123191	136879	164255	191630	219006	138	3590	4796	6005	7219	8438	9661	10888	12119	13355	14496	15841	17090	18343	19601	20864	22131	23402	24678	25958	27243	28532	29826	138
139	83926	97913	111901	125888	139876	167851	195826	223802	139	3642	4865	6092	7324	8560	9800	11045	12294	13548	14806	16068	17335	18607	19882	21163	22447	23737	25030	26329	27631	28939	30251	139
140	85750	100042	114333	128625	142917	171500	200083	228667	140	3695	4935	6180	7429	8683	9941	11203	12470	13741	15017	16298	17582	18872	20165	21464	22766	24074	25385	26702	28023	29348	30678	140
141	87601	102201	116801	131401	146001	175201	204402	233602	141	3748	5006	6268	7535	8806	10082	11362	12647	13937	15230	16529	17831	19139	20450	21767	23088	24413	25743	27077	28417	29760	31109	141
142	89478	104391	119304	134217	149130	178956	208781	238607	142	3801	5077	6357	7642	8931	10225	11523	12826	14133	15445	16761	18082	19407	20737	22072	23411	24755	26103	27456	28813	30175	31542	142
143	91382	106612	121842	137072	152304	182763	213223	243684	143	3854	5148	6446	7749	9056	10368	11685	13005	14331	15661	16995	18334	19678	21026	22379	23737	25099	26465	27837	29213	30593	31979	143
144	93312	108864	124416	139968	155520	186624	217728	248832	144	3908	5220	6536	7857	9183	10513	11847	13186	14530	15878	17231	18589	19951	21317	22689	24065	25445	26830	28220	29615	31014	32418	144
145	95270	111148	127026	142904	158783	190539	222296	254052	145	3963	5293	6627	7966	9310	10658	12011	13368	14731	16097	17469	18845	20225	21610	23000	24395	25794	27198	28607	30020	31438	32861	145

DATA FOR DESIGN OF STEEL CONNECTIONS

HIGH STRENGTH BOLTS

Joints required to resist shear between their connected parts are designated as either "friction type" or "bearing type" connections.

Bolts in friction type connections do not depend upon bearing against the sides of their holes or shear through the cross sectional area of the bolt. The clamping force of the bolt developes the shear between the contact surfaces of the connected parts. Specifications require these surfaces to be unpainted and well cleaned and allow the threaded portion of the bolt to be in the hole. Friction type joints are designed for a "shear" stress of 13,500 psi on an area based on the nominal diameter of the bolt to provide a factor of safety of 1.55 ±. Bearing of the bolt on the plates connected is not a consideration in design of friction type connections.

Bolts in bearing type connections are designed assuming the connected parts slip and thus the shear is developed by the cross sectional area of the bolt and bearing on the plates connected. The threaded portion of the bolt is excluded from shear planes of the connected parts in the hole. The connected parts may be painted before assembly. Bearing type connections are designed for a shear stress of 20,000 psi and a bearing stress of 40,000 psi based on the nominal diameter of the bolt.

Bearing type joints are excluded for use in shear connections subjected to stress reversal, severe stress fluctuation, impact or vibration or where slippage would be undesirable. All high strength bolt connections shown on the plans will be considered as friction type connections unless otherwise noted on the plans. Rivets can not be substituted for friction type high strength bolts unless special consideration is given to bearing stress on connected parts.

HIGH STRENGTH BOLTS

Allow. Shear = 13,500 psi — Friction Type
= 20,000 psi — Bearing Type
Allow. Bearing = 40,000 psi

	Diameter of Bolt		
	3/4"	7/8"	1"
Friction Type Connection			
Value in Single Shear	5.96	8.12	10.60
Value in Double Shear	11.93	16.24	21.21
Bearing Type Connection			
Value in Single Shear	8.83	12.02	15.70
Value in Double Shear	17.66	24.04	31.40
Bearing Type Connection Only			
Bearing Value in ℄ 1/8 thick	3.75	4.38	5.00
3/16	5.63	6.56	7.50
1/4	7.50	8.75	10.00
5/16	9.38	10.94	12.50
3/8	11.25	13.13	15.00
7/16	13.13	15.31	17.50
1/2	15.00	17.50	20.00
9/16	16.88	19.69	22.50
5/8	18.75	21.88	25.00
3/4		26.25	30.00
7/8			35.00

RIVETS

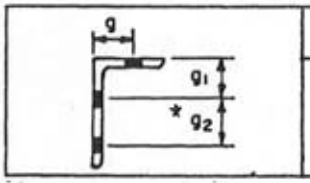
Allow. Shear = 13,500 psi
Allow. Bearing = 40,000 psi

	Diameter of Rivet		
	3/4"	7/8"	1"
Value in Single Shear	5.96	8.12	10.60
Value in Double Shear	11.93	16.24	21.21
Bearing Value on ℄ 1/8 thick	3.75	4.38	5.00
3/16	5.63	6.56	7.50
1/4	7.50	8.75	10.00
5/16	9.38	10.94	12.50
3/8	11.25	13.13	15.00
7/16	13.13	15.31	17.50
1/2		17.50	20.00
9/16			22.50

GENERAL INFORMATION—RIVETS AND HS BOLTS

	DIAMETER OF BOLT OR RIVET		
	3/4"	7/8"	1"
Diameter of Hole (Design)	0.875	1.00	1.125
Minimum Pitch	2-1/2	3	3-1/2
Minimum Width of Angle	2-1/2	3	3-1/2
Minimum Edge Dist. Rolled Edge	1-1/8	1-1/4	1-1/2
Sheared Edge	1-1/4	1-1/2	1-3/4
Weight of Two Rivet Heads – lbs.	0.32	0.48	0.70
Weight of bolt nut and washer–lbs. (Excl. shank within grip).	0.58	0.86	1.22

USUAL GAGES FOR ANGLES, INCHES



Leg	8	7	6	5	4	3 1/2	3	2 1/2	2	1 3/4	1 1/2	1 3/8	1 1/4	1
g	4 1/2	4	3 1/2	3	2 1/2	2	1 3/4	1 3/8	1 1/8	1	7/8	7/8	3/4	5/8
g_1	3	2 1/2	2 1/4	2										
g_2	3	3	2 1/2	1 3/4										

*When<3", check AISC for minimum pitch to maintain 3 dia.

FILLET WELDS (A36 Steel)

Allowable Load per in. of Weld – Kips

Weld Size	100,000 cycles		500,000 cycles			2,000,000 cycles		
	Zero to Max. 12.4 ksi	Full Reversal 8.0 ksi	0.2 Max. to Max 12.4 ksi	Zero to Max. 10.8 ksi	Full Reversal 7.0 ksi	0.5 Max. to Max. 12.4 ksi	Zero to Max. 9.0 ksi	Full Reversal 5.6 ksi
3/16	1.65	1.06	1.65	1.43	0.92	1.65	1.20	0.74
1/4	2.19	1.43	2.19	1.91	1.23	2.19	1.59	0.99
5/16	2.74	1.77	2.74	2.39	1.54	2.74	1.99	1.24
3/8	3.29	2.12	3.29	2.86	1.85	3.29	2.39	1.48
1/2	4.38	2.83	4.38	3.82	2.47	4.38	3.19	1.98
5/8	5.48	3.54	5.48	4.77	3.08	5.48	3.98	2.48

FILLET WELDS (A441 Steel)

Allowable Load per in. of Weld – Kips

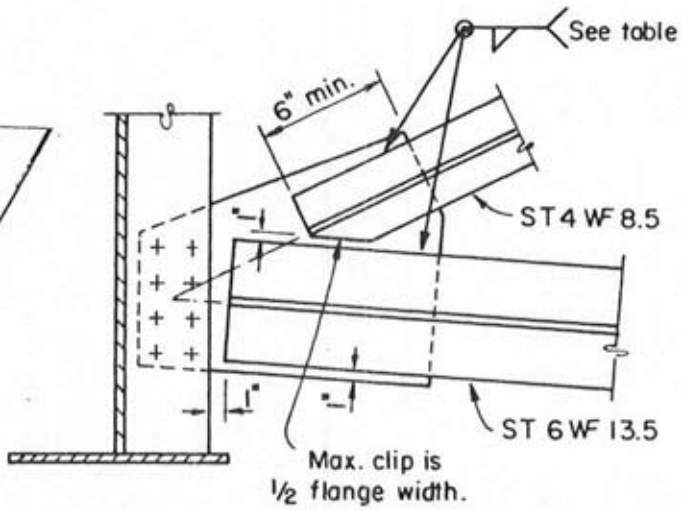
Weld Size	100,000 cycles			500,000 cycles			2,000,000 cycles		
	0.1 Max. to Max. 14.7 ksi	Zero to Max. 13.9 ksi	Full Reversal 9.3 ksi	0.4 Max. to Max. 14.7 ksi	Zero to Max. 11.6 ksi	Full Reversal 7.5 ksi	0.6 Max. to Max. 14.7 ksi	Zero to Max. 9.0 ksi	Full Reversal 5.6 ksi
3/16	1.95	1.84	1.23	1.95	1.54	0.99	1.95	1.19	0.74
1/4	2.60	2.46	1.64	2.60	2.05	1.33	2.60	1.59	0.99
5/16	3.25	3.07	2.06	3.25	2.58	1.66	3.25	1.99	1.24
3/8	3.90	3.68	2.46	3.90	3.07	2.00	3.90	2.39	1.48
1/2	5.20	4.91	3.29	5.20	4.10	2.65	5.20	3.18	1.98
5/8	6.50	6.14	4.11	6.50	5.15	3.33	6.50	3.98	2.48

STEEL CONNECTIONS, Length of Weld or Number of Bolts (Friction Type)

The table below gives length of weld and/or number of bolts required for connection of various bracing members.

Assumption: L/r = 140
Full stress reversal

Member	Weight lb/ft	Design Strength (kips)	Length of ¼" fillet weld	Number of ¾" bolts (Friction Type 5.96k/bolt)	Number of ⅞" bolts (Friction Type 8.12k/bolt)
ST 4 WF 8.5	8.5	18.4	13"	4	4
ST 4 WF 10	10	21.9	16"	4	4
ST 4 WF 12	12	27.3	20"	6	4
ST 5 WF 10.5	10.5	22.7	16"	4	4
ST 5 WF 12.5	12.5	27.6	20"	6	4
ST 6 WF 13.5	13.5	29.3	21"	6	4
ST 6 WF 15.5	15.5	33.7	24"	6	6
ST 6 WF 20	20	45.3	33"	8	6
ST 7 WF 15	15	31.4	23"	6	4
ST 7 WF 21.5	21.5	47.7	34"	8	6
ST 9 WF 38.5	38.5	82.7	59"	14	10
∠3 x 2½ x 5/16	5.6	11.3	8"	2	2
∠3 x 3 x 5/16	6.1	11.8	9"	2	2
∠3½ x 3 x 5/16	6.6	13.3	10"	3	2
∠3½ x 3½ x 5/16	7.2	14.1	10"	3	2
∠4 x 3½ x 5/16	7.7	15.4	11"	3	2
∠4 x 4 x 5/16	8.2	16.0	12"	3	2
∠6 x 4 x 5/16	10.3	21.7	16"	4	3
∠5 x 5 x 5/16	10.3	20.3	15"	4	3
∠6 x 6 x 3/8	14.9	29.2	21"	5	4



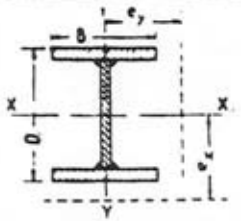
NOTE: Minimum length of 1/4" fillet weld to secure crossframe members to gusset ℄'s and other members shall be as follows:

Member	Length of Weld
ST 4 WF 8.5	13"
ST 6 WF 13.5	21"

Seal weld remaining contact surfaces at these connections with 3/16" fillet weld. Gusset ℄ configuration may be modified at the Contractor's option.

Example: Determine Design Strength
Member ST 4 WF 8.5

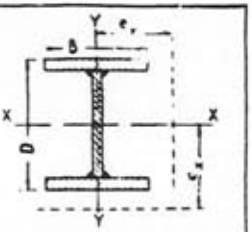
Welded Connection	Bolted Connection
Tension $A = 2.5 - \left(\frac{3.69}{2}\right)(0.23) = 2.08$ Strength = 2.08□" x 8.83k/□" = 18.4k Compression Strength = 2.5□" x 8.83k/□" = 22k 8.83k/□" = Allowable fatigue stress for A36 base metal adjacent to fillet weld.	Tension 3/4" bolt: A = 2.08□" – 2 x 7/8 x 0.308 = 1.54□" Strength = 1.54□" x 13.2k/□" = 20.4k 7/8" bolt: A = 2.08□" – 2 x 1 x 0.308 = 1.46□" Strength = 1.46□" x 13.2k/□" = 19.3k Compression Strength = 2.5□" x 10.1k/□" = 19.3k 13.2k/□" = Allowable fatigue stress for A36 base metal. Use design strength of 18.4k for both welded and bolted joints.



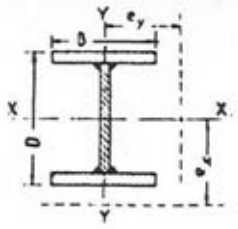
COMPOUND COLUMNS

Size D × B	Composed of		Wt. per foot	Area	Radii of Gyration inches		Moments of Inertia inches⁴		Moduli of Section inches³		Eccentricity Coefficients	
ins.	One Web	Two Flanges	lbs.	ins.²	k_x	k_y	I_x	I_y	Z_x	Z_y	e_x	e_y
28 × 18	24 1	18 2	326·4	96·0	11·79	4·50	13344	1946	953·1	216·2	0·10	0·44
27½ × 18	..	18 1½	295·8	87·0	11·55	4·42	11611	1703	844·5	189·2	0·10	0·46
27 × 18	..	18 1½	265·2	78·0	11·29	4·33	9941	1460	736·3	162·2	0·11	0·48
28 × 16	..	16 2	299·2	88·0	11·67	3·94	11989	1367	856·4	170·9	0·10	0·51
27½ × 16	..	16 1½	272·0	80·0	11·43	3·87	10449	1197	759·9	149·6	0·11	0·53
27 × 16	..	16 1½	244·8	72·0	11·16	3·77	8964	1026	664·0	128·3	0·11	0·56
27½ × 18	24 ¾	18 1½	275·4	81·0	11·82	4·58	11323	1702	823·5	189·1	0·10	0·43
27 × 18	..	18 1½	244·8	72·0	11·58	4·50	9653	1459	715·0	162·1	0·10	0·44
26½ × 18	..	18 1½	214·2	63·0	11·30	4·39	8042	1216	607·0	135·1	0·10	0·47
27½ × 16	..	16 1½	251·6	74·0	11·72	4·02	10161	1195	739·0	149·4	0·10	0·50
27 × 16	..	16 1½	224·4	66·0	11·47	3·94	8676	1025	642·7	128·1	0·10	0·52
26½ × 16	..	16 1½	197·2	58·0	11·18	3·84	7245	854·1	546·8	106·8	0·11	0·54
26 × 16	22 1	16 2	292·4	86·0	10·85	3·99	10125	1367	778·8	170·9	0·11	0·50
25½ × 16	..	16 1½	265·2	78·0	10·62	3·92	8798	1196	690·1	149·6	0·11	0·52
25 × 16	..	16 1½	238·0	70·0	10·37	3·83	7523	1026	601·9	128·2	0·12	0·55
26 × 14	..	14 2	265·2	78·0	10·72	3·43	8970	916·6	690·0	130·9	0·11	0·60
25½ × 14	..	14 1½	241·4	71·0	10·49	3·36	7809	802·2	612·5	114·6	0·12	0·62
25 × 14	..	14 1½	217·6	64·0	10·23	3·28	6694	687·8	535·5	98·3	0·12	0·65
25½ × 16	22 ¾	16 1½	246·5	72·5	10·88	4·06	8577	1195	672·7	149·4	0·11	0·49
25 × 16	..	16 1½	219·3	64·5	10·64	3·99	7302	1025	584·1	128·1	0·11	0·50
24½ × 16	..	16 1½	192·1	56·5	10·37	3·89	6076	854·1	496·0	106·8	0·11	0·53
25½ × 14	..	14 1½	222·7	65·5	10·76	3·50	7588	801·2	595·1	114·5	0·11	0·57
25 × 14	..	14 1½	198·9	58·5	10·52	3·43	6472	686·8	517·8	98·1	0·11	0·60
24½ × 14	..	14 1½	175·1	51·5	10·24	3·33	5400	572·4	440·8	81·8	0·12	0·63

COMPOUND COLUMNS



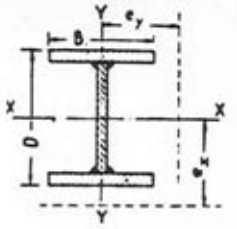
Size D × B	Composed of		Wt. per foot	Area	Radii of Gyration inches		Moments of Inertia inches⁴		Moduli of Section inches³		Eccentricity Coefficients	
ins.	One Web	Two Flanges	lbs.	ins.²	k_x	k_y	I_x	I_y	Z_x	Z_y	e_x	e_y
24 × 14	20 1	14 2	258·4	76·0	9·91	3·47	7461	916·5	621·8	130·9	0·12	0·58
23½ × 14	..	14 1½	234·6	69·0	9·69	3·41	6474	802·1	551·0	114·6	0·13	0·60
23 × 14	..	14 1½	210·8	62·0	9·44	3·33	5528	687·7	480·7	98·2	0·13	0·63
24 × 12	..	12 2	231·2	68·0	9·77	2·91	6491	577·7	540·9	96·3	0·13	0·71
23½ × 12	..	12 1½	210·8	62·0	9·54	2·86	5645	505·7	480·4	84·3	0·13	0·74
23 × 12	..	12 1½	190·4	56·0	9·29	2·78	4834	433·7	420·3	72·3	0·13	0·77
23½ × 14	20 ¾	14 1½	217·6	64·0	9·93	3·54	6307	801·1	536·8	114·4	0·12	0·56
23 × 14	..	14 1½	193·8	57·0	9·70	3·47	5362	686·7	466·2	98·1	0·12	0·58
22½ × 14	..	14 1½	170·0	50·0	9·44	3·38	4456	572·4	396·1	81·8	0·13	0·61
23½ × 12	..	12 1½	193·8	57·0	9·80	2·98	5478	504·7	466·2	84·1	0·12	0·68
23 × 12	..	12 1½	173·4	51·0	9·57	2·91	4667	432·7	405·8	72·1	0·13	0·71
22½ × 12	..	12 1½	153·0	45·0	9·30	2·83	3891	360·7	345·8	60·1	0·13	0·75
22 × 14	18 1	14 2	251·6	74·0	9·08	3·52	6105	916·3	555·0	130·9	0·13	0·57
21½ × 14	..	14 1½	227·8	67·0	8·87	3·46	5277	801·9	490·9	114·6	0·14	0·58
21 × 14	..	14 1½	204·0	60·0	8·65	3·39	4487	687·5	427·3	98·2	0·14	0·61
22 × 12	..	12 2	224·4	66·0	8·96	2·96	5302	577·5	482·0	96·3	0·14	0·69
21½ × 12	..	12 1½	204·0	60·0	8·75	2·90	4592	505·5	427·2	84·3	0·14	0·71
21 × 12	..	12 1½	183·6	54·0	8·51	2·83	3915	433·5	372·9	72·3	0·14	0·75
21½ × 14	18 ¾	14 1½	212·5	62·5	9·08	3·58	5155	801·0	479·5	114·4	0·13	0·55
21 × 14	..	14 1½	188·7	55·5	8·87	3·52	4365	686·6	415·7	98·1	0·13	0·57
20½ × 14	..	14 1½	164·9	48·5	8·63	3·44	3611	572·3	352·3	81·8	0·14	0·59
21½ × 12	..	12 1½	188·7	55·5	8·98	3·02	4471	504·6	415·9	84·1	0·13	0·66
21 × 12	..	12 1½	168·3	49·5	8·75	2·96	3794	432·6	361·3	72·1	0·14	0·69
20½ × 12	..	12 1½	147·9	43·5	8·51	2·88	3148	360·6	307·1	60·1	0·14	0·72



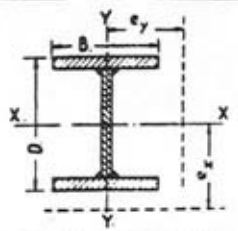
COMPOUND COLUMNS

Size D × B	Composed of		Wt. per foot	Area	Radii of Gyration inches		Moments of Inertia inches⁴		Moduli of Section inches³		Eccentricity Coefficients	
ins.	One Web	Two Flanges	lbs.	ins.²	k_x	k_y	I_x	I_y	Z_x	Z_y	e_x	e_y
21 × 14	18 × ½	14 × 1½	173·4	51·0	9·12	3·67	4244	686·2	404·1	98·0	0·13	0·52
20½ × 14	..	14 × 1¼	149·6	44·0	8·91	3·61	3490	571·8	340·5	81·7	0·13	0·54
20 × 14	..	14 × 1	125·8	37·0	8·66	3·52	2772	457·6	277·2	65·4	0·13	0·57
21 × 12	..	12 × 1½	153·0	45·0	9·03	3·10	3672	432·2	349·7	72·0	0·13	0·62
20½ × 12	..	12 × 1¼	132·6	39·0	8·81	3·04	3026	360·2	295·2	60·0	0·13	0·65
20 × 12	..	12 × 1	112·2	33·0	8·55	2·96	2411	288·2	241·1	48·0	0·14	0·70
20 × 14	16 × 1	14 × 2	244·8	72·0	8·25	3·57	4896	916·1	489·6	130·9	0·15	0·55
19½ × 14	..	14 × 1¾	221·0	65·0	8·05	3·51	4213	801·7	432·1	114·5	0·15	0·57
19 × 14	..	14 × 1½	197·2	58·0	7·84	3·44	3565	687·3	375·2	98·2	0·15	0·59
20 × 12	..	12 × 2	217·6	64·0	8·14	3·00	4245	577·3	424·5	96·2	0·15	0·67
19½ × 12	..	12 × 1¾	197·2	58·0	7·94	2·95	3660	505·3	375·4	84·2	0·15	0·70
19 × 12	..	12 × 1½	176·8	52·0	7·73	2·89	3104	433·3	326·8	72·2	0·16	0·72
19½ × 14	16 × ¾	14 × 1¾	207·4	61·0	8·23	3·62	4128	801·0	423·4	114·4	0·14	0·53
19 × 14	..	14 × 1½	183·6	54·0	8·03	3·57	3480	686·6	366·3	98·1	0·15	0·55
18½ × 14	..	14 × 1¼	159·8	47·0	7·81	3·49	2864	572·2	309·6	81·7	0·15	0·57
19½ × 12	..	12 × 1¾	183·6	54·0	8·14	3·06	3575	504·6	366·7	84·1	0·15	0·64
19 × 12	..	12 × 1½	163·2	48·0	7·93	3·00	3019	432·6	317·8	72·1	0·15	0·67
18½ × 12	..	12 × 1¼	142·8	42·0	7·70	2·93	2492	360·6	269·4	60·1	0·16	0·70
19 × 14	16 × ½	14 × 1½	170·0	50·0	8·24	3·70	3394	686·2	357·3	98·0	0·14	0·51
18½ × 14	..	14 × 1¼	146·2	43·0	8·04	3·65	2779	571·8	300·4	81·7	0·14	0·53
18 × 14	..	14 × 1	122·4	36·0	7·81	3·57	2196	457·6	244·0	65·4	0·15	0·55
19 × 12	..	12 × 1½	149·6	44·0	8·17	3·13	2934	432·2	308·8	72·0	0·14	0·61
18½ × 12	..	12 × 1¼	129·2	38·0	7·96	3·08	2406	360·2	260·1	60·0	0·15	0·63
18 × 12	..	12 × 1	108·8	32·0	7·72	3·00	1907	288·2	211·8	48·0	0·15	0·67

COMPOUND COLUMNS

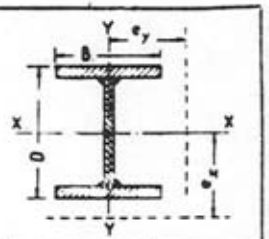


Size D × B	Composed of		Wt. per foot	Area	Radii of Gyration inches		Moments of Inertia inches⁴		Moduli of Section inches³		Eccentricity Coefficients	
Ins.	One Web	Two Flanges	lbs.	ins.²	k_x	k_y	I_x	I_y	Z_x	Z_y	e_x	e_y
19 × 14	15 × 1	14 × 2	241·4	71·0	7·82	3·59	4346	916·1	457·5	130·9	0·16	0·54
18½ × 14	..	14 × 1¾	217·6	64·0	7·63	3·54	3731	801·7	403·3	114·5	0·16	0·56
18 × 14	..	14 × 1½	193·8	57·0	7·43	3·47	3148	687·3	349·7	98·2	0·16	0·58
19 × 12	..	12 × 2	214·2	63·0	7·73	3·03	3765	577·3	396·3	96·2	0·16	0·65
18½ × 12	..	12 × 1¾	193·8	57·0	7·54	2·98	3238	505·3	350·0	84·2	0·16	0·68
18 × 12	..	12 × 1½	173·4	51·0	7·33	2·91	2738	433·3	304·2	72·2	0·17	0·71
18½ × 14	15 × ¾	14 × 1¾	204·9	60·3	7·79	3·65	3660	800·9	395·7	114·4	0·15	0·53
18 × 14	..	14 × 1½	181·1	53·3	7·60	3·59	3077	686·5	341·9	98·1	0·16	0·54
17½ × 14	..	14 × 1¼	157·3	46·3	7·39	3·52	2526	572·2	288·7	81·7	0·16	0·57
18½ × 12	..	12 × 1¾	181·1	53·3	7·71	3·08	3167	504·5	342·4	84·1	0·16	0·63
18 × 12	..	12 × 1½	160·7	47·3	7·51	3·03	2668	432·5	296·4	72·1	0·16	0·66
17½ × 12	..	12 × 1¼	140·3	41·3	7·30	2·96	2195	360·5	250·9	60·1	0·16	0·69
18 × 14	15 × ½	14 × 1½	168·3	49·5	7·79	3·72	3007	686·2	334·1	98·0	0·15	0·50
17½ × 14	..	14 × 1¼	144·5	42·5	7·60	3·67	2456	571·8	280·6	81·7	0·15	0·52
17 × 14	..	14 × 1	120·7	35·5	7·38	3·59	1935	457·6	227·6	65·4	0·15	0·54
18 × 12	..	12 × 1½	147·9	43·5	7·73	3·15	2598	432·2	288·6	72·0	0·15	0·60
17½ × 12	..	12 × 1¼	127·5	37·5	7·53	3·10	2125	360·2	242·8	60·0	0·15	0·62
17 × 12	..	12 × 1	107·1	31·5	7·30	3·02	1679	288·2	197·5	48·0	0·16	0·66
18 × 14	14 × 1	14 × 2	238·0	70·0	7·40	3·62	3831	915·8	425·7	130·9	0·16	0·53
17½ × 14	..	14 × 1¾	214·2	63·0	7·22	3·57	3280	801·6	374·8	114·5	0·17	0·55
17 × 14	..	14 × 1½	190·4	56·0	7·02	3·50	2759	687·2	324·6	98·2	0·17	0·57
18 × 12	..	12 × 2	210·8	62·0	7·31	3·05	3317	577·2	368·5	96·2	0·17	0·64
17½ × 12	..	12 × 1¾	190·4	56·0	7·13	3·00	2844	505·2	325·0	84·2	0·17	0·67
17 × 12	..	12 × 1½	170·0	50·0	6·92	2·94	2398	433·2	282·1	72·2	0·18	0·69



COMPOUND COLUMNS

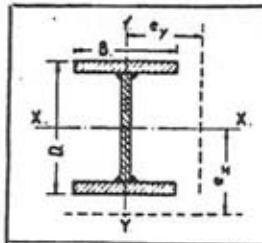
Size D × B	Composed of		Wt. per foot	Area	Radii of Gyration inches		Moments of Inertia inches⁴		Moduli of Section inches³		Eccentricity Coefficients	
Ins.	One Web	Two Flanges	lbs.	ins.²	k_x	k_y	I_x	I_y	Z_x	Z_y	e_x	e_y
17½ × 14	14 × ⅜	14 × 1¾	202·3	59·5	7·36	3·67	3223	800·9	368·3	114·4	0·16	0·52
17 × 14	..	14 × 1½	178·5	52·5	7·17	3·62	2702	686·5	317·9	98·1	0·17	0·54
16½ × 14	..	14 × 1¼	154·7	45·5	6·97	3·55	2211	572·2	268·0	81·7	0·17	0·56
17½ × 12	..	12 × 1¾	178·5	52·5	7·29	3·10	2787	504·5	318·5	84·1	0·16	0·62
17 × 12	..	12 × 1½	158·1	46·5	7·09	3·05	2341	432·5	275·4	72·1	0·17	0·65
16½ × 12	..	12 × 1¼	137·7	40·5	6·88	2·98	1920	360·5	232·7	60·1	0·17	0·67
17 × 14	14 × ½	14 × 1½	166·6	49·0	7·35	3·74	2645	686·1	311·2	98·0	0·16	0·50
16½ × 14	..	14 × 1¼	142·8	42·0	7·16	3·69	2154	571·8	261·1	81·7	0·16	0·51
16 × 14	..	14 × 1	119·0	35·0	6·95	3·62	1692	457·5	211·4	65·4	0·17	0·54
17 × 12	..	12 × 1½	146·2	43·0	7·29	3·17	2283	432·1	268·6	72·0	0·16	0·60
16½ × 12	..	12 × 1¼	125·8	37·0	7·09	3·12	1862	360·1	225·7	60·0	0·16	0·62
16 × 12	..	12 × 1	105·4	31·0	6·88	3·05	1466	288·1	183·3	48·0	0·17	0·65
15½ × 12	12 × ½	12 × 1¾	183·6	54·0	6·29	3·06	2140	505·0	276·1	84·2	0·20	0·64
15 × 12	..	12 × 1½	163·2	48·0	6·11	3·00	1791	433·0	238·8	72·2	0·20	0·67
14½ × 12	..	12 × 1¼	142·8	42·0	5·91	2·93	1465	361·0	202·0	60·2	0·21	0·70
15½ × 10	..	10 × 1¾	159·8	47·0	6·20	2·50	1807	292·7	233·2	58·5	0·20	0·80
15 × 10	..	10 × 1½	142·8	42·0	6·01	2·44	1517	251·0	202·2	50·2	0·21	0·84
14½ × 10	..	10 × 1¼	125·8	37·0	5·80	2·38	1245	209·3	171·7	41·9	0·22	0·88
15½ × 8	..	8 × 1¾	136·0	40·0	6·07	1·94	1475	150·3	190·3	37·6	0·21	1·06
15 × 8	..	8 × 1½	122·4	36·0	5·87	1·89	1242	129·0	165·6	32·3	0·22	1·12
14½ × 8	..	8 × 1¼	108·8	32·0	5·66	1·83	1024	107·7	141·3	26·9	0·23	1·19



COMPOUND COLUMNS

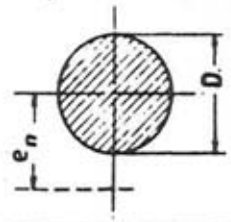
Size D × B	Composed of		Wt. per foot	Area	Radii of Gyration inches		Moments of Inertia inches⁴		Moduli of Section inches³		Eccentricity Coefficients	
ins.	One Web	Two Flanges	lbs.	ins.²	k_x	k_y	I_x	I_y	Z_x	Z_y	e_x	e_y
15 × 12	12 × ⅜	12 × 1½	153·0	45·0	6·24	3·10	1755	432·4	234·0	72·1	0·19	0·62
14½ × 12	..	12 × 1¼	132·6	39·0	6·05	3·04	1429	360·4	197·0	60·1	0·20	0·65
14 × 12	..	12 × 1	112·2	33·0	5·84	2·96	1124	288·4	160·6	48·1	0·21	0·69
15 × 10	..	10 × 1½	132·6	39·0	6·16	2·53	1481	250·4	197·4	50·1	0·20	0·78
14½ × 10	..	10 × 1¼	115·6	34·0	5·96	2·48	1209	208·7	166·7	41·7	0·20	0·81
14 × 10	..	10 × 1	98·6	29·0	5·74	2·40	954·6	167·1	136·4	33·4	0·21	0·87
15 × 8	..	8 × 1½	112·2	33·0	6·05	1·97	1206	128·4	160·8	32·1	0·21	1·03
14½ × 8	..	8 × 1¼	98·6	29·0	5·84	1·92	988·4	107·1	136·3	26·8	0·21	1·08
14 × 8	..	8 × 1	85·0	25·0	5·60	1·85	785·3	85·8	112·2	21·4	0·22	1·17
14½ × 12	12 × ½	12 × 1¼	122·4	36·0	6·22	3·16	1393	360·1	192·1	60·0	0·19	0·60
14 × 12	..	12 × 1	102·0	30·0	6·02	3·10	1088	288·1	155·4	48·0	0·19	0·62
13½ × 12	..	12 × ¾	81·6	24·0	5·79	3·00	804·4	216·1	119·2	36·0	0·20	0·67
14½ × 10	..	10 × 1¼	105·4	31·0	6·15	2·59	1173	208·4	161·7	41·7	0·19	0·74
14 × 10	..	10 × 1	88·4	26·0	5·94	2·53	918·6	166·8	131·2	33·4	0·20	0·78
13½ × 10	..	10 × ¾	71·4	21·0	5·70	2·44	682·3	125·1	101·1	25·0	0·21	0·84
14½ × 8	..	8 × 1¼	88·4	26·0	6·05	2·03	952·4	106·8	131·4	26·7	0·20	0·97
14 × 8	..	8 × 1	74·8	22·0	5·84	1·97	749·3	85·5	107·0	21·4	0·21	1·03
13½ × 8	...	8 × ¾	61·2	18·0	5·58	1·89	560·2	64·1	83·0	16·0	0·22	1·12
13 × 12	10 × ¾	12 × 1¼	147·9	43·5	5·38	3·15	1260	432·4	193·8	72·1	0·22	0·60
12½ × 12	..	12 × 1¼	127·5	37·5	5·20	3·10	1016	360·4	162·5	60·1	0·23	0·62
12 × 12	..	12 × 1	107·1	31·5	5·01	3·03	790·4	288·4	131·7	48·1	0·24	0·66
13 × 10	..	10 × 1½	127·5	37·5	5·32	2·58	1060	250·4	163·1	50·1	0·23	0·75
12½ × 10	..	10 × 1¼	110·5	32·5	5·13	2·53	856·7	208·7	137·1	41·7	0·24	0·78
12 × 10	..	10 × 1	93·5	27·5	4·93	2·46	669·1	167·0	111·5	33·4	0·25	0·82
13 × 8	..	8 × 1½	107·1	31·5	5·23	2·02	860·5	128·4	132·4	32·1	0·24	0·98
12½ × 8	..	8 × 1¼	93·5	27·5	5·04	1·97	697·9	107·0	111·7	26·8	0·25	1·03
12 × 8	..	8 × 1	79·9	23·5	4·83	1·91	547·8	85·7	91·3	21·4	0·26	1·10

COMPOUND COLUMNS

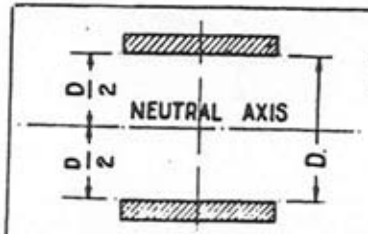


Size D × B	Composed of		Wt. per foot	Area	Radii of Gyration inches		Moments of Inertia inches⁴		Moduli of Section inches³		Eccentricity Coefficients	
Ins.	One Web	Two Flanges	lbs.	ins.²	k_x	k_y	I_x	I_y	Z_x	Z_y	e_x	e_y
12½ × 12	10 × ½	12 × 1½	119·0	35·0	5·33	3·21	994·7	360·1	159·2	60·0	0·22	0·58
12 × 12	..	12 × 1	98·6	29·0	5·15	3·15	769·6	288·1	128·3	48·0	0·23	0·60
11½ × 12	..	12 × ¾	78·2	23·0	4·95	3·07	562·5	216·1	97·8	36·0	0·24	0·64
12½ × 10	..	10 × 1½	102·0	30·0	5·28	2·64	835·9	208·4	133·7	41·7	0·22	0·72
12 × 10	..	10 × 1	85·0	25·0	5·09	2·58	648·3	166·8	108·0	33·4	0·23	0·75
11½ × 10	..	10 × ¾	68·0	20·0	4·88	2·50	475·7	125·1	82·7	25·0	0·24	0·80
12½ × 8	..	8 × 1½	85·0	25·0	5·20	2·07	677·0	106·8	108·3	26·7	0·23	0·94
12 × 8	..	8 × 1	71·4	21·0	5·01	2·02	527·0	85·4	87·8	21·4	0·24	0·98
11½ × 8	..	8 × ¾	57·8	17·0	4·78	1·94	388·9	64·1	67·6	16·0	0·25	1·06
11 × 12	8 × ¾	12 × 1½	142·8	42·0	4·50	3·21	851·0	432·3	154·7	72·0	0·27	0·58
10½ × 12	..	12 × 1½	122·4	36·0	4·34	3·16	677·6	360·3	129·1	60·0	0·28	0·60
10 × 12	..	12 × 1	102·0	30·0	4·16	3·10	519·9	288·3	104·0	48·0	0·29	0·62
11 × 10	..	10 × 1½	122·4	36·0	4·46	2·64	714·5	250·3	129·9	50·1	0·28	0·72
10½ × 10	..	10 × 1½	105·4	31·0	4·29	2·59	570·0	208·6	108·6	41·7	0·29	0·74
10 × 10	..	10 × 1	88·4	26·0	4·11	2·53	438·6	166·9	87·7	33·4	0·30	0·78
11 × 8	..	8 × 1½	102·0	30·0	4·39	2·07	578·0	128·3	105·1	32·1	0·29	0·94
10½ × 8	..	8 × 1½	88·4	26·0	4·22	2·03	462·4	107·0	88·1	26·7	0·30	0·97
10 × 8	..	8 × 1	74·8	22·0	4·03	1·97	357·3	85·6	71·5	21·4	0·31	1·03
10½ × 12	8 × ½	12 × 1½	115·6	34·0	4·43	3·25	666·9	360·1	127·6	60·0	0·27	0·57
10 × 12	..	12 × 1	95·2	28·0	4·26	3·21	509·3	288·1	101·9	48·0	0·27	0·58
9½ × 12	..	12 × ¾	74·8	22·0	4·08	3·13	366·7	216·1	77·2	36·0	0·28	0·61
10½ × 10	..	10 × 1½	98·6	29·0	4·39	2·68	559·3	208·4	106·5	41·7	0·27	0·70
10 × 10	..	10 × 1	81·6	24·0	4·22	2·64	427·9	166·7	85·6	33·3	0·28	0·72
9½ × 10	..	10 × ¾	64·6	19·0	4·03	2·57	309·1	125·1	65·1	25·0	0·29	0·76
10½ × 8	..	8 × 1½	81·6	24·0	4·34	2·11	451·7	106·8	86·0	26·7	0·28	0·90
10 × 8	..	8 × 1	68·0	20·0	4·16	2·07	346·6	85·4	69·3	21·4	0·29	0·94
9½ × 8	..	8 × ¾	54·4	16·0	3·97	2·00	251·6	64·1	53·0	16·0	0·30	1·00

SOLID ROUND COLUMNS



Diameter "D"	Weight per foot	Area	Radius of Gyration	Moment of Inertia	Modulus of Section	Eccentricity Coefficients	
Inches	lbs.	inches²	inches	inches⁴	inches³	General	For Semi-Diameter
12	384·5	113·10	3·000	1017·9	169·65	0·67	4
11½	353·2	103·87	2·875	858·5	149·31	0·70	4
11	323·1	95·03	2·750	718·7	130·67	0·73	4
10½	294·4	86·59	2·625	596·7	113·65	0·76	4
10	267·0	78·54	2·500	490·9	98·17	0·80	4
9½	241·0	70·88	2·375	399·8	84·17	0·84	4
9	216·3	63·62	2·250	322·1	71·57	0·89	4
8½	192·9	56·75	2·125	256·2	60·29	0·94	4
8	170·9	50·27	2·000	201·1	50·27	1·00	4
7½	150·2	44·18	1·875	155·3	41·42	1·07	4
7	130·8	38·48	1·750	117·9	33·67	1·15	4
6½	112·8	33·18	1·625	87·62	26·96	1·23	4
6	96·1	28·27	1·500	63·62	21·21	1·34	4
5½	80·8	23·76	1·375	44·92	16·33	1·46	4
5	66·8	19·64	1·250	30·68	12·27	1·60	4
4½	54·1	15·90	1·125	20·13	8·95	1·78	4
4	42·7	12·57	1·000	12·57	6·28	2·00	4
3½	32·7	9·62	0·875	7·37	4·21	2·29	4
3	24·0	7·07	0·750	3·98	2·65	2·67	4
2½	16·69	4·91	0·625	1·92	1·53	3·20	4
2	10·68	3·14	0·500	0·79	0·79	4·00	4
1½	6·00	1·77	0·375	0·25	0·33	5·33	4
1¼	4·17	1·23	0·313	0·12	0·19	6·40	4
1⅛	3·38	0·99	0·281	0·08	0·14	7·11	4
1	2·67	0·79	0·250	0·049	0·0982	8·00	4
⅞	2·04	0·60	0·219	0·029	0·0658	9·14	4
¾	1·50	0·44	0·188	0·0155	0·0414	10·67	4
⅝	1·04	0·31	0·156	0·0075	0·0240	12·80	4
½	0·67	0·20	0·125	0·0031	0·0123	16·00	4
⅜	0·38	0·11	0·094	0·00097	0·0052	21·33	4
¼	0·17	0·05	0·063	0·00019	0·0015	32·00	4



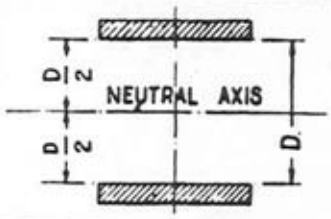
MOMENTS OF INERTIA OF TWO FLANGES

PER INCH WIDTH

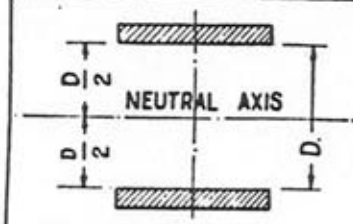
Distance "D" in inches	Thickness of each Flange in inches										
	⅜	½	⅝	¾	⅞	1	1⅛	1¼	1⅜	1½	1⅝
4	3·60	5·08	6·73	8·53	10·5	12·7	15·0	17·6	20·3	23·2	
5	5·43	7·58	9·93	12·5	15·2	18·2	21·3	24·7	28·4	32·2	36·4
6	7·63	10·6	13·8	17·2	20·8	24·7	28·8	33·2	37·8	42·8	48·0
7	10·2	14·1	18·2	22·6	27·2	32·2	37·4	42·9	48·7	54·8	61·2
8	13·2	18·1	23·3	28·8	34·6	40·7	47·1	53·8	60·9	68·3	76·0
9	16·5	22·6	29·0	35·7	42·8	50·2	57·9	66·0	74·4	83·3	92·4
10	20·2	27·6	35·3	43·4	51·9	60·7	69·9	79·4	89·4	99·8	111
11	24·3	33·1	42·3	51·8	61·8	72·2	82·9	94·1	106	118	130
12	28·7	39·1	49·9	61·0	72·6	84·7	97·1	110	123	137	152
13	33·6	45·6	58·1	71·0	84·3	98·2	112	127	142	158	175
14	38·8	52·6	66·9	81·7	96·9	113	129	146	163	181	199
15	44·3	60·1	76·3	93·1	110	128	146	165	185	205	225
16	50·3	68·1	86·4	105	125	145	165	186	208	230	253
17	56·6	76·6	97·1	118	140	162	185	208	233	257	283
18	63·3	85·6	108	132	156	181	206	232	259	286	314
19	70·4	95·1	120	146	173	200	228	257	286	316	346
20	77·8	105	133	162	191	221	251	283	315	347	381
21	85·7	116	146	177	209	242	276	310	345	380	417
22	93·9	127	160	194	229	265	301	338	376	415	454
23	102	138	174	212	249	288	328	368	409	451	493
24	111	150	190	230	271	313	355	399	443	488	534

MOMENTS OF INERTIA OF TWO FLANGES

PER INCH WIDTH



Thickness of each Flange in inches											Distance "D" in inches
1¾	1⅞	2	2⅛	2¼	2⅜	2½	2⅝	2¾	2⅞	3	
											4
											5
53·5											6
67·9	74·9										7
84·1	92·5	101									8
102	112	122									9
122	133	145	158								10
143	157	170	185	199							11
166	182	197	214	230	248						12
191	209	226	245	264	283	303					13
218	237	257	278	299	321	343					14
246	268	290	313	337	361	385	411				15
277	301	325	351	377	403	430	458	487			16
309	335	362	390	419	448	478	509	540	572		17
342	371	401	432	463	495	528	561	595	630	666	18
378	410	442	476	510	545	580	617	654	692	731	19
415	450	485	522	559	597	635	675	715	756	798	20
454	492	530	570	610	651	693	736	779	823	869	21
494	535	577	620	663	708	753	799	846	893	942	22
537	581	626	672	719	767	815	865	915	966	1019	23
581	629	677	727	777	828	880	933	987	1042	1098	24



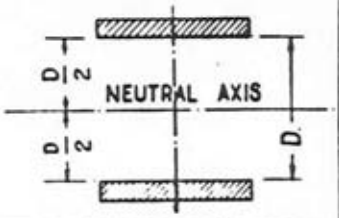
MOMENTS OF INERTIA OF TWO FLANGES

PER INCH WIDTH

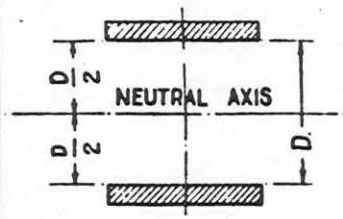
Distance "D" In inches	Thickness of each Flange in inches										
	⅜	½	⅝	¾	⅞	1	1⅛	1¼	1⅜	1½	1⅝
25	121	163	205	249	293	338	384	431	479	527	577
26	130	176	222	268	316	365	414	464	516	568	621
27	141	189	239	289	340	392	445	499	554	610	666
28	151	203	256	310	365	421	477	535	594	653	714
29	162	218	274	332	391	450	511	572	635	698	763
30	173	233	293	355	417	481	545	611	677	745	813
31	185	248	313	378	445	512	581	650	721	793	866
32	197	264	333	402	473	545	617	691	766	842	919
33	209	281	353	427	502	578	655	733	813	893	975
34	222	298	375	453	532	613	694	777	861	946	1032
35	235	315	397	479	563	648	734	822	910	1000	1091
36	248	333	419	507	595	685	776	868	961	1055	1151
37		352	442	534	628	722	818	915	1013	1112	1213
38		371	466	563	661	761	861	963	1066	1171	1276
39		390	491	593	696	800	906	1013	1121	1231	1342
40		410	516	623	731	841	952	1064	1177	1292	1408
41		431	541	654	767	882	998	1116	1235	1355	1477
42		452	568	685	804	925	1046	1169	1294	1420	1547
44		495	622	751	881	1013	1146	1280	1416	1553	1692
46		541	679	820	961	1105	1249	1396	1543	1693	1844
48		588	739	891	1045	1201	1358	1516	1676	1838	2002

MOMENTS OF INERTIA OF TWO FLANGES

PER INCH WIDTH



Thickness of each Flange in inches											Distance "D" in inches
1¾	1⅞	2	2⅛	2¼	2⅜	2½	2⅝	2¾	2⅞	3	
627	678	730	783	837	892	948	1005	1062	1121	1181	25
675	730	785	842	900	958	1018	1078	1140	1202	1266	26
724	783	842	903	964	1027	1090	1155	1220	1287	1355	27
775	838	901	966	1031	1098	1165	1234	1304	1374	1446	28
828	895	962	1031	1101	1171	1243	1316	1390	1464	1541	29
883	954	1025	1098	1172	1247	1323	1400	1478	155c	1638	30
939	1014	1090	1167	1246	1325	1405	1487	1570	1654	1739	31
998	1077	1157	1239	1322	1405	1490	1577	1664	1752	1842	32
1058	1141	1226	13f2	1400	1488	1578	1669	1761	1854	1949	33
1119	1208	1297	1388	1480	1573	1668	1764	1861	1959	2058	34
1183	1276	1370	1466	1563	1661	1760	1861	1963	2066	2171	35
1248	1346	1445	1546	1648	1751	1855	1961	2068	2176	2286	36
1315	1418	1522	1628	1735	1843	1953	2064	2176	2290	2405	3Z
1383	1492	1601	1712	1824	1938	2053	2169	2287	2406	2526	38
1454	1567	1682	1799	1916	2035	2155	2277	2400	2525	2651	39
1526	1645	1765	1887	2010	2135	2260	2388	2516	2646	2778	40
1600	1724	1850	1978	2106	2236	2368	2501	2635	2771	2909	41
1676	1806	1937	2070	2205	2341	2478	2617	2757	2899	3042	42
1832	1974	2117	2262	2408	2556	2705	2856	3009	3163	3318	44
1996	2150	2305	2462	2621	2781	2943	3106	3271	3438	3606	46
2167	2333	2501	2671	2843	3016	3190	3367	3545	3725	3906	48



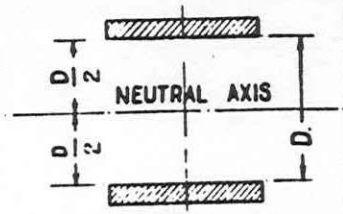
MOMENTS OF INERTIA OF TWO FLANGES

PER INCH WIDTH

Distance "D" In inches	Thickness of each Flange in inches										
	⅜	½	⅝	¾	⅞	1	1⅛	1¼	1⅜	1½	1⅝
50		638	801	966	1132	1301	1470	1642	1815	1990	2166
52		689	865	1044	1223	1405	1588	1773	1959	2147	2337
54		743	933	1124	1318	1513	1710	1908	2109	2311	2515
56		798	1002	1208	1415	1625	1836	2049	2264	2480	2699
58			1074	1294	1517	1741	1967	2194	2424	2656	2889
60			1149	1384	1621	1861	2102	2345	2590	2837	3086
62			1226	1477	1730	1985	2242	2501	2762	3027	3290
64			1305	1572	1841	2113	2386	2661	2939	3218	3500
66			1387	1671	1957	2245	2535	2827	3121	3418	3716
68			1472	1773	2076	2381	2688	2998	3309	3623	3939
70			1559	1877	2198	2521	2846	3173	3503	3835	4169
72			1648	1985	2324	2665	3008	3354	3702	4052	4405
74			1740	2095	2453	2813	3175	3539	3906	4276	4648
76			1835	2209	2586	2965	3346	3730	4116	4505	4897
78				2326	2722	3121	3522	3926	4332	4741	5152
80				2445	2862	3281	3702	4126	4553	4982	5414
82				2568	3005	3445	3887	4332	4780	5230	5683
84				2694	3152	3613	4076	4543	5012	5483	5958
86				2822	3302	3785	4270	4758	5249	5743	6239
88				2954	3456	3961	4468	4979	5492	6008	6527
90				3088	3613	4141	4671	5204	5741	6280	6822
92				3226	3734	4325	4878	5435	5995	6557	7123
94				3367	3938	4513	5090	5671	6254	6841	7430
96				3510	4106	4705	5306	5911	6519	7130	7744

MOMENTS OF INERTIA OF TWO FLANGES

PER INCH WIDTH



Thickness of each Flange in inches											Distance "D" in inches
1¾	1⅞	2	2⅛	2¼	2⅜	2½	2⅝	2¾	2⅞	3	
2344	2524	2705	2888	3073	3260	3448	3638	3829	4023	4218	50
2529	2722	2917	3114	3313	3513	3715	3919	4125	4333	4542	52
2720	2928	3137	3348	3562	3776	3993	4211	4432	4654	4878	54
2919	3141	3365	3591	3819	4049	4280	4514	4749	4987	5226	56
3125	3362	3601	3843	4086	4331	4578	4827	5078	5331	5586	58
3337	3590	3845	4102	4361	4622	4885	5150	5418	5687	5958	60
3557	3826	4097	4371	4646	4923	5203	5485	5768	6054	6342	62
3784	4069	4357	4647	4940	5234	5530	5829	6130	6433	6738	64
4017	4320	4625	4933	5242	5554	5868	6184	6503	6823	7146	66
4258	4578	4901	5226	5554	5883	6215	6550	6886	7225	7566	68
4505	4844	5185	5529	5874	6223	6573	6926	7281	7638	7998	70
4760	5118	5477	5840	6204	6571	6940	7312	7686	8063	8442	72
5022	5398	5777	6159	6543	6929	7318	7709	8103	8499	8898	74
5290	5687	6085	6487	6890	7297	7705	8117	8531	8947	9366	76
5566	5982	6401	6823	7247	7674	8103	8535	8969	9406	9846	78
5849	6286	6725	7168	7613	8060	8510	8963	9419	9877	10338	80
6138	6596	7057	7521	7987	8456	8928	9402	9879	10359	10842	82
6435	6915	7397	7883	8371	8862	9355	9852	[illegible]	10853	11358	84
6738	7240	7745	8253	8763	9277	9793	10312	10834	11358	11886	86
7049	7574	8101	8632	9165	9701	10240	10782	11327	11875	12426	88
7367	7915	8465	9019	9576	10135	10698	11263	11832	12403	12978	90
7691	8263	8837	9415	9995	10579	11165	11755	12348	12943	13542	92
8023	8619	9217	9819	10424	11032	11643	12257	12874	13495	14118	94
8362	8982	9605	10232	10862	11494	12130	12770	13412	14057	14706	96