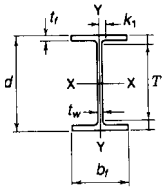


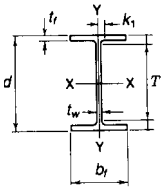
Wide Flange Beams

4" to 44" Sections

W Shapes
Dimensions



Shapes	Area A	Depth d		Web		Flange				Distance		
				Thickness t _w		Width b _f		Thickness t _f		k ₁	T	Work-able Gage
	in. ²	in.		in.		in.		in.		in.	in.	in.
W 4 x 13	3.83	4.16	4 1/8	0.280	1/4	4.06	4	0.345	3/8	1/2	2 5/8	2 1/4
W 5 x 16	4.71	5.01	5	0.240	1/4	5.00	5	0.360	3/8	7/16	3 1/2	2 3/4
W 5 x 19	5.56	5.15	5 1/8	0.270	1/4	5.03	5	0.430	7/16	7/16	3 1/2	2 3/4
W 6 x 9	2.68	5.90	5 7/8	0.170	3/16	3.94	4	0.215	3/16	1/2	4 1/2	2 1/4
W 6 x 12	3.55	6.03	6	0.230	1/4	4.00	4	0.280	1/4	9/16	↓	↓
W 6 x 16	4.74	6.28	6 1/4	0.260	1/4	4.03	4	0.405	3/8	9/16	↓	↓
W 6 x 15	4.43	5.99	6	0.230	1/4	5.99	6	0.260	1/4	9/16	4 1/2	3 1/2
W 6 x 20	5.87	6.20	6 1/4	0.260	1/4	6.02	6	0.365	3/8	9/16	↓	↓
W 6 x 25	7.34	6.38	6 3/8	0.320	5/16	6.08	6 1/8	0.455	7/16	9/16	↓	↓
W 8 x 10	2.96	7.89	7 7/8	0.170	3/16	3.94	4	0.205	3/16	1/2	6 1/2	2 1/4
W 8 x 13	3.84	7.99	8	0.230	1/4	4.00	4	0.255	1/4	9/16	↓	↓
W 8 x 15	4.44	8.11	8 1/8	0.245	1/4	4.02	4	0.315	5/16	9/16	↓	↓
W 8 x 18	5.26	8.14	8 1/8	0.230	1/4	5.25	5 1/4	0.330	5/16	9/16	6 1/2	2 3/4
W 8 x 21	6.16	8.28	8 1/4	0.250	1/4	5.27	5 1/4	0.400	3/8	9/16	6 1/2	2 3/4
W 8 x 24	7.08	7.93	7 7/8	0.245	1/4	6.50	6 1/2	0.400	3/8	9/16	6 1/8	4
W 8 x 28	8.24	8.06	8	0.285	5/16	6.54	6 1/2	0.465	7/16	5/8	6 1/8	4
W 8 x 31	9.12	8.00	8	0.285	5/16	8.00	8	0.435	7/16	3/4	5 3/4	5 1/2
W 8 x 35	10.3	8.12	8 1/8	0.310	5/16	8.02	8	0.495	1/2	13/16	↓	↓
W 8 x 40	11.7	8.25	8 1/4	0.360	3/8	8.07	8 1/8	0.560	9/16	13/16	↓	↓
W 8 x 48	14.1	8.50	8 1/2	0.400	3/8	8.11	8 1/8	0.685	1 1/16	13/16	↓	↓
W 8 x 58	17.1	8.75	8 3/4	0.510	1/2	8.22	8 1/4	0.810	1 3/16	7/8	↓	↓
W 8 x 67	19.7	9.00	9	0.570	9/16	8.28	8 1/4	0.935	1 5/16	15/16	↓	↓



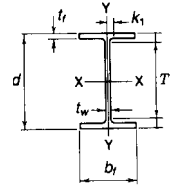
W Shapes

Dimensions

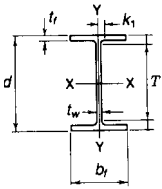
Shapes	Area A	Depth d		Web		Flange				Distance		
				Thickness t _w		Width b _f		Thickness t _f		k ₁	T	Work- able Gage
	in. ²	in.		in.		in.		in.		in.	in.	in.
W 10 x 12	3.54	9.87	9 ⁷ / ₈	0.190	³ / ₁₆	3.96	4	0.210	³ / ₁₆	⁹ / ₁₆	8 ³ / ₈	2 ¹ / ₄
x 15	4.41	10.0	10	0.230	¹ / ₄	4.00	4	0.270	¹ / ₄	⁹ / ₁₆	↓	↓
x 17	4.99	10.1	10 ⁷ / ₈	0.240	¹ / ₄	4.01	4	0.330	⁵ / ₁₆	⁹ / ₁₆	↓	↓
x 19	5.62	10.2	10 ¹ / ₄	0.250	¹ / ₄	4.02	4	0.395	³ / ₈	⁵ / ₈	↓	↓
W 10 x 22	6.49	10.2	10 ⁷ / ₈	0.240	¹ / ₄	5.75	5 ³ / ₄	0.360	³ / ₈	⁵ / ₈	8 ¹ / ₄	2 ³ / ₄
x 26	7.61	10.3	10 ³ / ₈	0.260	¹ / ₄	5.77	5 ³ / ₄	0.440	⁷ / ₁₆	¹¹ / ₁₆	↓	↓
x 30	8.84	10.5	10 ¹ / ₂	0.300	⁵ / ₁₆	5.81	5 ³ / ₄	0.510	¹ / ₂	¹¹ / ₁₆	↓	↓
W 10 x 33	9.71	9.73	9 ³ / ₄	0.290	⁵ / ₁₆	7.96	8	0.435	⁷ / ₁₆	³ / ₄	7 ¹ / ₂	5 ¹ / ₂
x 39	11.5	9.92	9 ⁷ / ₈	0.315	⁵ / ₁₆	7.99	8	0.530	¹ / ₂	¹³ / ₁₆	↓	↓
x 45	13.3	10.1	10 ⁷ / ₈	0.350	³ / ₈	8.02	8	0.620	⁵ / ₈	¹³ / ₁₆	↓	↓
W 10 x 49	14.4	10.0	10	0.340	⁵ / ₁₆	10.0	10	0.560	⁹ / ₁₆	¹³ / ₁₆	7 ¹ / ₂	5 ¹ / ₂
x 54	15.8	10.1	10 ⁷ / ₈	0.370	³ / ₈	10.0	10	0.615	⁵ / ₈	¹³ / ₁₆	↓	↓
x 60	17.6	10.2	10 ¹ / ₄	0.420	⁷ / ₁₆	10.1	10 ⁷ / ₈	0.680	¹¹ / ₁₆	¹³ / ₁₆	↓	↓
x 68	20.0	10.4	10 ³ / ₈	0.470	¹ / ₂	10.1	10 ⁷ / ₈	0.770	³ / ₄	⁷ / ₈	↓	↓
x 77	22.6	10.6	10 ⁵ / ₈	0.530	¹ / ₂	10.2	10 ¹ / ₄	0.870	⁷ / ₈	⁷ / ₈	↓	↓
x 88	25.9	10.8	10 ⁷ / ₈	0.605	⁵ / ₈	10.3	10 ¹ / ₄	0.990	1	¹⁵ / ₁₆	↓	↓
x100	29.4	11.1	11 ¹ / ₈	0.680	¹¹ / ₁₆	10.3	10 ³ / ₈	1.12	1 ¹ / ₈	1	↓	↓
x112	32.9	11.4	11 ³ / ₈	0.755	³ / ₄	10.4	10 ³ / ₈	1.25	1 ¹ / ₄	1	↓	↓
W 12 x 14	4.16	11.9	11 ⁷ / ₈	0.200	³ / ₁₆	3.97	4	0.225	¹ / ₄	⁹ / ₁₆	10 ³ / ₈	2 ¹ / ₄
x 16	4.71	12.0	12	0.220	¹ / ₄	3.99	4	0.265	¹ / ₄	⁹ / ₁₆	↓	↓
x 19	5.57	12.2	12 ⁷ / ₈	0.235	¹ / ₄	4.01	4	0.350	³ / ₈	⁹ / ₁₆	↓	↓
x 22	6.48	12.3	12 ¹ / ₄	0.260	¹ / ₄	4.03	4	0.425	⁷ / ₁₆	⁵ / ₈	↓	↓
W 12 x 26	7.65	12.2	12 ¹ / ₄	0.230	¹ / ₄	6.49	6 ¹ / ₂	0.380	³ / ₈	³ / ₄	10 ⁷ / ₈	3 ¹ / ₂
x 30	8.79	12.3	12 ³ / ₈	0.260	¹ / ₄	6.52	6 ¹ / ₂	0.440	⁷ / ₁₆	³ / ₄	↓	↓
x 35	10.3	12.5	12 ¹ / ₂	0.300	⁵ / ₁₆	6.56	6 ¹ / ₂	0.520	¹ / ₂	³ / ₄	↓	↓
W 12 x 40	11.7	11.9	12	0.295	⁵ / ₁₆	8.01	8	0.515	¹ / ₂	⁷ / ₈	9 ¹ / ₄	5 ¹ / ₂
x 45	13.1	12.1	12	0.335	⁵ / ₁₆	8.05	8	0.575	⁹ / ₁₆	¹⁵ / ₁₆	↓	↓
x 50	14.6	12.2	12 ¹ / ₄	0.370	³ / ₈	8.08	8 ¹ / ₈	0.640	⁵ / ₈	¹⁵ / ₁₆	↓	↓
W 12 x 53	15.6	12.1	12	0.345	³ / ₈	10.0	10	0.575	⁹ / ₁₆	¹⁵ / ₁₆	9 ¹ / ₄	5 ¹ / ₂
x 58	17.0	12.2	12 ¹ / ₄	0.360	³ / ₈	10.0	10	0.640	⁵ / ₈	¹⁵ / ₁₆	9 ¹ / ₄	5 ¹ / ₂

W Shapes

Dimensions



Shapes	Area A	Depth d		Web		Flange				Distance		
				Thickness t _w		Width b _f		Thickness t _f		k ₁	T	Work- able Gage
	in. ²	in.		in.		in.		in.		in.	in.	in.
W 12 x 65	19.1	12.1	12 ¹ / ₈	0.390	³ / ₈	12.0	12	0.605	⁵ / ₈	1	9 ¹ / ₈	5 ¹ / ₂
x 72	21.1	12.3	12 ¹ / ₄	0.430	⁷ / ₁₆	12.0	12	0.670	¹¹ / ₁₆	1 ¹ / ₁₆	↓	↓
x 79	23.2	12.4	12 ³ / ₈	0.470	¹ / ₂	12.1	12 ¹ / ₈	0.735	³ / ₄	1 ¹ / ₁₆	↓	↓
x 87	25.6	12.5	12 ¹ / ₂	0.515	¹ / ₂	12.1	12 ¹ / ₈	0.810	¹³ / ₁₆	1 ¹ / ₁₆	↓	↓
x 96	28.2	12.7	12 ³ / ₄	0.550	⁹ / ₁₆	12.2	12 ¹ / ₈	0.900	⁷ / ₈	1 ¹ / ₈	↓	↓
x 106	31.2	12.9	12 ⁷ / ₈	0.610	⁵ / ₈	12.2	12 ¹ / ₄	0.990	1	1 ¹ / ₈	↓	↓
x 120	35.3	13.1	13 ¹ / ₈	0.710	¹¹ / ₁₆	12.3	12 ³ / ₈	1.11	1 ¹ / ₈	1 ³ / ₁₆	↓	↓
x 136	39.9	13.4	13 ³ / ₈	0.790	¹³ / ₁₆	12.4	12 ³ / ₈	1.25	1 ¹ / ₄	1 ¹ / ₄	↓	↓
x 152	44.7	13.7	13 ³ / ₄	0.870	⁷ / ₈	12.5	12 ¹ / ₂	1.40	1 ³ / ₈	1 ¹ / ₄	↓	↓
x 170	50.0	14.0	14	0.960	¹⁵ / ₁₆	12.6	12 ³ / ₄	1.56	1 ⁹ / ₁₆	1 ⁵ / ₁₆	↓	↓
x 190	55.8	14.4	14 ¹ / ₂	1.060	1 ¹ / ₈	12.7	12 ³ / ₄	1.74	1 ³ / ₄	1 ³ / ₈	↓	↓
x 210	61.8	14.7	14 ³ / ₄	1.180	1 ³ / ₁₆	12.8	12 ³ / ₄	1.90	1 ⁷ / ₈	1 ⁷ / ₁₆	↓	↓
x 230	67.7	15.1	15	1.290	1 ⁵ / ₁₆	12.9	12 ⁷ / ₈	2.07	2 ¹ / ₁₆	1 ¹ / ₂	↓	↓
x 252	74.0	15.4	15 ¹ / ₂	1.400	1 ³ / ₈	13.0	13	2.25	2 ¹ / ₄	1 ¹ / ₂	↓	↓
x 279	81.9	15.9	15 ⁷ / ₈	1.530	1 ¹ / ₂	13.1	13 ¹ / ₈	2.47	2 ¹ / ₂	1 ⁵ / ₈	↓	↓
x 305	89.6	16.3	16 ¹ / ₈	1.630	1 ⁵ / ₈	13.2	13 ¹ / ₄	2.71	2 ¹¹ / ₁₆	1 ⁵ / ₈	↓	↓
x 336	98.8	16.8	16 ¹ / ₂	1.780	1 ³ / ₄	13.4	13 ³ / ₈	2.96	2 ¹⁵ / ₁₆	1 ¹¹ / ₁₆	↓	↓
W 14 x 22	6.49	13.7	13 ³ / ₄	0.230	¹ / ₄	5.00	5	0.335	⁵ / ₁₆	³ / ₄	11 ⁵ / ₈	2 ³ / ₄
x 26	7.69	13.9	13 ⁷ / ₈	0.255	¹ / ₄	5.03	5	0.420	⁷ / ₁₆	³ / ₄	11 ⁵ / ₈	2 ³ / ₄
W 14 x 30	8.85	13.8	13 ⁷ / ₈	0.270	¹ / ₄	6.73	6 ³ / ₄	0.385	³ / ₈	³ / ₄	11 ⁵ / ₈	3 ¹ / ₂
x 34	10.0	14.0	14	0.285	⁵ / ₁₆	6.75	6 ³ / ₄	0.455	⁷ / ₁₆	³ / ₄	↓	↓
x 38	11.2	14.1	14 ¹ / ₈	0.310	⁵ / ₁₆	6.77	6 ³ / ₄	0.515	¹ / ₂	1 ³ / ₁₆	↓	↓
W 14 x 43	12.6	13.7	13 ⁵ / ₈	0.305	⁵ / ₁₆	8.00	8	0.530	¹ / ₂	1	10 ⁷ / ₈	5 ¹ / ₂
x 48	14.1	13.8	13 ³ / ₄	0.340	⁵ / ₁₆	8.03	8	0.595	⁵ / ₈	1	↓	↓
x 53	15.6	13.9	13 ⁷ / ₈	0.370	³ / ₈	8.06	8	0.660	¹¹ / ₁₆	1	↓	↓
W 14 x 61	17.9	13.9	13 ⁷ / ₈	0.375	³ / ₈	10.0	10	0.645	⁵ / ₈	1	10 ⁷ / ₈	5 ¹ / ₂
x 68	20.0	14.0	14	0.415	⁷ / ₁₆	10.0	10	0.720	³ / ₄	1 ¹ / ₁₆	↓	↓
x 74	21.8	14.2	14 ¹ / ₈	0.450	⁷ / ₁₆	10.1	10 ¹ / ₈	0.785	¹³ / ₁₆	1 ¹ / ₁₆	↓	↓
x 82	24.0	14.3	14 ¹ / ₄	0.510	¹ / ₂	10.1	10 ¹ / ₈	0.855	⁷ / ₈	1 ¹ / ₁₆	↓	↓
W 14 x 90	26.5	14.0	14	0.440	⁷ / ₁₆	14.5	14 ¹ / ₂	0.710	¹¹ / ₁₆	1 ⁷ / ₁₆	10	5 ¹ / ₂
x 99	29.1	14.2	14 ¹ / ₈	0.485	¹ / ₂	14.6	14 ⁵ / ₈	0.780	³ / ₄	1 ⁷ / ₁₆	↓	↓
x 109	32.0	14.3	14 ¹ / ₂	0.525	¹ / ₂	14.6	14 ⁵ / ₈	0.860	⁷ / ₈	1 ¹ / ₂	↓	↓
x 120	35.3	14.5	14 ¹ / ₂	0.590	⁹ / ₁₆	14.7	14 ⁵ / ₈	0.940	¹⁵ / ₁₆	1 ¹ / ₂	↓	↓
x 132	38.8	14.7	14 ³ / ₈	0.645	⁵ / ₈	14.7	14 ³ / ₄	1.03	1	1 ⁹ / ₁₆	↓	↓



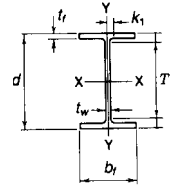
W Shapes

Dimensions

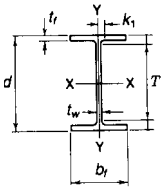
Shapes	Area A	Depth d		Web		Flange				Distance		
				Thickness t _w		Width b _f		Thickness t _f		k ₁	T	Work- able Gage
	in. ²	in.		in.		in.		in.		in.	in.	in.
W 14 x 145	42.7	14.8	14¾	0.680	1⅛	15.5	15½	1.09	1⅛	1⅞	10	3-7½-3
x 159	46.7	15.0	15	0.745	¾	15.6	15⅝	1.19	1⅜	1⅞	↓	↓
x 176	51.8	15.2	15¼	0.830	13⁄16	15.7	15⅝	1.31	1⅝	1⅝	↓	↓
x 193	56.8	15.5	15½	0.890	7⁄8	15.7	15¾	1.44	1⅞	1⅞	↓	↓
x 211	62.0	15.7	15¾	0.980	1	15.8	15¾	1.56	1⅞	1⅞	↓	↓
x 233	68.5	16.0	16	1.070	1⅛	15.9	15⅞	1.72	1¾	1¾	↓	↓
x 257	75.6	16.4	16⅝	1.180	1¾	16.0	16	1.89	1⅞	1⅞	↓	↓
x 283	83.3	16.7	16¾	1.290	1⅝	16.1	16⅞	2.07	2⅛	1⅞	↓	↓
x 311	91.4	17.1	17⅞	1.410	1⅞	16.2	16¼	2.26	2¼	1⅞	↓	↓
x 342	101.0	17.5	17½	1.540	1⅞	16.4	16⅝	2.47	2½	2	↓	↓
x 370	109.0	17.9	17⅞	1.660	1⅞	16.5	16½	2.66	2⅞	2⅞	↓	↓
x 398	117.0	18.3	18¼	1.770	1¾	16.6	16⅝	2.85	2⅞	2⅞	↓	↓
x 426	125.0	18.7	18⅝	1.880	1⅞	16.7	16¾	3.04	3⅞	2⅞	↓	↓
x 455	134.0	19.0	19	2.020	2	16.8	16⅞	3.21	3⅞	2¼	↓	↓
x 500	147.0	19.6	19⅞	2.190	2⅞	17.0	17	3.50	3½	2⅞	↓	↓
x 550	162.0	20.2	20¼	2.380	2⅞	17.2	17¼	3.82	3⅞	2⅞	↓	↓
x 605	178.0	20.9	20⅞	2.600	2⅞	17.4	17⅞	4.16	4⅞	2⅞	↓	↓
x 665	196.0	21.6	21⅞	2.830	2⅞	17.7	17⅞	4.52	4½	2⅞	↓	↓
x 730	215.0	22.4	22⅞	3.070	3⅞	17.9	17⅞	4.91	4⅞	2¾	↓	↓
W 16 x 26	7.68	15.7	15¾	0.250	¼	5.50	5½	0.345	⅝	¾	13⅞	3½
x 31	9.13	15.9	15⅞	0.275	¼	5.53	5½	0.440	7⁄16	¾	13⅞	3½
W 16 x 36	10.6	15.9	15⅞	0.295	5⁄16	6.99	7	0.430	7⁄16	¾	13⅞	3½
x 40	11.8	16.0	16	0.305	5⁄16	7.00	7	0.505	½	13⁄16	↓	↓
x 45	13.3	16.1	16⅞	0.345	⅝	7.04	7	0.565	9⁄16	13⁄16	↓	↓
x 50	14.7	16.3	16¼	0.380	⅝	7.07	7⅞	0.630	⅝	13⁄16	↓	↓
x 57	16.8	16.4	16⅝	0.430	7⁄16	7.12	7⅞	0.715	1⅞	7⁄8	↓	↓
W 16 x 67	19.7	16.3	16⅝	0.395	⅝	10.2	10¼	0.665	1⅞	1	13¼	5½
x 77	22.6	16.5	16½	0.455	7⁄16	10.3	10¼	0.760	¾	1⅞	↓	↓
x 89	26.2	16.8	16¾	0.525	½	10.4	10⅝	0.875	7⁄8	1⅞	↓	↓
x 100	29.5	17.0	17	0.585	9⁄16	10.4	10⅝	0.985	1	1⅞	↓	↓

W Shapes

Dimensions



Shapes	Area A	Depth d		Web		Flange			Distance			
				Thickness t _w		Width b _f		Thickness t _f	k ₁		T	Work-able Gage
	in. ²	in.		in.		in.		in.	in.	in.	in.	in.
W 18 x 35	10.3	17.7	17¾	0.300	⅞	6.00	6	0.425	⅞	¾	15½	3½
x 40	11.8	17.9	17⅞	0.315	⅞	6.02	6	0.525	½	1⅜	↓	↓
x 46	13.5	18.1	18	0.360	¾	6.06	6	0.605	⅝	1⅜	↓	↓
W 18 x 50	14.7	18.0	18	0.355	¾	7.50	7½	0.570	⅞	1⅜	15½	3½
x 55	16.2	18.1	18⅞	0.390	¾	7.53	7½	0.630	⅝	1⅜	↓	↓
x 60	17.6	18.2	18¼	0.415	⅞	7.56	7½	0.695	1⅞	1⅜	↓	↓
x 65	19.1	18.4	18⅝	0.450	⅞	7.59	7⅝	0.750	¾	⅞	↓	↓
x 71	20.8	18.5	18½	0.495	½	7.64	7⅝	0.810	1⅜	⅞	↓	↓
W 18 x 76	22.3	18.2	18¼	0.425	⅞	11.0	11	0.680	1⅞	1⅞	15⅝	5½
x 86	25.3	18.4	18⅝	0.480	½	11.1	11⅞	0.770	¾	1⅞	↓	↓
x 97	28.5	18.6	18⅝	0.535	⅞	11.1	11⅞	0.870	⅞	1⅞	↓	↓
x 106	31.1	18.7	18¾	0.590	⅞	11.2	11¼	0.940	1⅞	1⅞	↓	↓
x 119	35.1	19.0	19	0.655	⅝	11.3	11¼	1.06	1⅞	1⅞	↓	↓
x 130	38.2	19.3	19¼	0.670	1⅞	11.2	11⅞	1.20	1⅞	1⅞	↓	↓
x 143	42.1	19.5	19½	0.730	¾	11.2	11¼	1.32	1⅞	1⅞	↓	↓
x 158	46.3	19.7	19¾	0.810	1⅜	11.3	11¼	1.44	1⅞	1¼	↓	↓
x 175	51.3	20.0	20	0.890	⅞	11.4	11⅝	1.59	1⅞	1¼	↓	↓
x 192	56.4	20.4	20⅝	0.960	1⅞	11.5	11½	1.75	1¾	1⅞	↓	↓
x 211	62.1	20.7	20⅝	1.060	1⅞	11.6	11½	1.91	1⅞	1⅞	15½	↓
x 234	68.8	21.1	21	1.160	1⅜	11.7	11⅝	2.11	2⅞	1⅞	↓	↓
x 258	75.9	21.5	21½	1.280	1¼	11.8	11¾	2.30	2⅞	1¼	↓	↓
x 283	83.3	21.9	21⅞	1.400	1⅝	11.9	11⅞	2.50	2½	1⅞	↓	↓
x 311	91.6	22.3	22⅝	1.520	1½	12.0	12	2.74	2¾	1⅞	↓	↓
W 21 x 44	13.0	20.7	20⅝	0.350	¾	6.50	6½	0.450	⅞	1⅜	18⅝	3½
x 50	14.7	20.8	20⅞	0.380	¾	6.53	6½	0.535	⅞	1⅜	↓	↓
x 57	16.7	21.1	21	0.405	¾	6.56	6½	0.650	⅝	1⅜	↓	↓
W 21 x 48	14.1	20.6	20⅝	0.350	¾	8.14	8⅞	0.430	⅞	1⅜	18⅝	5½
x 55	16.2	20.8	20¾	0.375	¾	8.22	8¼	0.522	½	1⅜	↓	↓
x 62	18.3	21.0	21	0.400	¾	8.24	8¼	0.615	⅝	1⅜	↓	↓
x 68	20.0	21.1	21⅞	0.430	⅞	8.27	8¼	0.685	1⅞	⅞	↓	↓
x 73	21.5	21.2	21¼	0.455	⅞	8.30	8¼	0.740	¾	⅞	↓	↓
x 83	24.3	21.4	21⅝	0.515	½	8.36	8⅝	0.835	1⅜	⅞	↓	↓
x 93	27.3	21.6	21⅝	0.058	⅞	8.42	8⅝	0.930	1⅞	1⅞	↓	↓



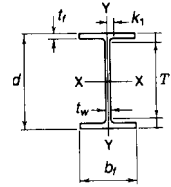
W Shapes

Dimensions

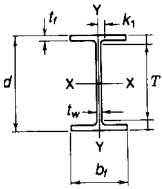
Shapes	Area A	Depth d		Web		Flange				Distance		
				Thickness t_w		Width b_f		Thickness t_f		k_1	T	Work-able Gage
				in.		in.		in.		in.	in.	in.
W 21 x 101	29.8	21.4	21 $\frac{3}{8}$	0.500	$\frac{1}{2}$	12.3	12 $\frac{1}{4}$	0.800	$\frac{13}{16}$	1 $\frac{1}{16}$	18	5 $\frac{1}{2}$
x 111	32.7	21.5	21 $\frac{1}{2}$	0.550	$\frac{9}{16}$	12.3	12 $\frac{3}{8}$	0.875	$\frac{7}{8}$	1 $\frac{1}{8}$	↓	↓
x 122	35.9	21.7	21 $\frac{5}{8}$	0.600	$\frac{5}{8}$	12.4	12 $\frac{3}{8}$	0.960	$\frac{15}{16}$	1 $\frac{1}{8}$	↓	↓
x 132	38.8	21.8	21 $\frac{7}{8}$	0.650	$\frac{5}{8}$	12.4	12 $\frac{1}{2}$	1.04	$\frac{1}{16}$	1 $\frac{1}{8}$	↓	↓
x 147	43.2	22.1	22	0.720	$\frac{3}{4}$	12.5	12 $\frac{1}{2}$	1.15	1 $\frac{1}{8}$	1 $\frac{3}{16}$	↓	↓
x 166	48.8	22.5	22 $\frac{1}{2}$	0.750	$\frac{3}{4}$	12.4	12 $\frac{3}{8}$	1.36	1 $\frac{3}{8}$	1 $\frac{3}{16}$	↓	↓
x 182	53.6	22.7	22 $\frac{3}{4}$	0.830	$\frac{13}{16}$	12.5	12 $\frac{1}{2}$	1.48	1 $\frac{1}{2}$	1 $\frac{1}{4}$	↓	↓
x 201	59.2	23.0	23	0.910	$\frac{15}{16}$	12.6	12 $\frac{3}{8}$	1.63	1 $\frac{5}{8}$	1 $\frac{5}{16}$	↓	↓
W 24 x 55	16.2	23.6	23 $\frac{3}{8}$	0.395	$\frac{3}{8}$	7.01	7	0.505	$\frac{1}{2}$	1	20 $\frac{3}{4}$	3 $\frac{1}{2}$
x 62	18.2	23.7	23 $\frac{3}{4}$	0.430	$\frac{7}{16}$	7.04	7	0.590	$\frac{9}{16}$	1 $\frac{1}{16}$	20 $\frac{3}{4}$	3 $\frac{1}{2}$
W 24 x 68	20.1	23.7	23 $\frac{3}{4}$	0.415	$\frac{7}{16}$	8.97	9	0.585	$\frac{9}{16}$	1 $\frac{1}{16}$	20 $\frac{3}{4}$	5 $\frac{1}{2}$
x 76	22.4	23.9	23 $\frac{7}{8}$	0.440	$\frac{7}{16}$	8.99	9	0.680	$\frac{11}{16}$	1 $\frac{1}{16}$	↓	↓
x 84	24.7	24.1	24 $\frac{1}{8}$	0.470	$\frac{1}{2}$	9.02	9	0.770	$\frac{3}{4}$	1 $\frac{1}{16}$	↓	↓
x 94	27.7	24.3	24 $\frac{1}{4}$	0.515	$\frac{1}{2}$	9.07	9 $\frac{1}{8}$	0.875	$\frac{7}{8}$	1 $\frac{1}{16}$	↓	↓
x 103	30.3	24.5	24 $\frac{1}{2}$	0.550	$\frac{9}{16}$	9.00	9	0.980	1	1 $\frac{1}{8}$	↓	↓
W 24 x 104	30.6	24.1	24	0.500	$\frac{1}{2}$	12.8	12 $\frac{3}{4}$	0.750	$\frac{3}{4}$	1 $\frac{1}{16}$	20 $\frac{3}{4}$	5 $\frac{1}{2}$
x 117	34.4	24.3	24 $\frac{1}{4}$	0.550	$\frac{9}{16}$	12.8	12 $\frac{3}{4}$	0.850	$\frac{7}{8}$	1 $\frac{1}{8}$	↓	↓
x 131	38.5	24.5	24 $\frac{1}{2}$	0.605	$\frac{5}{8}$	12.9	12 $\frac{7}{8}$	0.960	$\frac{15}{16}$	1 $\frac{1}{8}$	↓	↓
x 146	43.0	24.7	24 $\frac{3}{4}$	0.650	$\frac{5}{8}$	12.9	12 $\frac{7}{8}$	1.09	1 $\frac{1}{16}$	1 $\frac{1}{8}$	↓	↓
x 162	47.7	25.0	25	0.705	$\frac{11}{16}$	13.0	13	1.22	1 $\frac{1}{4}$	1 $\frac{3}{16}$	↓	↓
x 176	51.7	25.2	25 $\frac{1}{4}$	0.750	$\frac{3}{4}$	12.9	12 $\frac{7}{8}$	1.34	1 $\frac{5}{16}$	1 $\frac{3}{16}$	↓	↓
x 192	56.3	25.5	25 $\frac{1}{2}$	0.810	$\frac{13}{16}$	13.0	13	1.46	1 $\frac{7}{16}$	1 $\frac{1}{4}$	↓	↓
x 207	60.7	25.7	25 $\frac{3}{4}$	0.870	$\frac{7}{8}$	13.0	13	1.57	1 $\frac{9}{16}$	1 $\frac{1}{4}$	↓	↓
x 229	67.2	26.0	26	0.960	$\frac{15}{16}$	13.1	13 $\frac{1}{8}$	1.73	1 $\frac{3}{4}$	1 $\frac{5}{16}$	↓	↓
x 250	73.5	26.3	26 $\frac{3}{8}$	1.04	1 $\frac{1}{16}$	13.2	13 $\frac{1}{8}$	1.89	1 $\frac{7}{8}$	1 $\frac{3}{8}$	↓	↓
x 279	82.0	26.7	26 $\frac{3}{4}$	1.16	1 $\frac{3}{16}$	13.3	13 $\frac{1}{4}$	2.09	2 $\frac{1}{16}$	1 $\frac{7}{16}$	↓	↓
x 306	89.9	27.1	27 $\frac{1}{8}$	1.26	1 $\frac{1}{4}$	13.4	13 $\frac{3}{8}$	2.28	2 $\frac{1}{4}$	1 $\frac{7}{16}$	↓	↓
x 335	98.4	27.5	27 $\frac{1}{2}$	1.38	1 $\frac{3}{8}$	13.5	13 $\frac{1}{2}$	2.48	2 $\frac{1}{2}$	1 $\frac{1}{2}$	↓	↓
x 370	109.0	28.0	28	1.52	1 $\frac{1}{2}$	13.7	13 $\frac{3}{8}$	2.72	2 $\frac{3}{4}$	$\frac{9}{16}$	↓	↓

W Shapes

Dimensions



Shapes	Area A	Depth <i>d</i>		Web		Flange				Distance		
				Thickness <i>t_w</i>		Width <i>b_f</i>		Thickness <i>t_f</i>		<i>k₁</i>	<i>T</i>	Work-able Gage
	in. ²	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	
W 27 x 84	24.8	26.7	26¾	0.460	7/16	10.0	10	0.640	5/8	1 1/16	23 5/8	5 1/2
x 94	27.7	26.9	26 7/8	0.490	1 1/2	10.0	10	0.745	¾	1 1/16	↓	↓
x 102	30.0	27.1	27 1/8	0.515	1 1/2	10.0	10	0.830	1 3/16	1 1/16	↓	↓
x 114	33.5	27.3	27 1/4	0.570	9/16	10.1	10 1/8	0.930	1 5/16	1 1/8	↓	↓
x 129	37.8	27.6	27 5/8	0.610	5/8	10.0	10	1.10	1 1/8	1 1/8	↓	↓
W 27 x 146	43.1	27.4	27 3/8	0.605	5/8	14.0	14	0.975	1	1 1/8	23 5/8	5 1/2
x 161	47.6	27.6	27 5/8	0.660	1 1/16	14.0	14	1.08	1 1/16	1 3/16	↓	↓
x 178	52.5	27.8	27 3/4	0.725	¾	14.1	14 1/8	1.19	1 3/16	1 3/16	↓	↓
x 194	57.2	28.1	28 1/8	0.750	¾	14.0	14	1.34	1 5/16	1 3/16	↓	↓
x 217	64.0	28.4	28 3/8	0.830	1 3/16	14.1	14 1/8	1.50	1 1/2	1 1/4	↓	↓
x 235	69.4	28.7	28 5/8	0.910	1 5/16	14.2	14 1/4	1.61	1 5/8	1 5/16	↓	↓
x 258	76.0	29.0	29	0.980	1 1/2	14.3	14 1/4	1.77	1 3/4	1 5/16	↓	↓
x 281	82.9	29.3	29 1/4	1.060	1 1/16	14.4	14 3/8	1.93	1 15/16	1 3/8	↓	↓
x 307	90.4	29.6	29 5/8	1.160	1 3/16	14.4	14 1/2	2.09	2 1/16	1 7/16	↓	↓
x 336	98.9	30.0	30	1.260	1 1/4	14.6	14 1/2	2.28	2 1/4	1 7/16	↓	↓
x 368	108.0	30.4	30 3/8	1.380	1 3/8	14.7	14 5/8	2.48	2 1/2	1 1/2	↓	↓
x 539	159	32.5	32 1/2	1.970	2	15.3	15 1/4	3.54	3 9/16	1 13/16	↓	↓
W 30 x 90	26.4	29.5	29 1/2	0.470	1/2	10.4	10 3/8	0.610	5/8	1 1/16	26 1/2	5 1/2
x 99	29.1	29.7	29 5/8	0.520	1/2	10.5	10 1/2	0.670	1 1/16	1 1/16	↓	↓
x 108	31.7	29.8	29 7/8	0.545	9/16	10.5	10 1/2	0.760	¾	1 1/8	↓	↓
x 116	34.2	30.0	30	0.565	9/16	10.5	10 1/2	0.850	7/8	1 1/8	↓	↓
x 124	36.5	30.2	30 1/8	0.585	9/16	10.5	10 1/2	0.930	1 5/16	1 1/8	↓	↓
x 132	38.9	30.3	30 1/4	0.615	5/8	10.5	10 1/2	1.00	1	1 1/8	↓	↓
x 148	43.5	30.7	30 5/8	0.650	5/8	10.5	10 1/2	1.18	1 3/16	1 1/8	↓	↓
W 30 x 173	51.0	30.4	30 1/2	0.655	5/8	15.0	15	1.07	1 1/16	1 1/8	26 1/2	5 1/2
x 191	56.3	30.7	30 5/8	0.710	1 1/16	15.0	15	1.19	1 3/16	1 3/16	↓	↓
x 211	62.2	30.9	31	0.775	¾	15.1	15 1/8	1.32	1 5/16	1 3/16	↓	↓
x 235	69.2	31.3	31 1/4	0.830	1 3/16	15.1	15	1.50	1 1/2	1 1/4	↓	↓
x 261	76.9	31.6	31 3/8	0.930	1 5/16	15.2	15 1/8	1.65	1 5/8	1 5/16	↓	↓
x 292	85.9	32.0	32	1.02	1	15.3	15 1/4	1.85	1 7/8	1 5/16	↓	↓
x 326	95.8	32.4	32 3/8	1.14	1 1/8	15.4	15 3/8	2.05	2 1/16	1 3/8	↓	↓
x 357	105.0	32.8	32 3/4	1.24	1 1/4	15.5	15 1/2	2.24	2 1/4	1 7/16	↓	↓
x 391	115.0	33.2	32 1/4	1.36	1 3/8	15.6	15 5/8	2.44	2 7/16	1 1/2	↓	↓



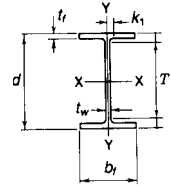
W Shapes

Dimensions

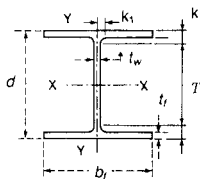
Shapes	Area A	Depth <i>d</i>		Web		Flange				Distance				
				Thickness <i>t_w</i>		Width <i>b_f</i>		Thickness <i>t_f</i>		<i>k₁</i>	<i>T</i>	Work- able Gage		
	in. ²	in.		in.		in.		in.		in.	in.	in.		
W 33 x 118 x 130 x 141 x 152 x 169	34.7	32.9	32⅞	0.550	⅑ ₁₆	11.5	11½	0.740	¾	1⅛	29⅝	5½		
	38.3	33.1	33⅛	0.580	⅑ ₁₆	11.5	11½	0.855	⅞	1⅛	↓	↓		
	41.6	33.3	33¼	0.605	⅝	11.5	11½	0.960	1⅝ ₁₆	1⅛				
	44.8	33.5	33½	0.635	⅝	11.6	11⅝	1.06	1⅞ ₁₆	1⅛				
	49.5	33.8	33⅜	0.670	1⅞ ₁₆	11.5	11½	1.22	1¼	1⅞ ₁₆				
W 33 x 201 x 221 x 241 x 263 x 291 x 318 x 354 x 387	59.2	33.7	33⅝	0.715	1⅞ ₁₆	15.7	15¾	1.15	1⅛	1⅞ ₁₆			29⅝	5½
	65.2	33.9	33⅞	0.775	¾	15.8	15¾	1.28	1¼	1⅞ ₁₆	↓	↓		
	71.0	34.2	34⅛	0.830	1⅞ ₁₆	15.9	15⅞	1.40	1⅝	1¼				
	77.5	34.5	34½	0.870	⅞	15.8	15¾	1.57	1⅞ ₁₆	1¼				
	85.7	34.8	34⅞	0.960	1⅞ ₁₆	15.9	15⅞	1.73	1⅝	1⅞ ₁₆				
	93.6	35.2	35⅛	1.04	1⅞ ₁₆	16.0	16	1.89	1⅞	1⅞ ₁₆				
	104.0	35.6	35½	1.16	1⅞ ₁₆	16.1	16⅛	2.09	2⅞ ₁₆	1⅝				
	114.0	36.0	36	1.26	1¼	16.2	16¼	2.28	2¼	1⅞ ₁₆				
	W 36 x 135 x 150 x 160 x 170 x 182 x 194 x 210 x 232 x 256	39.7	35.6	35½	0.600	⅝	12.0	12	0.790	1⅞ ₁₆			1⅛	32⅞
44.2		35.9	35⅞	0.625	⅝	12.0	12	0.940	1⅞ ₁₆	1⅛			↓	↓
47.0		36.0	36	0.650	⅝	12.0	12	1.02	1	1⅞				
50.1		36.2	36⅛	0.680	1⅞ ₁₆	12.0	12	1.10	1⅞	1⅞ ₁₆				
53.6		36.3	36⅜	0.725	¾	12.1	12⅞	1.18	1⅞ ₁₆	1⅞ ₁₆				
57.0		36.5	36½	0.765	¾	12.1	12⅞	1.26	1¼	1⅞ ₁₆				
61.8		36.7	36¾	0.830	1⅞ ₁₆	12.2	12⅞	1.36	1⅝	1¼				
68.1		37.1	37⅞	0.870	⅞	12.1	12⅞	1.57	1⅞ ₁₆	1¼				
75.4		37.4	37⅝	0.960	1⅞ ₁₆	12.2	12¼	1.73	1¾	1⅞ ₁₆				
W 36 x 231 x 247 x 262 x 282 x 302 x 330 x 361 x 395 x 441 x 487 x 529 x 652 x 800	68.1	36.5	36½	0.760	¾	16.5	16½	1.26	1¼	1⅞ ₁₆	31⅜	7½		
	72.5	36.7	36⅝	0.800	1⅞ ₁₆	16.5	16½	1.35	1⅝	1⅝	↓	↓		
	77.0	36.9	36⅞	0.840	1⅞ ₁₆	16.6	16½	1.44	1⅞ ₁₆	1⅝				
	82.9	37.1	37⅞	0.885	⅞	16.6	16⅝	1.57	1⅞ ₁₆	1⅝				
	88.8	37.3	37⅝	0.945	1⅞ ₁₆	16.7	16⅝	1.68	1⅞ ₁₆	1⅞ ₁₆				
	97.0	37.7	37⅝	1.02	1	16.6	16⅝	1.85	1⅞	1¾				
	106.0	38.0	38	1.12	1⅞	16.7	16¾	2.01	2	1¾				
	116.0	38.4	38⅝	1.22	1¼	16.8	16⅞	2.20	2⅞ ₁₆	1⅞ ₁₆				
	130.0	38.9	38⅞	1.36	1⅝	17.0	17	2.44	2⅞ ₁₆	1⅞				
	143.0	39.3	39⅝	1.50	1½	17.1	17⅞	2.68	2⅞ ₁₆	1⅞ ₁₆				
	156.0	39.8	39¾	1.61	1⅝	17.2	17¼	2.91	2⅞ ₁₆	2				
	192.0	41.1	41	1.97	2	17.6	17⅝	3.54	3⅞ ₁₆	2⅞ ₁₆				
	236.0	42.6	42½	2.38	2⅝	18.0	18	4.29	4⅝ ₁₆	2⅝				

W Shapes

Dimensions



Shapes	Area A	Depth d		Web		Flange				Distance		
				Thickness t_w		Width b_f		Thickness t_f		k_1	T	Work- able Gage
	in. ²	in.		in.		in.		in.		in.	in.	in.
W 40 x 149	43.8	38.2	38 1/4	0.630	5/8	11.8	11 3/4	0.830	1 3/16	1 1/2	34	7 1/2
x 167	49.2	38.6	38 5/8	0.650	5/8	11.8	11 3/4	1.03	1	1 9/16		
x 183	53.3	39.0	39	0.650	5/8	11.8	11 3/4	1.20	1 1/16	1 9/16		
x 211	62.0	39.4	39 3/8	0.750	3/4	11.8	11 3/4	1.42	1 7/16	1 9/16		
x 235	69.0	39.7	39 3/4	0.830	1 3/16	11.9	11 7/8	1.58	1 9/16	1 5/8		
x 264	77.6	40.0	40	0.960	1 5/16	11.9	11 7/8	1.73	1 3/4	1 11/16		
x 278	82.0	40.2	40 1/8	1.03	1	12.0	12	1.81	1 13/16	1 3/4		
x 294	86.3	40.4	40 3/8	1.06	1 1/16	12.0	12	1.93	1 15/16	1 3/4		
x 327	96.0	40.8	40 3/4	1.18	1 3/16	12.1	12 1/8	2.13	2 1/8	1 13/16		
x 331	97.5	40.8	40 3/4	1.22	1 1/4	12.2	12 1/8	2.13	2 1/8	1 13/16		
x 392	115.0	41.6	41 5/8	1.42	1 7/16	12.4	12 3/8	2.52	2 1/2	1 15/16	↓	↓
W 40 x 199	58.5	38.7	38 5/8	0.650	5/8	15.8	15 3/4	1.07	1 1/16	1 9/16	34	7 1/2
x 215	63.4	39.0	39	0.650	5/8	15.8	15 3/4	1.22	1 1/4	1 9/16		
x 249	73.3	39.4	39 3/8	0.750	3/4	15.8	15 3/4	1.42	1 7/16	1 9/16		
x 277	81.4	39.7	39 3/4	0.830	1 3/16	15.8	15 7/8	1.58	1 9/16	1 5/8		
x 297	87.4	39.8	39 7/8	0.930	1 5/16	15.8	15 7/8	1.65	1 5/8	1 11/16		
x 324	95.3	40.2	40 1/8	1.00	1	15.9	15 7/8	1.81	1 13/16	1 11/16		
x 362	107.0	40.6	40 1/2	1.12	1 1/8	16.0	16	2.01	2	1 3/4		
x 372	109.0	40.6	40 5/8	1.16	1 3/16	16.1	16 1/8	2.05	2 1/16	1 13/16		
x 397	117.0	41.0	41	1.22	1 1/4	16.1	16 1/8	2.20	2 3/16	1 13/16		
x 431	127.0	41.3	41 1/4	1.34	1 5/16	16.2	16 1/4	2.36	2 3/8	1 7/8		
x 503	148.0	42.1	42	1.54	1 9/16	16.4	16 3/8	2.76	2 3/4	2		
x 593	174.0	43.0	43	1.79	1 13/16	16.7	16 3/4	3.23	3 1/4	2 1/8	↓	↓
W 44 x 230	67.7	42.9	42 7/8	0.710	1 1/16	15.8	15 3/4	1.22	1 1/4	1 3/16	38 3/4	5 1/2
x 262	76.9	43.3	43 3/4	0.785	1 3/16	15.8	1 3/4	1.42	1 7/16	1 3/16		
x 290	85.4	43.6	43 3/8	0.865	7/8	15.8	15 7/8	1.58	1 9/16	1 1/4		
x 335	98.5	44.0	44	1.03	1	15.9	16	1.77	1 3/4	1 5/16	↓	↓



HP Shapes

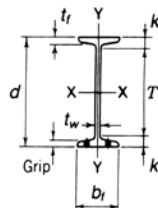
Dimensions

Designation	Area A	Depth d		Web			Flange				Distance		
				Thickness t _w		t _w 2	Width b _f		Thickness t _f		T	k	k ₁
				in.		in.	in.		in.		in.	in.	
HP 8 x 36	10.6	8.02	8	0.805	7/16	1/4	8.155	8 1/8	0.445	7/16	6 1/8	1 5/16	5/8
HP 10 x 42	12.4	9.70	9 3/4	0.415	7/16	1/4	10.075	10 1/8	0.420	7/16	7 5/8	1 1/16	3/4
x 57	16.8	9.99	10	0.565	9/16	5/16	10.225	10 1/4	0.565	9/16	7 5/8	1 3/16	13/16
HP 12 x 53	15.5	11.78	11 3/4	0.435	7/16	1/4	12.045	12	0.435	7/16	9 1/2	1 1/8	7/8
x 63	18.4	11.94	12	0.515	1/2	1/4	12.125	12 1/8	0.515	1/2	9 1/2	1 1/4	7/8
x 74	21.8	12.13	12 1/8	0.605	5/8	5/16	12.215	12 1/4	0.610	5/8	9 1/2	1 5/16	15/16
x 84	24.6	12.28	12 1/4	0.685	1 1/16	3/8	12.295	12 1/4	0.685	1 1/16	9 1/2	1 3/8	1
HP 14 x 73	21.4	13.61	13 5/8	0.505	1/2	1/4	14.585	14 5/8	0.505	1/2	11 1/4	1 3/16	7/8
x 89	26.1	13.83	13 3/8	0.615	5/8	5/16	14.695	14 3/4	0.615	5/8	11 1/4	1 5/16	15/16
x 102	30.0	14.01	14	0.705	1 1/16	3/8	14.785	14 3/4	0.705	1 1/16	11 1/4	1 3/8	1
x 117	34.4	14.21	14 1/4	0.805	1 3/16	7/16	14.885	14 7/8	0.805	1 3/16	11 1/4	1 1/2	1 1/16

I-Beams “S” Shapes 4” to 24”

S Shapes

Dimensions

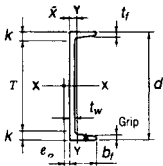


Shapes	Area A	Depth <i>d</i>		Web			Flange				Distance		Grip	Max. Fge. Fas- ten- er
				Thickness <i>t_w</i>		<i>t_w</i> 2	Width <i>b_f</i>		Thickness <i>t_f</i>	<i>T</i>	<i>k</i>			
	in. ²	in.	in.			in.		in.		in.	in.	in.	in.	
S 3 x 5.7 x 7.5	1.67 2.21	3.00 3.00	3 3	0.170 0.349	3/16 3/8	1/8 3/16	2.330 2.509	23/8 2 1/2	0.260 0.260	1/4 1/4	1 5/8 1 5/8	1 1/16 1 1/16	1/4 1/4	— —
S 4 x 7.7 x 9.5	2.26 2.79	4.00 4.00	4 4	0.193 0.326	3/16 3/16	1/8 3/16	2.663 2.796	2 5/8 2 3/4	0.293 0.293	5/16 5/16	2 1/2 2 1/2	3/4 3/4	5/16 5/16	— —
S 5 x 10 x 14.75	2.94 4.34	5.00 5.00	5 5	0.214 0.494	3/16 1/2	1/8 1/4	3.004 3.284	3 3 1/4	0.326 0.326	5/16 5/16	3 3/8 3 3/8	1 3/16 1 3/16	5/16 5/16	— —
S 6 x 12.5 x 17.25	3.67 5.07	6.00 6.00	6 6	0.232 0.465	1/4 7/16	1/8 1/4	3.332 3.565	3 3/8 3 3/8	0.359 0.359	3/8 3/8	4 1/4 4 1/4	7/8 7/8	3/8 3/8	— 5/8
S 7 x1 7.25 x 20	5.07 5.88	6.00 7.00	6 7	0.465 0.450	7/16 7/16	1/4 1/4	3.565 3.860	3 5/8 3 7/8	0.359 0.392	3/8 3/8	4 1/4 5 1/8	7/8 1 5/16	3/8 3/8	5/8 5/8
S 8 x 18.4 x 23	5.41 6.77	8.00 8.00	8 8	0.271 0.441	1/4 7/16	1/8 1/4	4.001 4.171	4 4 1/8	0.426 0.426	7/16 7/16	6 6	1 1	7/16 7/16	3/4 3/4
S 10 x 25.4 x 35	7.46 10.3	10.00 10.00	10 10	0.311 0.594	5/16 5/8	3/16 5/16	4.661 4.944	4 5/8 5	0.491 0.491	1/2 1/2	7 3/4 7 3/4	1 1/8 1 1/8	1/2 1/2	3/4 3/4
S 12 x 31.8 x 35	9.35 10.3	12.00 12.00	12 12	0.350 0.428	3/8 7/16	3/16 1/4	5.000 5.078	5 5 1/8	0.544 0.544	9/16 9/16	9 5/8 9 5/8	1 3/16 1 3/16	1/2 1/2	3/4 3/4
S 12 x 40.8 x 50	12.0 14.7	12.00 12.00	12 12	0.462 0.687	7/16 1 1/16	1/4 3/8	5.252 5.477	5 1/4 5 1/2	0.659 0.659	1 1/16 1 1/16	9 1/8 9 1/8	1 7/16 1 7/16	5/8 1 1/16	3/4 3/4
S 15 x 42.9 x 50	12.6 14.7	15.00 15.00	15 15	0.411 0.550	7/16 9/16	1/4 5/16	5.501 5.640	5 1/2 5 5/8	0.622 0.622	5/8 5/8	12 1/4 12 1/4	1 3/8 1 3/8	9/16 9/16	3/4 3/4
S 18 x 54.7 x 70	16.1 20.6	18.00 18.00	18 18	0.461 0.711	7/16 1 1/16	1/4 3/8	6.001 6.251	6 6 1/4	0.691 0.691	1 1/16 1 1/16	15 15	1 1/2 1 1/2	1 1/16 1 1/16	7/8 7/8
S 20 x 66 x 75	19.4 22.0	20.00 20.00	20 20	0.505 0.635	1/2 5/8	1/4 5/16	6.255 6.385	6 1/4 6 3/8	0.795 0.795	1 3/16 1 3/16	16 3/4 16 3/4	1 5/8 1 5/8	1 3/16 1 3/16	7/8 7/8
S 20 x 86 x 96	25.3 28.2	20.30 20.30	20 1/4 20 1/4	0.660 0.800	1 1/16 1 3/16	3/8 7/16	7.060 7.200	7 7 1/4	0.920 0.920	1 5/16 1 5/16	16 3/4 16 3/4	1 3/4 1 3/4	1 5/16 1 5/16	1 1
S 24 x 80 x 90	23.5 26.5	24.00 24.00	24 24	0.500 0.625	1/2 5/8	1/4 5/16	7.000 7.125	7 7 1/8	0.870 0.870	7/8 7/8	20 1/2 20 1/2	1 3/4 1 3/4	7/8 7/8	1 1
x 100	29.3	24.00	24	0.745	3/4	3/8	7.245	7 1/4	0.870	7/8	20 1/2	1 3/4	7/8	1
S 24 x 106 x 121	31.2 35.6	24.50 24.50	24 1/2 24 1/2	0.620 0.800	5/8 1 3/16	5/16 7/16	7.870 8.050	7 7/8 8	1.090 1.090	1 1/16 1 1/16	20 1/2 20 1/2	2 2	1 1/8 1 1/8	1 1

Standard Channel

3" to 15"

Standard
Channels
Dimensions



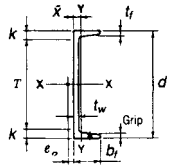
Shapes	Area A	Depth d	Web			Flange				Distance		Grip	Max. Flge. Fas- ten- er
			Thickness t _w		t _w 2	Width b _f		Thickness t _f		T	k		
			in.		in.	in.		in.		in.	in.	in.	in.
C 3 x 4.1	1.21	3.0	0.170	3⁄16	1⁄16	1.410	1 1⁄8	0.273	1⁄4	1 1⁄8	11⁄16	—	—
x 5	1.47	3.0	0.258	1⁄4	1⁄8	1.498	1 1⁄2	0.273	1⁄4	1 1⁄8	11⁄16	—	—
x 6	1.76	3.0	0.356	3⁄8	3⁄16	1.596	1 5⁄8	0.273	1⁄4	1 1⁄8	11⁄16	—	—
C 4 x 5.4	1.59	4.0	0.184	3⁄16	1⁄16	1.584	1 1⁄8	0.296	5⁄16	2 5⁄8	11⁄16	5⁄16	5⁄8
x 7.25	2.13	4.0	0.321	5⁄16	3⁄16	1.721	1 3⁄4	0.296	5⁄16	2 5⁄8	11⁄16	—	—
C 5 x 6.7	1.97	5.0	0.190	3⁄16	1⁄8	1.750	1 3⁄4	0.320	5⁄16	3 1⁄2	3⁄4	5⁄16	5⁄8
x 9	2.64	5.0	0.325	5⁄16	3⁄16	1.885	1 7⁄8	0.320	5⁄16	3 1⁄2	3⁄4	—	—
C 6 x 8.2	2.40	6.0	0.200	3⁄16	1⁄8	1.920	1 7⁄8	0.343	5⁄16	4 3⁄8	13⁄16	5⁄16	5⁄8
x 10.5	3.09	6.0	0.314	5⁄16	3⁄16	2.034	2	0.343	5⁄16	4 3⁄8	13⁄16	3⁄8	5⁄8
x 13	3.83	6.0	0.437	7⁄16	3⁄16	2.157	2 1⁄8	0.343	5⁄16	4 3⁄8	13⁄16	5⁄16	5⁄8
C 7 x 9.8	2.87	7.0	0.210	3⁄16	1⁄8	2.090	2 1⁄8	0.366	3⁄8	5 1⁄4	7⁄8	3⁄8	5⁄8
x 12.25	3.60	7.0	0.314	5⁄16	3⁄16	2.194	2 1⁄4	0.366	3⁄8	5 1⁄4	7⁄8	3⁄8	5⁄8
x 14.75	4.33	7.0	0.419	7⁄16	3⁄16	2.299	2 1⁄4	0.336	3⁄8	5 1⁄4	7⁄8	3⁄8	5⁄8
C 8 x 11.5	3.38	8.0	0.220	1⁄4	1⁄8	2.260	2 1⁄4	0.390	3⁄8	6 1⁄8	15⁄16	3⁄8	3⁄4
x 13.75	4.04	8.0	0.303	5⁄16	1⁄8	2.343	2 3⁄8	0.390	3⁄8	6 1⁄8	15⁄16	3⁄8	3⁄4
x 18.75	5.51	8.0	0.487	1⁄2	1⁄4	2.527	2 1⁄2	0.390	3⁄8	6 1⁄8	15⁄16	3⁄8	3⁄4
C 9 x 13.4	3.94	9.0	0.233	1⁄4	1⁄8	2.433	2 3⁄8	0.413	7⁄16	7 1⁄8	15⁄16	7⁄16	3⁄4
x 15	4.41	9.0	0.285	5⁄16	1⁄8	2.485	2 1⁄2	0.413	7⁄16	7 1⁄8	15⁄16	7⁄16	3⁄4
x 20	5.88	9.0	0.448	7⁄16	1⁄4	2.648	2 5⁄8	0.413	7⁄16	7 1⁄8	15⁄16	7⁄16	3⁄4
C 10 x 15.3	4.49	10.0	0.240	1⁄4	1⁄8	2.600	2 5⁄8	0.436	7⁄16	8	1	7⁄16	3⁄4
x 20	5.88	10.0	0.379	3⁄8	3⁄16	2.739	2 3⁄4	0.436	7⁄16	8	1	7⁄16	3⁄4
x 25	7.35	10.0	0.526	1⁄2	1⁄4	2.886	2 7⁄8	0.436	7⁄16	8	1	7⁄16	3⁄4
x 30	8.82	10.0	0.673	1 1⁄16	5⁄16	3.033	3	0.436	7⁄16	8	1	7⁄16	3⁄4
C 12 x 20.7	6.09	12.0	0.282	5⁄16	1⁄8	2.942	3	0.501	1⁄2	9 3⁄4	1 1⁄8	1⁄2	7⁄8
x 25	7.35	12.0	0.387	3⁄8	3⁄16	3.047	3	0.501	1⁄2	9 3⁄4	1 1⁄8	1⁄2	7⁄8
x 30	8.82	12.0	0.510	1⁄2	1⁄4	3.170	3 1⁄8	0.501	1⁄2	9 3⁄4	1 1⁄8	1⁄2	7⁄8
C 15 x 33.9	9.96	15.0	0.400	3⁄8	3⁄16	3.400	3 3⁄8	0.650	5⁄8	12 1⁄8	1 7⁄16	5⁄8	1
x 40	11.8	15.0	0.520	1⁄2	1⁄4	3.520	3 1⁄2	0.650	5⁄8	12 1⁄8	1 7⁄16	5⁄8	1
x 50	14.7	15.0	0.716	1 1⁄16	3⁄8	3.716	3 3⁄4	0.650	5⁄8	12 1⁄8	1 7⁄16	5⁄8	1

Miscellaneous Channels & M Shapes 3" to 18"

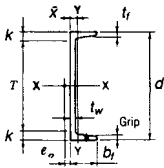
Channels

Miscellaneous

Dimensions



Shapes	Area A	Depth <i>d</i>	Web			Flange				Distance		Grip	Max. Flge. Fastener
			Thickness <i>t_w</i>		<i>t_w</i> 2	Width <i>b_f</i>		Thickness <i>t_f</i>		<i>T</i>	<i>k</i>		
	in. ²	in.	in.		in.	in.		in.		in.	in.	in.	in.
MC 3 x 7.1	2.09	3.00	0.310	5/16	1/8	1.940	1 7/8	0.350	3/8				
MC 4 x 13.8	4.02	4.00	0.500	1/2	1/4	2.500	2 1/2	0.500	1/4				
MC 6 x 12	3.53	6.00	0.310	5/16	1/8	2.497	2 1/2	0.375	3/8	4 3/8	1 3/16	3/8	5/8
MC 6 x 15.1 x 16.3	4.44	6.00	0.316	5/16	3/16	2.941	3	0.475	1/2	3 7/8	1 1/16	1/2	3/4
	4.79	6.00	0.375	3/8	3/16	3.000	3	0.475	1/2	3 7/8	1 1/16	1/2	3/4
MC 6 x 15.3 x 18	4.50	6.00	0.340	5/16	3/16	3.500	3 1/2	0.385	3/8	4 1/4	7/8	3/8	7/8
	5.29	6.00	0.379	3/8	3/16	3.504	3 1/2	0.475	1/2	3 7/8	1 1/16	1/2	7/8
MC 7 x 19.1 x 22.7	5.61	7.00	0.352	3/8	3/16	3.452	3 1/2	0.500	1/2	4 3/4	1 1/8	1/2	7/8
	6.67	7.00	0.503	1/2	1/4	3.603	3 3/8	0.500	1/2	4 3/4	1 1/8	1/2	7/8
MC 8 x 8.5	2.50	8.00	0.179	3/16	1/16	1.874	1 7/8	0.311	5/16	6 1/2	3/4	5/16	5/8
MC 8 x 1 8.7 x 20	5.50	8.00	0.353	3/8	3/16	2.978	3	0.500	1/2	5 3/4	1 1/8	1/2	7/8
	5.88	8.00	0.400	3/8	3/16	3.025	3	0.500	1/2	5 3/4	1 1/8	1/2	7/8
MC 8 x 21.4 x 22.8	6.28	8.00	0.375	3/8	3/16	3.450	3 1/2	0.525	1/2	5 5/8	1 3/16	1/2	7/8
	6.70	8.00	0.427	7/16	3/16	3.502	3 1/2	0.525	1/2	5 5/8	1 3/16	1/2	7/8
MC 9 x 23.9 x 25.4	7.02	9.00	0.400	3/8	3/16	3.450	3 1/2	0.550	9/16	6 5/8	1 3/16	9/16	7/8
	7.47	9.00	0.450	7/16	1/4	3.500	3 1/2	0.550	9/16	6 5/8	1 3/16	9/16	7/8
MC 10 x 6.5	1.91	10.00	0.152	1/8	1/16	1.127	1 1/8	0.202	3/16	9 1/8	7/16	—	—
MC 10 x 8.4	2.46	10.00	0.170	3/16	1/16	1.500	1 1/2	0.280	1/4	8 5/8	1 1/16	—	—
MC 10 x 22 x 25	6.45	10.00	0.290	5/16	1/8	3.315	3 3/8	0.575	9/16	7 1/2	1 1/4	9/16	7/8
	7.35	10.00	0.380	3/8	3/16	3.405	3 3/8	0.575	9/16	7 1/2	1 1/4	9/16	7/8
MC 10 x 2 8.5 x 33.6 x 41.1	8.47	10.00	0.425	7/16	3/16	3.950	4	0.575	9/16	7 1/2	1 1/4	9/16	7/8
	9.87	10.00	0.575	9/16	5/16	4.100	4 1/8	0.575	9/16	7 1/2	1 1/4	9/16	7/8
	12.1	10.00	0.796	1 3/16	3/8	4.321	4 3/8	0.575	9/16	7 1/2	1 1/4	9/16	7/8
MC 12 x 10.6	3.1	12.00	0.190	3/16	1/8	1.500	1 1/2	0.309	5/16	10 5/8	1 1/16	—	—



Channels

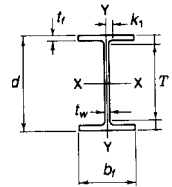
Miscellaneous

Dimensions

Shapes	Area A	Depth d	Web			Flange				Distance		Grip	Max. Flge. Fastener
			Thickness t _w		$\frac{t_w}{2}$	Width b _f		Thickness t _f		T	k		
	in. ²	in.	in.		in.	in.		in.		in.	in.	in.	in.
MC 12 x 31	9.12	12.00	0.370	$\frac{3}{8}$	$\frac{3}{16}$	3.670	$3\frac{3}{8}$	.0700	$1\frac{1}{16}$	$9\frac{3}{8}$	$1\frac{5}{16}$	$1\frac{1}{16}$	1
x 35	10.3	12.00	0.467	$\frac{7}{16}$	$\frac{1}{4}$	3.767	$3\frac{3}{4}$	.0700	$1\frac{1}{16}$	$9\frac{3}{8}$	$1\frac{5}{16}$	$1\frac{1}{16}$	1
x 40	11.8	12.00	0.590	$\frac{9}{16}$	$\frac{5}{16}$	3.890	$3\frac{7}{8}$	.0700	$1\frac{1}{16}$	$9\frac{3}{8}$	$1\frac{5}{16}$	$1\frac{1}{16}$	1
x 45	13.2	12.00	0.712	$1\frac{1}{16}$	$\frac{3}{8}$	4.012	4	.0700	$1\frac{1}{16}$	$9\frac{3}{8}$	$1\frac{5}{16}$	$1\frac{1}{16}$	1
x 50	14.7	12.00	0.835	$1\frac{3}{16}$	$\frac{7}{16}$	4.135	$4\frac{1}{8}$	.0700	$1\frac{1}{16}$	$9\frac{3}{8}$	$1\frac{5}{16}$	$1\frac{1}{16}$	1
MC 13 x 31.8	9.35	13.00	0.375	$\frac{3}{8}$	$\frac{3}{16}$	4.000	4	0.610	$\frac{5}{8}$	$10\frac{1}{4}$	$1\frac{3}{8}$	$\frac{9}{16}$	1
x 35	10.3	13.00	0.447	$\frac{7}{16}$	$\frac{1}{4}$	4.072	$4\frac{1}{8}$	0.610	$\frac{5}{8}$	$10\frac{1}{4}$	$1\frac{3}{8}$	$\frac{9}{16}$	1
x 40	11.8	13.00	0.560	$\frac{9}{16}$	$\frac{1}{4}$	4.185	$4\frac{1}{8}$	0.610	$\frac{5}{8}$	$10\frac{1}{4}$	$1\frac{3}{8}$	$\frac{9}{16}$	1
x 50	14.7	13.00	0.787	$1\frac{3}{16}$	$\frac{3}{8}$	4.412	$4\frac{3}{8}$	0.610	$\frac{5}{8}$	$10\frac{1}{4}$	$1\frac{3}{8}$	$\frac{5}{8}$	1
MC 18 x 42.7	12.6	18.00	0.450	$\frac{7}{16}$	$\frac{1}{4}$	3.950	4	0.625	$\frac{5}{8}$	$15\frac{1}{4}$	$1\frac{3}{8}$	$\frac{5}{8}$	1
x 45.8	13.5	18.00	0.500	$\frac{1}{2}$	$\frac{1}{4}$	4.000	4	0.625	$\frac{5}{8}$	$15\frac{1}{4}$	$1\frac{3}{8}$	$\frac{5}{8}$	1
x 51.9	15.3	18.00	0.600	$\frac{5}{8}$	$\frac{5}{16}$	4.100	$4\frac{1}{8}$	0.625	$\frac{5}{8}$	$15\frac{1}{4}$	$1\frac{3}{8}$	$\frac{5}{8}$	1
x 58	17.1	18.00	0.800	$1\frac{1}{16}$	$\frac{3}{8}$	4.200	$4\frac{1}{4}$	0.625	$\frac{5}{8}$	$15\frac{1}{4}$	$1\frac{3}{8}$	$\frac{5}{8}$	1

M Shapes

Dimensions

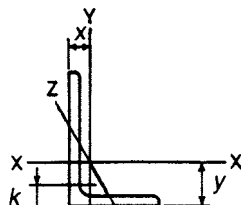


Shapes	Area A	Depth <i>d</i>	Web			Flange				Distance		Grip	Max. Flge. Fas- ten- er
			Thickness <i>t_w</i>		<i>t_w</i> 2	Width <i>b_f</i>		Thickness <i>t_f</i>		<i>T</i>	<i>k</i>		
	in. ²	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	
M 5 x 18.9	5.55	5.00	5	0.316	5⁄16	3⁄16	5.003	5	0.416	7⁄16	3¼	7⁄16	7⁄8
M 6 x 4.4	1.29	6.00	6	0.114	1⁄8	1⁄16	1.844	17⁄8	0.171	3⁄16	5½	3⁄16	—
M 8 x 6.5	1.92	8.00	8	0.135	1⁄8	1⁄16	2.281	2¼	0.189	3⁄16	7	3⁄16	—
M 10 x 7.5	2.21	9.99	10	0.130	1⁄8	1⁄16	2.690	2¾	0.173	3⁄16	9½	3⁄16	3⁄8
x 8	2.35	9.95	10	0.141	3⁄16	1⁄16	2.690	2¾	0.182	3⁄16	9½	3⁄16	3⁄8
x 9	2.65	10.00	10	0.157	3⁄16	1⁄8	2.690	2¾	0.206	3⁄16	87⁄8	3⁄16	—
M 12 x 10	2.94	11.97	12	0.149	3⁄16	1⁄16	3.250	3¼	0.180	3⁄16	11	3⁄16	½
x 10.8	3.18	11.97	12	0.160	3⁄16	1⁄16	3.065	3½	0.210	¼	11	¼	½
x 11.8	3.47	12.00	12	0.177	3⁄16	1⁄8	3.065	3½	0.225	¼	107⁄8	¼	—
M 14 x 18	5.10	14.00	14	0.215	3⁄16	1⁄8	4.000	4	0.270	¼	12¾	¼	¾

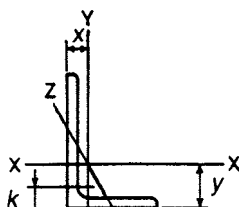
Structural and Bar Angle Equal and Unequal Legs

Angles

Equal legs
Properties for designing



Size and Thickness	k	Weight per ft.	Area	Axis X-X				Axis Y-Y				Axis Z-Z	
				<i>I</i>	<i>S</i>	<i>r</i>	<i>y</i>	<i>I</i>	<i>S</i>	<i>r</i>	<i>x</i>	<i>r</i>	Tan
in.	in.	lb.	in. ²	in. ⁴	in. ³	in.	in.	in. ⁴	in. ³	in.	in.	in.	
L 1 x 1 x 1/8	1/4	0.800	0.234	0.022	0.031	0.304	0.296	0.022	0.031	0.304	0.296	0.196	1.000
L 1 1/8 x 1 1/8 x 1/8	7/32	0.900	0.266	0.032	0.040	0.345	0.327	0.032	0.040	0.345	0.327	0.221	1.000
L 1 1/4 x 1 1/4 x 3/16 x 1/4	3/8	1.48	0.434	0.061	0.071	0.377	0.381	0.061	0.071	0.377	0.381	0.244	1.000
	7/16	1.92	0.563	0.077	0.091	0.369	0.403	0.077	0.091	0.369	0.403	0.243	1.000
L 1 1/2 x 1 1/2 x 3/16 x 1/4	3/8	1.80	0.527	0.110	0.104	0.457	0.444	0.110	0.104	0.457	0.444	0.293	1.000
	7/16	2.34	0.688	0.139	0.134	0.449	0.466	0.139	0.134	0.449	0.466	0.292	1.000
L 1 3/4 x 1 3/4 x 3/16 x 1/4	7/16	2.12	0.621	0.179	0.144	0.537	0.506	0.179	0.144	0.537	0.506	0.343	1.000
	1/2	2.77	0.813	0.227	0.227	0.529	0.529	0.227	0.227	0.529	0.529	0.341	1.000
L 2 x 2 x 1/8 x 3/16 x 1/4 x 5/16 x 3/8	3/8	1.65	0.484	0.190	0.131	0.626	0.546	0.190	0.131	0.626	0.546	0.398	1.000
	7/16	2.44	0.715	0.272	0.190	0.617	0.569	0.272	0.190	0.617	0.569	0.394	1.000
	1/2	3.19	0.938	0.348	0.247	0.609	0.592	0.348	0.247	0.609	0.592	0.391	1.000
	9/16	3.92	1.15	0.416	0.300	0.601	0.614	0.416	0.300	0.601	0.614	0.390	1.000
	5/8	4.7	1.36	0.479	0.351	0.594	0.636	0.479	0.351	0.594	0.636	0.389	1.000
L 2 1/2 x 2 1/2 x 3/16 x 1/4 x 5/16 x 3/8 x 1/2	1/2	3.07	0.902	0.547	0.303	0.778	0.694	0.547	0.303	0.778	0.694	0.495	1.000
	9/16	4.1	1.19	0.709	0.394	0.769	0.717	0.703	0.394	0.769	0.717	0.491	1.000
	5/8	5.0	1.46	0.849	0.482	0.761	0.740	0.849	0.482	0.761	0.740	0.489	1.000
	11/16	5.9	1.73	0.984	0.566	0.753	0.762	0.984	0.566	0.753	0.762	0.487	1.000
	13/16	7.7	2.25	1.230	0.724	0.739	0.806	1.230	0.724	0.739	0.806	0.487	1.000
L 3 x 3 x 3/16 x 1/4 x 5/16 x 3/8 x 1/2	1/2	3.71	1.09	0.962	0.441	0.939	0.820	0.962	0.441	0.939	0.820	0.596	1.000
	9/16	4.9	1.44	1.24	0.577	0.930	0.842	1.24	0.577	0.930	0.842	0.592	1.000
	5/8	6.1	1.78	1.51	0.707	0.922	0.865	1.51	0.707	0.922	0.865	0.589	1.000
	11/16	7.2	2.11	1.76	0.833	0.913	0.888	1.76	0.833	0.913	0.888	0.587	1.000
	13/16	9.4	2.75	2.22	1.07	0.898	0.932	2.22	1.07	0.898	0.932	0.584	1.000
L 3 1/2 x 3 1/2 x 1/4 x 5/16 x 3/8 x 1/2	5/8	5.8	1.69	1.69	0.794	1.09	0.968	2.01	0.794	1.09	0.968	0.694	1.000
	11/16	7.2	2.09	2.09	0.976	1.08	0.990	2.45	0.976	1.08	0.990	0.690	1.000
	3/4	8.5	2.48	2.48	1.15	1.07	1.01	2.87	1.15	1.07	1.01	0.687	1.000
	7/8	11.1	3.25	3.25	1.49	1.06	1.06	3.64	1.49	1.06	1.06	0.683	1.000



Angles

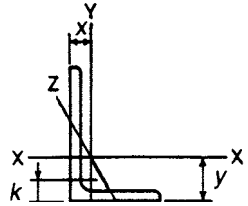
Equal legs

Properties for designing

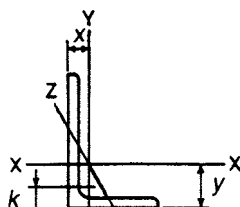
Size and Thickness	k	Weight per ft.	Area	Axis X-X				Axis Y-Y				Axis Z-Z	
				<i>l</i>	<i>S</i>	<i>r</i>	<i>y</i>	<i>l</i>	<i>S</i>	<i>r</i>	<i>x</i>	<i>r</i>	Tan
in.	in.	lb.	in. ²	in. ⁴	in. ³	in.	in.	in. ⁴	in. ³	in.	in.	in.	
L 4 x 4 x ¼	⅝	6.6	1.94	1.94	1.05	1.25	1.09	3.04	1.05	1.25	1.09	0.795	1.000
x ⅝	1 ⅙	8.2	2.40	2.40	1.29	1.24	1.12	3.71	1.29	1.24	1.12	0.791	1.000
x ¾	¾	9.8	2.86	2.86	1.52	1.23	1.14	4.36	1.52	1.23	1.14	0.788	1.000
x ½	1	12.8	3.75	3.75	1.97	1.22	1.18	5.56	1.97	1.22	1.18	0.782	1.000
x ⅝	1	15.7	4.61	4.61	2.40	1.20	1.23	6.66	2.40	1.20	1.23	0.779	1.000
x ¾	1 ⅙	18.5	5.44	5.44	2.81	1.19	1.27	7.67	2.81	1.19	1.27	0.778	1.000
L 5 x 5 x ⅝	1 ⅙	10.3	3.03	7.42	2.04	1.57	1.37	7.42	2.04	1.57	1.37	0.994	1.000
x ¾	¾	12.3	3.61	8.74	2.42	1.56	1.39	8.74	2.42	1.56	1.39	0.990	1.000
x ½	1	16.2	4.75	11.3	3.16	1.54	1.43	11.3	3.16	1.54	1.43	0.983	1.000
x ⅝	1 ⅙	20.0	5.86	13.6	3.86	1.52	1.48	13.6	3.86	1.52	1.48	0.978	1.000
x ¾	1 ¼	23.6	6.94	15.7	4.53	1.51	1.52	15.7	4.53	1.51	1.52	0.975	1.000
L 6 x 6 x ⅝	1 ⅙	12.4	3.65	13.0	2.97	1.89	1.62	13.0	2.97	1.89	1.62	1.20	1.000
x ¾	¾	14.9	4.36	15.4	3.53	1.88	1.64	15.4	3.53	1.88	1.64	1.19	1.000
x ½	1	19.6	5.75	19.9	4.61	1.86	1.68	19.9	4.61	1.86	1.68	1.18	1.000
x ⅝	1 ⅙	24.2	7.11	24.2	5.66	1.84	1.73	24.2	5.66	1.84	1.73	1.18	1.000
x ¾	1 ¼	28.7	8.44	28.2	6.66	1.83	1.78	28.2	6.66	1.83	1.78	1.17	1.000
x 1	1 ½	37.4	11.0	35.5	8.57	1.80	1.86	35.5	8.57	1.80	1.86	1.17	1.000
L 8 x 8 x ½	1 ⅙	26.4	7.75	48.6	8.36	2.50	2.19	48.6	8.36	2.50	2.19	1.59	1.000
x ⅝	1 ¼	32.7	9.61	59.4	10.3	2.49	2.23	59.4	10.3	2.49	2.23	1.58	1.000
x ¾	1 ⅙	38.9	11.4	69.7	12.2	2.47	2.28	69.7	12.2	2.47	2.28	1.58	1.000
x 1	1 ⅝	51.0	15.0	89.0	15.8	2.44	2.37	89.0	15.8	2.44	2.37	1.56	1.000
x 1 ⅙	1 ¾	56.9	16.7	89.0	17.5	2.42	2.41	98.0	17.5	2.42	2.41	1.56	1.000

Angles

Unequal legs
Properties for designing



Size and Thickness	k	Weight per ft.	Area	Axis X-X				Axis Y-Y				Axis Z-Z	
				<i>l</i>	<i>S</i>	<i>r</i>	<i>y</i>	<i>l</i>	<i>S</i>	<i>r</i>	<i>x</i>	<i>r</i>	Tan
in.	in.	lb.	in. ²	in. ⁴	in. ³	in.	in.	in. ⁴	in. ³	in.	in.	in.	
L 2½ x 2 x ⅜	½	2.75	0.809	0.509	0.293	0.793	0.764	0.291	0.196	0.600	0.514	0.427	0.631
x ¼	⅞	3.62	1.06	0.654	0.381	0.784	0.787	0.372	0.254	0.592	0.537	0.424	0.626
x ⅝	⅝	4.5	1.31	0.788	0.466	0.776	0.809	0.446	0.310	0.584	0.559	0.422	0.620
x ¾	11/16	5.3	1.55	0.912	0.547	0.768	0.831	0.514	0.363	0.577	0.581	0.420	0.614
L 3 x 2 x ⅜	½	3.07	0.902	0.842	0.415	0.966	0.970	0.307	0.200	0.583	0.470	0.439	0.446
x ¼	⅞	4.1	1.19	1.09	0.542	0.957	0.993	0.392	0.260	0.574	0.493	0.435	0.440
x ⅝	⅝	5.0	1.46	1.320	0.664	0.948	1.02	0.470	0.317	0.567	0.516	0.432	0.435
x ¾	11/16	5.9	1.73	1.53	0.781	0.940	1.04	0.543	0.371	0.559	0.539	0.430	0.428
x ½	13/16	7.7	2.25	1.920	1.00	0.924	1.08	0.672	0.474	0.546	0.583	0.428	0.414
L 3 x 2½ x ⅜	⅞	3.39	0.996	0.907	0.430	0.954	0.888	0.577	0.310	0.761	0.638	0.533	0.688
x ¼	⅝	4.5	1.31	1.17	0.561	0.945	0.911	0.743	0.404	0.753	0.661	0.528	0.684
x ⅝	11/16	5.6	1.62	1.42	0.688	0.937	0.933	0.898	0.494	0.744	0.683	0.525	0.680
x ¾	¾	6.6	1.92	1.66	0.810	0.928	0.956	1.04	0.581	0.736	0.706	0.522	0.676
x ½	7/8	8.5	2.50	2.08	1.04	0.913	1.00	1.30	0.744	0.722	0.750	0.520	0.667
L 3½ x 2½ x ¼	11/16	4.9	1.44	1.44	0.755	1.12	1.11	0.777	0.412	0.735	0.614	0.544	0.506
x ⅝	¾	6.1	1.78	1.78	0.927	1.11	1.14	0.939	0.504	0.727	0.637	0.540	0.501
x ¾	13/16	7.2	2.11	2.11	1.09	1.10	1.16	1.09	0.592	0.719	0.660	0.537	0.496
x ½	15/16	9.4	2.75	2.75	1.41	1.09	1.20	1.36	0.760	0.704	0.705	0.534	0.486
L 3½ x 3½ x ¼	⅝	5.8	1.69	1.69	0.794	1.09	0.968	2.01	0.794	1.09	0.968	0.694	1.000
x ⅝	11/16	7.2	2.09	2.09	0.976	1.08	0.990	2.45	0.976	1.08	0.990	0.690	1.000
x ¾	¾	8.5	2.48	2.48	1.15	1.07	1.01	2.87	1.15	1.07	1.01	0.687	1.000
x ½	7/8	11.1	3.25	3.25	1.49	1.06	1.06	3.64	1.49	1.06	1.06	0.683	1.000
L 4 x 3 x ¼	11/16	5.8	1.69	1.69	1.00	1.28	1.24	1.36	0.599	0.896	0.736	0.651	0.559
x ⅝	¾	7.2	2.09	2.09	1.23	1.27	1.26	1.65	0.734	0.887	0.759	0.647	0.554
x ¾	13/16	8.5	2.48	2.48	1.46	1.26	1.28	1.92	0.866	0.879	0.782	0.644	0.551
x ½	15/16	11.1	3.25	3.25	1.89	1.25	1.33	2.42	1.12	0.864	0.827	0.639	0.543
L 4 x 3½ x ¼	11/16	6.2	1.81	1.81	1.03	1.27	1.16	2.09	0.808	1.07	0.909	0.734	0.759
x ⅝	¾	7.7	2.25	2.25	1.26	1.26	1.18	2.55	0.994	1.07	0.932	0.730	0.757
x ¾	13/16	9.1	2.67	2.67	1.49	1.25	1.21	2.95	1.17	1.06	0.955	0.727	0.755
x ½	15/16	11.9	3.50	3.50	1.94	1.23	1.25	3.79	1.52	1.04	1.00	0.722	0.750



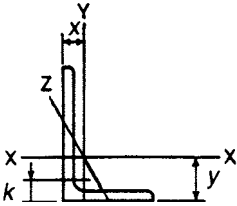
Angles

Unequal legs
Properties for designing

Size and Thickness	k	Weight per ft.	Area	Axis X-X				Axis Y-Y				Axis Z-Z	
				l	S	r	y	l	S	r	x	r	Tan
in.	in.	lb.	in. ²	in. ⁴	in. ³	in.	in.	in. ⁴	in. ³	in.	in.	in.	
L 5 x 3 x 1/4	3/4	6.6	1.94	5.11	1.53	1.62	1.66	1.44	0.614	0.861	0.657	0.663	0.371
x 5/16	13/16	8.2	2.40	6.26	1.89	1.61	1.68	1.75	0.753	0.853	0.681	0.658	0.368
x 3/8	7/8	9.8	2.86	7.37	2.24	1.61	1.70	2.04	0.888	0.845	0.704	0.654	0.364
x 1/2	1	12.8	3.75	9.45	2.91	1.59	1.75	2.58	1.15	0.829	0.750	0.648	0.357
x 5/8	1	15.7	4.61	11.4	3.55	1.57	1.80	3.06	1.39	0.815	0.796	0.644	0.349
L 5 x 3 1/2 x 1/4	3/4	7.0	2.06	5.39	1.57	1.62	1.56	2.23	0.830	1.04	0.814	0.770	0.492
x 5/16	13/16	8.7	2.56	6.60	1.94	1.61	1.59	2.72	1.02	1.03	0.838	0.776	0.489
x 3/8	7/8	10.4	3.05	7.78	2.29	1.60	1.61	3.18	1.21	1.02	0.861	0.762	0.486
x 1/2	1	13.6	4.00	9.99	2.99	1.58	1.66	4.05	1.56	1.01	0.906	0.755	0.479
x 5/8	1 1/8	16.8	4.92	12.0	3.65	1.56	1.70	4.83	1.90	0.991	0.951	0.751	0.472
x 3/4	1 1/4	19.8	5.81	13.9	4.28	1.55	1.75	5.55	2.22	0.977	0.996	0.748	0.464
L 6 x 3 1/2 x 5/16	13/16	9.8	2.87	10.9	2.73	1.95	2.01	2.85	1.04	0.996	0.763	0.772	0.352
x 3/8	7/8	11.7	3.42	12.9	3.24	1.94	2.04	3.34	1.23	0.998	0.787	0.767	0.350
x 1/2	1	15.3	4.50	16.6	4.24	1.92	2.08	4.25	1.59	0.972	0.833	0.759	0.344
L 6 x 4 x 5/16	13/16	10.3	3.03	11.4	2.79	1.94	1.92	4.18	1.35	1.17	0.918	0.882	0.448
x 3/8	7/8	12.3	3.61	13.5	3.32	1.93	1.94	4.90	1.60	1.17	0.941	0.877	0.446
x 1/2	1	16.2	4.75	17.4	4.33	1.91	1.99	6.27	2.08	1.15	0.987	0.870	0.440
x 5/8	1 1/8	20.0	5.86	21.1	5.31	1.90	2.03	7.52	2.54	1.13	1.03	0.864	0.435
x 3/4	1 1/4	23.6	6.94	24.5	6.25	1.88	2.08	8.68	2.97	1.12	1.08	0.860	0.428
L 7 x 4 x 3/8	7/8	13.6	3.98	20.6	4.44	2.27	2.37	5.10	1.63	1.13	0.870	0.880	0.340
x 1/2	1	17.9	5.25	26.7	5.81	2.25	2.42	6.53	2.12	1.11	0.917	0.872	0.335
x 5/8	1 1/8	22.1	6.48	32.4	7.14	2.24	2.46	7.84	2.58	1.10	0.963	0.865	0.329
x 3/4	1 1/4	26.2	7.69	37.8	8.42	2.22	2.51	9.05	3.03	1.09	1.01	0.860	0.324
L 8 x 4 x 1/2	1	19.6	5.75	38.5	7.49	2.59	2.86	6.74	2.15	1.08	0.859	0.865	0.267
x 3/4	1 1/4	28.7	8.44	54.9	10.9	2.55	2.95	9.36	3.07	1.05	0.953	0.852	0.258
x 1	1 1/2	37.4	11.0	69.6	14.1	2.52	3.05	11.6	3.94	1.03	1.05	0.846	0.247

Angles

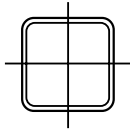
Unequal legs
Properties for designing



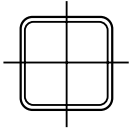
Size and Thickness	k	Weight per ft.	Area	Axis X-X				Axis Y-Y				Axis Z-Z	
				<i>I</i>	<i>S</i>	<i>r</i>	<i>y</i>	<i>I</i>	<i>S</i>	<i>r</i>	<i>x</i>	<i>r</i>	Tan
in.	in.	lb.	in. ²	in. ⁴	in. ³	in.	in.	in. ⁴	in. ³	in.	in.	in.	
L 8 x 6 x 7/16	15/16	20.2	5.93	39.2	7.07	2.57	2.45	19.3	4.23	1.80	1.45	1.31	0.560
x 1/2	1	23.0	6.75	44.3	8.02	2.56	2.47	21.7	4.79	1.79	1.47	1.30	0.558
x 5/8	1 1/8	28.5	8.36	54.1	9.87	2.54	2.52	26.3	5.88	1.77	1.52	1.29	0.554
x 3/4	1 1/4	33.8	9.94	63.4	11.7	2.53	2.56	30.7	6.92	1.76	1.56	1.29	0.551
x 1	1 1/2	44.2	13.0	80.8	15.1	2.49	2.65	38.8	8.92	1.73	1.65	1.28	0.543
L 9 x 4 x 5/8	1	21.3	6.25	53.2	9.34	2.92	3.31	6.92	2.17	1.05	0.810	0.854	0.220
x 9/16	1 1/16	23.8	7.00	59.1	10.4	2.91	3.33	7.63	2.41	1.04	0.834	0.850	0.218
x 1/2	1 1/8	26.3	7.73	64.9	11.5	2.90	3.36	8.32	2.65	1.04	0.810	0.847	0.216

Square Tubing All Sizes

Structural Tubing
Square
Dimensions and Properties



Square Tube	Design Wall Thick- ness, <i>t</i>	Nominal wt.	Area <i>A</i>	Square Tube	Design Wall Thick- ness, <i>t</i>	Nominal wt.	Area <i>A</i>
	in.	lb./ft.	in. ²		in.	lb./ft.	in. ²
2 x 2 x 1/8	0.116	3.04	0.840	5 x 5 x 1/8	0.116	8.15	2.23
x 3/16	0.174	4.30	1.19	x 3/16	0.174	11.96	3.28
x 1/4	0.233	5.38	1.51	x 1/4	0.233	15.58	4.30
				x 5/16	0.291	19.03	5.26
2 1/4 x 2 1/4 x 1/8	0.116	3.47	0.956	x 3/8	0.349	22.30	6.18
x 3/16	0.174	4.94	1.37	x 1/2	0.465	28.30	7.88
x 1/4	0.233	6.23	1.74				
				5 1/2 x 5 1/2 x 1/8	0.116	9.00	2.46
2 1/2 x 2 1/2 x 1/8	0.116	3.90	1.07	x 3/16	0.174	13.23	3.63
x 3/16	0.174	5.57	1.54	x 1/4	0.233	17.28	4.77
x 1/4	0.233	7.08	1.97	x 5/16	0.291	21.16	5.85
x 5/16	0.291	8.40	2.35	x 3/8	0.349	24.85	6.88
3 x 3 x 1/8	0.116	4.75	1.03	6 x 6 x 1/8	0.116	9.85	2.70
x 3/16	0.174	6.85	1.89	x 3/16	0.174	14.51	3.98
x 1/4	0.233	8.78	2.44	x 1/4	0.233	18.99	5.24
x 5/16	0.291	10.53	2.94	x 5/16	0.291	23.29	6.43
x 3/8	0.349	12.09	3.39	x 3/8	0.349	27.41	7.58
				x 1/2	0.465	35.11	9.74
3 1/2 x 3 1/2 x 1/8	0.116	5.60	1.54	x 5/8	0.581	42.10	11.7
x 3/16	0.174	8.13	2.24				
x 1/4	0.233	10.48	2.91	7 x 7 x 1/8	0.116	11.55	3.16
x 5/16	0.291	12.65	3.52	x 3/16	0.174	17.06	4.67
x 3/8	0.349	14.65	4.09	x 1/4	0.233	22.39	6.17
				x 5/16	0.291	27.54	7.59
4 x 4 x 1/8	0.116	6.45	1.77	x 3/8	0.349	32.51	8.97
x 3/16	0.174	9.40	2.58	x 1/2	0.465	41.91	11.6
x 1/4	0.233	12.18	3.37	x 5/8	0.581	50.60	14.0
x 5/16	0.291	14.78	4.10				
x 3/8	0.349	17.20	4.78	8 x 8 x 1/8	0.116	13.25	3.62
x 1/2	0.465	21.50	6.02	x 3/16	0.174	19.61	5.37
				x 1/4	0.233	25.79	7.10
4 1/2 x 4 1/2 x 1/8	0.116	7.30	2.00	x 5/16	0.291	31.79	8.76
x 3/16	0.174	10.68	2.93	x 3/8	0.349	37.61	10.4
x 1/4	0.233	13.88	3.84	x 1/2	0.465	48.72	13.5
x 5/16	0.291	16.91	4.68	x 5/8	0.581	59.11	16.4
x 3/8	0.349	19.75	5.48				
x 1/2	0.465	24.90	6.95				



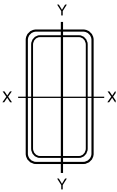
Structural Tubing Square

Dimensions and Properties

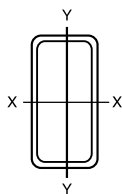
Square Tube	Design Wall Thick- ness, <i>t</i>	Nominal wt.	Area <i>A</i>	Square Tube	Design Wall Thick- ness, <i>t</i>	Nominal wt.	Area <i>A</i>
	in.	lb./ft.	in. ²		in.	lb./ft.	in. ²
9 x 9 x 1/8	0.116	14.95	4.09	12 x 12 x 3/16	0.174	29.82	8.15
	x 3/16	0.174	22.16		x 1/4	0.233	39.40
	x 1/4	0.233	29.19		x 5/16	0.291	48.81
	x 5/16	0.291	36.05		x 3/8	0.349	58.03
	x 3/8	0.349	42.72		x 1/2	0.465	75.94
	x 1/2	0.465	55.53		x 5/8	0.581	93.14
	x 5/8	0.581	67.62				
10 x 10 x 3/16	0.174	24.72	6.76	14 x 14 x 5/16	0.291	57.31	15.7
	x 1/4	0.233	32.60		x 3/8	0.349	68.24
	x 5/16	0.291	40.30		x 1/2	0.456	89.55
	x 3/8	0.349	47.82		x 5/8	0.581	110.00
	x 1/2	0.465	62.33	16 x 16 x 5/16	0.291	65.82	18.1
	x 5/8	0.581	76.13		x 3/8	0.349	78.45
					x 1/2	0.456	103.00
					x 5/8	0.581	127.00

Rectangular Tubing / Pipe All Sizes

Structural Tubing
Rectangular
Dimensions and Properties



Rectangular Tube	Design Wall Thick- ness, <i>t</i>	Nominal wt.	Area <i>A</i>	Rectangular Tube	Design Wall Thick- ness, <i>t</i>	Nominal wt.	Area <i>A</i>
	in.				in.		
2 x 1 x 1/8 x 3/16	0.116	2.19	0.608	3 1/2 x 1 1/2 x 1/8 x 3/16 x 1/4	0.116	3.90	1.07
	0.174	3.03	0.845		0.174	5.59	1.54
2 x 1 1/2 x 1/8 x 3/16	0.116	2.62	0.724	3 1/2 x 2 x 1/8 x 3/16 x 1/4	0.233	7.08	1.97
	0.174	3.67	1.02		0.116	4.32	1.19
2 1/4 x 2 x 1/8 3/16	0.116	3.26	0.898	x 3/16 x 1/4	0.174	6.23	1.71
	0.174	4.63	1.28		0.223	7.93	2.21
2 1/2 x 1 x 1/8 x 3/16	0.116	2.62	0.724	3 1/2 x 2 1/2 x 1/8 x 3/16 x 1/4 x 5/16	0.116	4.75	1.30
	0.174	3.67	1.02		0.174	6.87	1.89
2 1/2 x 1 1/2 x 1/8 x 3/16 x 1/4	0.116	3.04	0.840	x 1/4 x 5/16 x 3/8	0.233	8.78	2.44
	0.174	4.31	1.19		0.291	10.54	2.94
x 1/4	0.233	5.38	1.51	4 x 2 x 1/8 x 3/16 x 1/4	0.349	12.09	3.39
	0.116	3.47	0.956		0.116	4.75	1.30
2 1/2 x 2 x 1/8 x 3/16 x 1/4	0.116	3.47	0.956	x 3/16 x 1/4 x 5/16 x 3/8	0.174	6.87	1.89
	0.174	4.95	1.37		0.233	8.78	2.44
x 1/4	0.233	6.23	1.74	x 5/16 x 3/8	0.291	10.54	2.94
	0.116	3.04	0.840		0.349	12.09	3.39
3 x 1 x 1/8 x 3/16	0.116	3.04	0.840	4 x 3 x 1/8 x 3/16 x 1/4	0.116	5.60	1.54
	0.174	4.31	1.19		0.174	8.15	2.24
3 x 1 1/2 x 1/8 x 3/16 x 1/4	0.116	3.47	0.956	x 1/4 x 3/16 x 3/8	0.233	10.48	2.91
	0.174	4.95	1.37		0.291	12.67	3.52
x 1/4	0.233	6.23	1.74	x 3/8	0.349	14.65	4.09
3 x 2 x 1/8 x 3/16 x 1/4 x 5/16	0.116	3.90	1.07		5 x 2 x 1/8 x 3/16 x 1/4 x 3/16 x 5/16	0.116	5.60
	0.174	5.59	1.54	0.174		8.15	2.24
x 1/4	0.233	7.08	1.97	x 1/4 x 3/16 x 3/8	0.233	10.48	2.91
x 5/16	0.291	8.41	2.35		0.291	12.67	3.52
3 x 2 1/2 x 1/8 x 3/16 x 1/4 x 5/16	0.116	4.32	1.19	x 3/8	0.349	14.65	4.09
	0.174	6.23	1.71		5 x 3 x 1/8 x 3/16 x 1/4 x 3/16 x 3/8 x 1/2	0.116	6.45
x 1/4	0.233	7.93	2.21	x 3/16 x 1/4 x 3/16 x 3/8 x 1/2		0.174	9.43
x 5/16	0.291	9.47	2.64		x 1/4 x 3/16 x 3/8 x 1/2	0.233	12.18
3 x 2 1/2 x 1/8 x 3/16 x 1/4 x 5/16	0.116	4.32	1.19	x 3/16 x 3/8 x 1/2		0.291	14.80
	0.174	6.23	1.71		x 3/8 x 1/2	0.349	17.20
x 1/4	0.233	7.93	2.21	x 1/2		0.465	21.50
x 5/16	0.291	9.47	2.64				



Structural Tubing

Rectangular

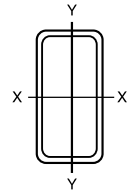
Dimensions and Properties

Rectangular Tube	Design Wall Thickness, t	Nominal wt.	Area A	Rectangular Tube	Design Wall Thickness, t	Nominal wt.	Area A
	in.	lb./ft.	in. ²		in.	lb./ft.	in. ²
5 x 4 x $\frac{1}{8}$	0.116	7.30	2.00	7 x 3 x $\frac{1}{8}$	0.116	8.15	2.23
x $\frac{3}{16}$	0.174	10.70	2.93	x $\frac{3}{16}$	0.174	11.98	3.28
x $\frac{1}{4}$	0.233	13.88	3.84	x $\frac{1}{4}$	0.233	15.58	4.30
x $\frac{5}{16}$	0.291	16.93	4.68	x $\frac{5}{16}$	0.291	19.06	5.26
x $\frac{3}{8}$	0.349	19.75	5.48	x $\frac{3}{8}$	0.349	22.30	6.18
x $\frac{1}{2}$	0.465	24.90	6.95	x $\frac{1}{2}$	0.465	28.30	7.88
6 x 2 x $\frac{1}{8}$	0.116	6.45	1.77	7 x 4 x $\frac{1}{8}$	0.116	9.00	2.46
x $\frac{3}{16}$	0.174	9.43	2.58	x $\frac{3}{16}$	0.174	13.26	3.63
x $\frac{1}{4}$	0.233	12.18	3.37	x $\frac{1}{4}$	0.233	17.28	4.77
x $\frac{5}{16}$	0.291	14.80	4.10	x $\frac{5}{16}$	0.291	21.19	5.85
x $\frac{3}{8}$	0.349	17.20	4.78	x $\frac{3}{8}$	0.349	24.85	6.88
				x $\frac{1}{2}$	0.465	31.71	8.81
6 x 3 x $\frac{1}{8}$	0.116	7.30	2.00	7 x 5 x $\frac{1}{8}$	0.116	9.85	2.70
x $\frac{3}{16}$	0.174	10.70	2.93	x $\frac{3}{16}$	0.174	14.54	3.98
x $\frac{1}{4}$	0.233	13.88	3.84	x $\frac{1}{4}$	0.233	18.99	5.24
x $\frac{5}{16}$	0.291	16.93	4.68	x $\frac{5}{16}$	0.291	23.32	6.43
x $\frac{3}{8}$	0.349	19.75	5.48	x $\frac{3}{8}$	0.349	27.41	7.58
x $\frac{1}{2}$	0.465	24.90	6.95	x $\frac{1}{2}$	0.465	35.11	9.74
6 x 4 x $\frac{1}{8}$	0.116	8.15	2.23	8 x 2 x $\frac{1}{8}$	0.116	8.15	2.23
x $\frac{3}{16}$	0.174	11.98	3.28	x $\frac{3}{16}$	0.174	11.98	3.28
x $\frac{1}{4}$	0.233	15.58	4.30	x $\frac{1}{4}$	0.233	15.58	4.30
x $\frac{5}{16}$	0.291	19.06	5.26	x $\frac{5}{16}$	0.291	19.06	5.26
x $\frac{3}{8}$	0.349	22.30	6.18	x $\frac{3}{8}$	0.349	22.30	6.18
x $\frac{1}{2}$	0.465	28.30	7.88				
6 x 5 x $\frac{1}{8}$	0.116	9.00	2.46	8 x 3 x $\frac{1}{8}$	0.116	9.00	2.46
x $\frac{3}{16}$	0.174	13.26	3.63	x $\frac{3}{16}$	0.174	13.26	3.63
x $\frac{1}{4}$	0.233	17.28	4.77	x $\frac{1}{4}$	0.233	17.28	4.77
x $\frac{5}{16}$	0.291	21.19	5.85	x $\frac{5}{16}$	0.291	21.19	5.85
x $\frac{3}{8}$	0.349	24.85	6.88	x $\frac{3}{8}$	0.349	24.85	6.88
x $\frac{1}{2}$	0.465	31.71	8.81	x $\frac{1}{2}$	0.465	31.71	8.81
7 x 2 x $\frac{1}{8}$	0.116	7.30	2.00				
x $\frac{3}{16}$	0.174	10.70	2.93				
x $\frac{1}{4}$	0.233	13.88	3.84				

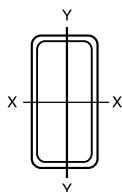
Structural Tubing

Rectangular

Dimensions and Properties



Rectangular Tube	Design Wall Thick- ness, <i>t</i>	Nominal wt.	Area <i>A</i>	Rectangular Tube	Design Wall Thick- ness, <i>t</i>	Nominal wt.	Area <i>A</i>
	in.	lb./ft.	in. ²		in.	lb./ft.	in. ²
8 x 4 x 1/8	0.116	9.85	2.70	10 x 2 x 1/8	0.116	9.85	2.70
x 3/16	0.174	14.54	3.98	x 3/16	0.174	14.54	3.98
x 1/4	0.233	18.99	5.24	x 1/4	0.233	18.99	5.24
x 5/16	0.291	23.32	6.43	x 5/16	0.291	23.32	6.43
x 3/8	0.349	27.41	7.58	x 3/8	0.349	27.41	7.58
x 1/2	0.465	35.11	9.74				
x 5/8	0.581	42.10	11.7	10 x 3 x 1/8	0.116	10.70	2.93
				x 3/16	0.174	15.82	4.32
8 x 6 x 3/16	0.174	17.10	4.67	x 1/4	0.233	20.69	5.70
x 1/4	0.233	22.39	6.17	x 5/16	0.291	25.45	7.01
x 5/16	0.291	27.58	7.59	x 3/8	0.349	29.96	8.27
x 3/8	0.349	32.51	8.97				
x 1/2	0.465	41.91	11.6	10 x 4 x 1/8	0.116	11.55	3.16
x 5/8	0.581	50.60	14.0	x 3/16	0.174	17.10	4.67
				x 1/4	0.233	22.39	6.17
9 x 3 x 3/16	0.174	14.54	3.98	x 5/16	0.291	27.58	7.59
x 1/4	0.233	18.99	5.24	x 3/8	0.349	32.51	8.97
x 5/16	0.291	23.32	6.43	x 1/2	0.465	41.91	11.6
x 3/8	0.349	27.41	7.58	x 5/8	0.581	50.60	14.0
x 1/2	0.465	35.11	9.74				
				10 x 5 x 3/16	0.174	18.38	5.02
9 x 5 x 3/16	0.174	17.10	4.67	x 1/4	0.233	24.09	6.63
x 1/4	0.233	22.39	6.17	x 5/16	0.291	29.71	8.17
x 5/16	0.291	27.58	7.59	x 3/8	0.349	35.06	9.67
x 3/8	0.349	32.51	8.97				
x 1/2	0.465	41.91	11.6	10 x 6 x 3/16	0.174	19.66	5.37
x 5/8	0.581	50.60	14.0	x 1/4	0.233	25.79	7.10
				x 5/16	0.291	31.84	8.76
9 x 7 x 3/16	0.174	19.66	5.37	x 3/8	0.349	37.61	10.4
x 1/4	0.233	25.79	7.10	x 1/2	0.465	48.72	13.5
x 5/16	0.291	31.84	8.76	x 5/8	0.581	59.11	16.4
x 3/8	0.349	37.61	10.4				
x 1/2	0.465	48.72	13.5				
x 5/8	0.581	59.11	16.4				



Structural Tubing

Rectangular

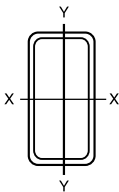
Dimensions and Properties

Rectangular Tube	Design Wall Thickness, t	Nominal wt.	Area A	Rectangular Tube	Design Wall Thickness, t	Nominal wt.	Area A
	in.	lb./ft.	in. ²		in.	lb./ft.	in. ²
10 x 8 x $\frac{3}{16}$	0.174	22.22	6.06	12 x 10 x $\frac{1}{4}$	0.233	36.00	9.90
	x $\frac{1}{4}$ 0.233	29.19	8.03		x $\frac{5}{16}$ 0.291	44.62	12.2
	x $\frac{5}{16}$ 0.291	36.10	9.92		x $\frac{3}{8}$ 0.349	52.93	14.6
	x $\frac{3}{8}$ 0.349	42.72	11.8		x $\frac{1}{2}$ 0.465	69.14	19.0
	x $\frac{1}{2}$ 0.465	55.53	15.3	14 x 4 x $\frac{3}{16}$	0.174	22.12	6.06
	x $\frac{5}{8}$ 0.581	67.62	18.7		x $\frac{1}{4}$ 0.233	29.25	8.03
12 x 2 x $\frac{3}{16}$	0.174	17.10	4.67		x $\frac{5}{16}$ 0.291	36.09	9.92
	x $\frac{1}{4}$ 0.233	22.39	6.17		x $\frac{3}{8}$ 0.349	42.75	11.8
	x $\frac{5}{16}$ 0.291	27.58	7.59		x $\frac{1}{2}$ 0.465	55.53	15.3
					x $\frac{5}{8}$ 0.581	67.59	18.7
12 x 3 x $\frac{3}{16}$	0.174	18.38	5.02	14 x 6 x $\frac{3}{16}$	0.174	24.66	6.76
	x $\frac{1}{4}$ 0.233	24.09	6.63		x $\frac{1}{4}$ 0.233	32.66	8.96
	x $\frac{5}{16}$ 0.291	29.71	8.17		x $\frac{5}{16}$ 0.291	40.35	11.1
12 x 4 x $\frac{3}{16}$	0.174	19.66	5.37		x $\frac{3}{8}$ 0.349	47.86	13.2
	x $\frac{1}{4}$ 0.233	25.79	7.10		x $\frac{1}{2}$ 0.465	62.33	17.2
	x $\frac{5}{16}$ 0.291	31.84	8.76		x $\frac{5}{8}$ 0.581	76.09	21.0
	x $\frac{3}{8}$ 0.349	37.61	10.4	14 x 10 x $\frac{1}{4}$	0.233	39.48	10.8
	x $\frac{1}{2}$ 0.465	48.72	13.5		x $\frac{5}{16}$ 0.291	48.87	13.4
	x $\frac{5}{8}$ 0.581	59.11	16.4		x $\frac{3}{8}$ 0.349	58.07	16.0
					x $\frac{1}{2}$ 0.465	75.94	20.9
12 x 6 x $\frac{3}{16}$	0.174	22.22	6.06		x $\frac{5}{8}$ 0.581	93.10	25.7
	x $\frac{1}{4}$ 0.233	29.19	8.03	16 x 4 x $\frac{3}{16}$	0.174	24.66	6.76
	x $\frac{5}{16}$ 0.291	36.10	9.92		x $\frac{1}{4}$ 0.233	32.66	8.96
	x $\frac{3}{8}$ 0.349	42.72	11.8		x $\frac{5}{16}$ 0.291	40.35	11.1
	x $\frac{1}{2}$ 0.465	55.53	15.3		x $\frac{3}{8}$ 0.349	47.86	13.2
	x $\frac{5}{8}$ 0.581	67.62	18.7		x $\frac{1}{2}$ 0.465	62.33	17.2
					x $\frac{5}{8}$ 0.581	76.09	21.0
12 x 8 x $\frac{3}{16}$	0.174	24.78	6.76	16 x 8 x $\frac{1}{4}$	0.233	39.48	10.8
	x $\frac{1}{4}$ 0.233	32.60	8.96		x $\frac{5}{16}$ 0.291	48.87	13.4
	x $\frac{5}{16}$ 0.291	40.36	11.1		x $\frac{3}{8}$ 0.349	58.07	16.0
	x $\frac{3}{8}$ 0.349	47.82	13.2		x $\frac{1}{2}$ 0.465	75.94	20.9
	x $\frac{1}{2}$ 0.465	62.33	17.2		x $\frac{5}{8}$ 0.581	93.10	25.7
	x $\frac{5}{8}$ 0.581	76.13	21.0				

Structural Tubing

Rectangular

Dimensions and Properties



Rectangular Tube	Design Wall Thick- ness, <i>t</i>	Nominal wt.	Area <i>A</i>	Rectangular Tube	Design Wall Thick- ness, <i>t</i>	Nominal wt.	Area <i>A</i>
	in.	lb./ft.	in. ²		in.	lb./ft.	in. ²
16 x 12 x $\frac{5}{16}$	0.291	57.38	15.7	20 x 8 x $\frac{5}{16}$	0.291	57.31	15.7
	x $\frac{3}{8}$	68.29	18.7		x $\frac{3}{8}$	68.29	18.7
	x $\frac{1}{2}$	89.55	24.6		x $\frac{1}{2}$	89.55	24.6
	x $\frac{5}{8}$	110.00	30.3		x $\frac{5}{8}$	110.00	30.3
18 x 6 x $\frac{1}{4}$	0.233	39.48	10.8	20 x 12 x $\frac{5}{16}$	0.291	65.82	18.1
	x $\frac{5}{16}$	48.87	13.4		x $\frac{3}{8}$	78.45	21.5
	x $\frac{3}{8}$	58.07	16.0		x $\frac{1}{2}$	103.00	28.3
	x $\frac{1}{2}$	75.94	20.9		x $\frac{5}{8}$	127.00	35.0
	x $\frac{5}{8}$	93.10	25.7				
20 x 4 x $\frac{1}{4}$	0.233	39.48	10.8				
	x $\frac{5}{16}$	48.87	13.4				
	x $\frac{3}{8}$	58.07	16.0				
	x $\frac{1}{2}$	75.94	20.9				



The listed sections are available in conformance with ASTM Specification A53 Grade B or A501. Other sections are made to these specifications. Consult with pipe manufacturers or distributors for availability.

Universal Mill Plate & Plate

Universal Mill Plate & Plate

Universal Mill Plate								
Weight in Pounds								
Size	Per Foot	20'	Size	Per Foot	20'	Size	Per Foot	20'
¼ x 9	7.66	153.14	½ x 9	15.31	306.29	1 x 9	30.63	612.58
x 10	8.51	170.16	x 10	17.02	340.32	x 10	34.03	680.64
x 12	10.21	204.19	x 12	20.42	408.38	x 12	40.84	816.77
⅝ ₁₆ x 9	9.57	191.43	⅝ x 9	19.14	382.86	1¼ x 10	42.54	850.80
x 10	10.64	212.70	x 10	21.27	425.40	x 12	51.05	1020.96
x 12	12.76	255.24	x 12	25.52	510.48	1½ x 10	51.05	1020.96
¾ x 9	11.49	229.72	¾ x 9	22.97	459.43	x 12	61.26	1255.15
x 10	2.76	255.24	x 10	25.52	510.48			
x 12	15.31	306.29	x 12	30.63	612.57			

Plate					
Size		Weight Per Plate	Size		Weight Per Plate
3/16	7.66# / Sq. Ft.		1/4	10.21# / Sq. Ft.	
	48 x 96	245.05		48 x 96	326.71
	x 120	306.32		x 120	408.38
	x 144	367.58		x 144	490.06
	x 240	612.63		x 240	816.77
	60 x 96	306.32		60 x 96	408.38
	x 120	382.90		x 120	510.48
	x 144	459.47		x 144	612.58
	x 240	765.79		x 240	1020.96
	x 360	1148.69		x 360	1531.44
	72 x 96	367.58		72 x 96	490.06
	x 120	459.47		x 120	612.58
	x 144	551.37		x 144	735.09
	x 240	918.95		x 240	1225.15
	x 360	1378.42		x 360	1837.73
	84 x 96	428.84		84 x 96	571.74
	x 120	536.05		x 120	714.67
	x 144	643.26		x 144	857.61
	x 240	1072.11		x 240	1429.34
	x 360	1608.16		x 360	2144.02
96 x 120	612.63	96 x 120	816.77		
x 144	735.16	x 144	980.12		
x 240	1225.26	x 240	1633.54		
x 360	1837.90	x 360	2450.30		

Plate

Plate					
Size		Weight Per Plate	Size		Weight Per Foot
1/4	10.21# / Sq. Ft		3/8	15.31# / Sq. Ft.	
	96 x 480	3267.07		48 x 96	490.06
	120 x 240	2041.92		x 120	612.58
	x 360	3062.88		x 144	735.09
	x 480	4083.84		x 240	1225.15
5/16	12.76# / Sq. Ft			60 x 96	612.58
	48 x 96	408.41		x 120	765.72
	x 120	510.51		x 144	918.86
	x 144	612.61		x 240	1531.44
	x 240	1021.02		x 360	2297.16
	60 x 96	510.51	72 x 96	735.09	
	x 120	638.14	x 120	918.86	
	x 144	765.76	x 144	1102.64	
	x 240	1276.27	x 240	1837.73	
	x 360	1914.41	x 360	2756.59	
	72 x 96	612.61	84 x 96	857.61	
	x 120	765.76	x 120	1072.01	
	x 144	918.92	x 144	1286.41	
	x 240	1531.53	x 240	2144.02	
	x 360	2297.29	x 360	3216.02	
	84 x 96	714.71	96 x 120	1225.15	
	x 120	893.39	x 144	1470.18	
	x 144	1072.07	x 240	2450.30	
	x 240	1786.78	x 360	3675.46	
	x 360	2680.17	x 480	4900.61	
	96 x 120	1021.02	120 x 240	3062.88	
	x 144	1225.22	x 360	4594.32	
	x 240	2042.04	x 480	6125.76	
	x 360	3063.05			
	x 480	4084.08			
	120 x 240	2552.24			
	x 360	3828.82			
	x 480	5104.48			
		7/16	17.87# / Sq. Ft.		

Plate

Plate					
Size		Weight Per Plate	Size		Weight Per Plate
1/2	20.42# / Sq. Ft		5/8	25.52# / Sq. Ft.	
	48 x 96	653.41		96 x 120	2041.92
	x 120	816.77		x 240	4083.84
	x 144	980.12		x 360	6125.76
	x 240	1633.54			
	60 x 96	816.77	11/16	28.08# / Sq. Ft.	
	x 120	1020.96			
	x 144	1225.15	3/4	30.63# / Sq. Ft.	
	x 240	2041.92		48 x 96	980.12
	x 360	3062.88		x 120	1225.15
	72 x 96	980.12		x 144	1470.18
	x 120	1225.15		x 240	2450.30
	x 144	1470.18		60 x 96	1225.15
	x 240	2450.30		x 120	1513.44
	x 360	3675.46		x 144	1837.73
	84 x 96	1143.48		x 240	3062.88
	x 120	1429.34		x 360	4594.32
	x 144	1715.21		72 x 96	1470.18
	x 240	2858.69		x 120	1837.73
	x 360	4288.03		x 144	2205.27
	96 x 120	1633.54		x 240	3675.46
	x 144	1960.25		x 360	5513.18
	x 240	3267.07		84 x 96	1715.22
	x 360	4900.61		x 120	2144.02
	x 480	6534.14		x 144	2572.82
	120 x 240	4083.84		x 240	4288.03
	x 360	6125.76		x 360	6432.05
	x 480	8167.68		96 x 120	2450.31
				x 144	2940.36
				x 240	4900.61
				x 360	7350.91
				x 480	9801.22
9/16	22.97# / Sq. Ft.		120 x 240	6125.76	
5/8	25.52# / Sq. Ft.		x 360	9188.64	
	48 x 96	816.77	x 480	12251.52	
	x 120	1020.96			
	60 x 120	1276.20			
	x 240	2552.40			
	72 x 120	1531.44			
	x 240	3062.88			
	84 x 120	1786.68			
	x 240	3573.36			

Plate

Plate					
Size		Weight Per Plate	Size		Weight Per Plate
13/16	33.18# / Sq. Ft.		1	40.84# / Sq. Ft.	
				84 x 96	2286.95
7/8	35.73# / Sq. Ft.			x 120	2858.69
	48 x 96	1143.48		x 144	3430.43
	x 120	1429.35		x 240	5717.38
	x 144	1715.21		x 340	8576.06
	x 240	2858.69		96 x 120	3267.07
	60 x 96	1429.34		x 144	3920.49
	x 120	1786.68		x 240	6534.14
	x 144	2144.02		x 360	9804.22
	x 240	3573.36		x 480	13068.29
	72 x 120	2144.02		120 x 240	8167.68
	x 240	4288.03		x 360	12251.52
	84 x 120	2501.35		x 480	16335.36
	x 240	5002.70			
	96 x 120	2858.69	1 1/8	45.94# / Sq. Ft.	
	x 240	5717.38			
	x 360	8576.06	1 1/4	51.05# / Sq. Ft.	
				48 x 96	1633.53
15/16	38.29# / Sq. Ft.			x 120	2041.92
				60 x 120	2552.40
1	40.84# / Sq. Ft.			x 240	5104.80
	48 x 96	1306.83		72 x 120	3062.88
	x 120	1633.54		x 240	6125.76
	x 144	1960.24		84 x 120	3573.36
	x 240	3267.08		x 240	7146.72
	60 x 96	1633.54		96 x 120	4083.44
	x 120	2041.92		x 240	8167.68
	x 144	2450.30		x 360	12251.52
	x 240	4083.84			
	x 360	6125.76	1 3/16	48.50# / Sq. Ft.	
	72 x 96	1960.24			
	x 120	2450.30	1 3/8	56.15# / Sq. Ft.	
	x 144	2940.36			
	x 240	4900.61			
	x 360	7350.91			

Plate

Plate					
Size		Weight Per Plate	Size		Weight Per Plate
1 1/2	61.26# / Sq. Ft.		1 7/8	76.57# / Sq. Ft.	
	48 x 96	1960.24	2	81.68# / Sq. Ft.	
	x 120	2450.30		48 x 96	2613.66
	60 x 120	3062.88		x 120	3267.07
	x 240	6125.76		60 x 120	4083.84
	72 x 120	3675.45		x 240	8167.68
	x 240	7350.91		72 x 120	4900.61
	84 x 120	4288.03		x 240	9801.61
	x 240	8576.06		84 x 120	5717.37
	96 x 120	4900.60		x 240	11434.75
	x 240	9801.22		96 x 120	6534.14
	x 360	14701.80		x 240	13068.29
1 5/8	66.36# / Sq. Ft.			x 360	19602.43
1 3/4	71.47# / Sq. Ft.				
	48 x 96	2286.95			
	x 120	2858.68			
	60 x 120	3573.36			
	x 240	7146.72			
	72 x 120	4288.03			
	x 240	8576.06			
	84 x 120	5002.70			
	x 240	10005.41			
	96 x 120	5717.37			
	x 240	11434.75			
	x 360	17152.13			

Strip
Flat Bar
Round Bar
Square Bar
Rebar

Hot Rolled Strip &
Hot Rolled Flat Bar

Hot Rolled Strip						Hot Rolled Flat Bar					
Weight in Pounds						Weight in Pounds					
Size	Per Foot	20'	Size	Per Foot	20'	Size	Per Foot	20'	Size	Per Foot	20'
1/8 x 1/2	0.213	4.26	3/16 x 1/2	0.319	6.38	7/8 x 6	17.85	357.00	1 1/2 x 2	10.20	204.00
x 5/8	0.266	5.32	x 5/8	0.398	7.96	x 7	20.83	416.60	x 2 1/2	12.75	255.00
x 3/4	0.319	6.38	x 3/4	0.478	9.56	x 8	23.80	470.00	x 3	15.30	306.00
x 7/8	0.372	7.44	x 7/8	0.558	11.16				x 4	20.40	408.00
x 1	0.425	8.50	x 1	0.638	12.76	1 x 1 1/2	5.10	102.00	x 5	25.50	510.00
x 1 1/4	0.531	10.62	x 1 1/4	0.797	15.94	x 2	6.80	136.00	x 6	30.60	612.00
x 1 1/2	0.638	12.76	x 1 1/2	0.956	19.12	x 2 1/2	8.50	170.00	x 7	35.70	714.00
x 1 3/4	0.744	14.88	x 1 3/4	1.120	22.40	x 3	10.20	204.00	x 8	40.80	816.00
x 2	0.850	17.00	x 2	1.280	25.60	x 3 1/2	11.90	238.00			
x 2 1/4	0.956	19.12	x 2 1/4	1.430	28.60	x 4	13.60	272.00	1 3/4 x 4	23.80	476.00
x 2 1/2	1.063	21.26	x 2 1/2	1.594	31.88	x 4 1/2	15.30	306.00	x 4 1/2	26.77	535.40
x 2 3/4	1.169	23.38	x 2 3/4	1.753	35.06	x 5	17.00	340.00	x 5	29.75	595.00
x 3	1.275	25.50	x 3	1.913	38.26	x 6	20.40	408.00	x 6	35.70	714.00
x 3 1/2	1.488	29.76	x 3 1/2	2.230	44.60	x 7	23.80	476.00	x 7	41.65	833.00
x 4	1.700	34.00	x 4	2.550	51.00	x 8	27.20	544.00	x 8	47.60	952.00
x 4 1/2	1.913	38.26	x 5	3.188	63.76						
x 5	2.125	42.50	6	3.825	76.50	1 1/8 x 2	7.65	153.00	2 x 2 1/2	17.00	340.00
x 6	2.550	51.00	x 7	4.463	89.25	x 2 1/2	9.56	191.20	x 3	20.40	408.00
x 7	2.975	59.50	x 8	5.100	102.00	x 3	11.48	229.60	x 4	27.20	544.00
x 8	3.400	68.00	x 10	6.375	127.50	x 4	15.30	306.00	x 5	34.00	680.00
x 10	4.250	85.00	x 12	7.650	153.00	x 5	19.13	382.00	x 6	40.80	816.00
x 12	5.100	102.00				x 6	22.95	459.00	x 7	47.60	952.00
x 16	6.800	136.00							x 8	54.40	1088.00
						1 1/4 x 2	8.50	170.00			
						x 2 1/2	10.63	212.50			
						x 3	12.75	255.00			
						x 4	17.00	340.00			
						x 5	21.25	425.00			
						x 6	25.50	510.00			
						x 7	29.75	595.00			
						x 8	34.00	680.00			

Hot Rolled Round Bar & Hot Rolled Square Bar

Hot Rolled Round Bar								
Theoretical Weight in Pounds								
Size	Per Foot (1)	20'	Size	Per Foot (1)	20'	Size	Per Foot (1)	20'
1/4	0.167	3.34	2 1/8	12.060	241.20	5 3/4	88.29	1765.80
5/16	0.261	5.22	2 1/4	13.520	270.40	6	96.13	1922.60
3/8	0.376	7.52	2 3/8	15.060	301.20	6 1/4	104.31	2086.20
7/16	0.511	10.22	2 1/2	16.690	333.80	6 1/2	112.82	2256.40
1/2	0.668	13.36	2 5/8	18.400	368.00	6 3/4	121.67	2433.40
9/16	0.845	16.90	2 3/4	20.190	403.80	7	130.85	2617.00
5/8	1.043	20.86	3	24.030	480.60	7 1/4	140.36	2807.20
3/4	1.500	30.00	3 1/4	28.210	564.20	7 1/2	150.21	3004.20
7/8	2.040	40.80	3 1/2	32.170	654.20	7 3/4	160.40	3208.00
1	2.670	53.40	3 5/8	35.090	701.80	8	170.90	3418.00
1 1/8	3.380	67.60	3 3/4	37.550	751.00	8 1/4	181.75	3635.00
1 1/4	4.170	83.40	4	42.73	854.60	8 1/2	192.93	3858.60
1 3/8	5.050	101.00	4 1/4	48.23	964.60	9	216.30	4326.00
1 1/2	6.010	120.20	4 1/2	54.08	1081.60	9 1/2	241.00	4820.00
1 5/8	7.050	141.00	4 3/4	60.25	1205.00	10	267.04	5340.80
1 3/4	8.180	163.60	5	66.76	1335.20	10 1/2	294.40	5888.00
1 7/8	9.390	187.80	5 1/4	73.60	1472.00	12	384.53	7690.60
2	10.680	213.60	5 1/2	80.78	1615.60			

Hot Rolled Square Bar								
Weight in Pounds								
Size	Per Foot	20'	Size	Per Foot	20'	Size	Per Foot	20'
1/4	0.213	4.26	1 1/8	4.300	86.00	2 5/8	23.430	468.60
5/16	0.332	6.64	1 1/4	5.310	106.20	2 3/4	25.710	514.20
3/8	0.478	9.56	1 3/8	6.430	128.60	3	30.600	612.00
7/16	0.651	13.02	1 1/2	7.650	153.00	3 1/4	35.910	718.20
1/2	0.850	17.00	1 5/8	8.980	179.60	3 1/2	41.650	833.00
9/16	1.080	21.60	1 3/4	10.410	208.20	4	54.400	1088.00
5/8	1.330	26.60	1 7/8	11.950	239.00	4 1/2	68.850	1377.00
3/4	1.910	38.20	2	13.600	272.00	5	85.000	1700.00
7/8	2.600	52.00	2 1/4	17.210	344.20	6	122.400	2448.00
1	3.400	68.00	2 1/2	21.250	425.00			

Rebar

Rebar				
Bar Size Designation	Weight Pounds Per Foot	Nominal Diameter Inches	Cross Sectional Area-Sq. Inches	Perimeter Inches
#3	0.375	0.376	0.11	1.178
#4	0.668	0.500	0.20	1.571
#5	1.043	0.625	0.31	1.963
#6	1.502	0.750	0.44	2.356
#7	2.044	0.875	0.60	2.749
#8	2.670	1.000	0.79	3.142
#9	3.400	1.128	1.00	3.544
#10	4.303	1.270	1.27	3.990
#11	5.313	1.410	1.56	4.430
#14	7.650	1.693	2.25	5.320
#18	13.600	2.257	4.00	7.090

Information Tables

Standard Mill Practice

Methods of increasing areas
and weights by spreading rolls

W Shapes

To vary the area and weight within a given nominal size, the flange width, the flange thickness and the web thickness are changed, as shown in Fig. 1.

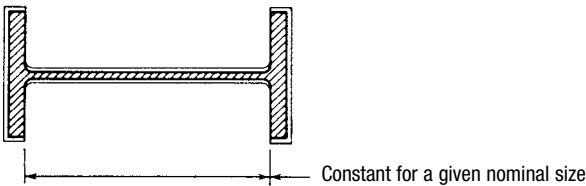


Figure 1

S Shapes and American Standard Channels

To vary the area and weight within a given nominal size, the web thickness and the flange width are changed by an equal amount, as shown in Figs. 2 and 3.

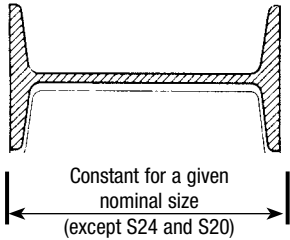


Figure 2

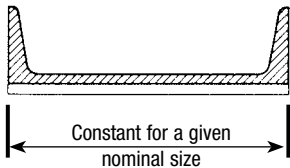


Figure 3

Angles

To vary area and weight for a given leg length, the thickness of each leg is changed. Note that leg length is changed slightly by this method (Fig. 4).



Figure 4

Standard Mill Practice

Cambering of rolled beams

All beams are straightened after rolling to meet permissible variations for sweep and camber listed herein after for **W** shapes and **S** shapes. The following data refers to the subsequent cold cambering of beams to produce a predetermined dimension.

The maximum lengths that can be cambered depend on the length to which a given section can be rolled, with a maximum of 100 ft. The following table outlines the maximum and minimum induced camber of **W** shapes and **S** shapes.

MAXIMUM AND MINIMUM INDUCED CAMBER

Sections Nominal Depth In.	Specified Length of Beam, Ft.				
	Over 30 to 42, incl.	Over 42 to 52, incl.	Over 52 to 65, incl.	Over 65 to 85, incl.	Over 85 to 100, incl.
	Max. and Min. Camber Acceptable, In.				
W Shapes, 24 and over	1 to 2, incl.	1 to 3, incl.	2 to 4, incl.	3 to 5, incl.	3 to 6, incl.
W Shapes, 14 to 21, incl. and S shapes, 12 in. and over	¾ to 2½, incl.	1 to 3, incl.	2 to 4, incl.	2½ to 5, incl.	Inquire

Consult the producer for specific camber and/or lengths outside the above listed available lengths and sections.

Mill camber in beams of less depth than tabulated should not be specified.

A single minimum value for camber, within the ranges shown above for the length ordered, should be specified.

Camber is measured at the mill and will not necessarily be present in the same amount in the section of beam as received due to release of stress induced during the cambering operation. In general, 75% of the specified camber is likely to remain.

Camber will approximate a simple regular curve nearly the full length of the beam, or between any two points specified.

Camber is ordinarily specified by the ordinate at the mid-length of the portion of the beam to be curved. Ordinates at other points should not be specified.

Although mill cambering to achieve reverse or other compound curves is not considered practical, fabricating shop facilities for cambering by heat can accomplish such results as well as form regular curves in excess of the limits tabulated above. Refer to Effects of Heat on Steel, Part 6 of this Manual, for further information.

Standard Mill Practice

Cambering of rolled beams

PERMISSIBLE VARIATIONS FOR CAMBER ORDINATE

Lengths	Plus Variation	Minus Variation
50 ft. and less	½ inch	0
Over 50 ft.	½ in. plus ⅛ in. for each 10 ft. or fraction thereof in excess of 50 ft.	0

OTHER PERMISSIBLE VARIATIONS

Area and Weight Variation: ± 2.5% theoretical or specified amount.

Ends Out-of-Square: 1/64 in. per in. of depth, or of flange width if greater than the depth.

Camber and Sweep:

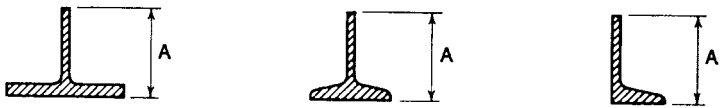
Sizes	Length	Permissible Variation, In.	
		Camber	Sweep
Sizes with flange width equal to or greater than 6 in.	All	$\frac{1}{8} \text{ in.} \times \frac{(\text{total length, ft.})}{10}$	
Sizes with flange width less than 6 in.	All	$\frac{1}{8} \text{ in.} \times \frac{(\text{total length, ft.})}{10}$	$\frac{1}{8} \text{ in.} \times \frac{(\text{total length, ft.})}{5}$
Certain sections with a flange width approx. equal to depth & specified on order as columns ^b	45 ft. and under	$\frac{1}{8} \text{ in.} \times \frac{(\text{total length, ft.})}{10}$ with ⅜ in. max	
	Over 45 ft.	$\frac{3}{8} \text{ in.} + \left[\frac{(\text{total length, ft.} - 45)}{10} \right]$	

^bApplies only to: W 8 x 31 and heavier, W 10 x 49 and heavier, W 12 x 65 and heavier, W 14 x 90 and heavier. If other sections are specified on the order as columns, the tolerance will be subject to negotiation with the manufacturer.

Standard Mill Practice

Tees split from W, M and S shapes
Angles split from channels

PERMISSIBLE VARIATIONS IN DEPTH



Dimension A may be approximately 1/2 beam or channel depth, or any dimension resulting from off-center splitting, or splitting on two lines as specified on the order.

Depth of Beam from which Tees or Angles are Split	Variations in Depth A Over and Under	
	Tees	Angles
To 6 in., excl.	1/8	1/8
6 to 16, excl.	3/16	3/16
16 to 20, excl.	1/4	1/4
20 to 24, excl.	5/16	—
24 and over	3/8	—

The above variations for depths of tees or angles include the permissible variations in depth for the beams and channels before splitting.

OTHER PERMISSIBLE VARIATIONS

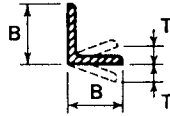
Other permissible variations in cross section, as well as permissible variations in length, area and weight variation and ends out-of-square, will correspond to those of the beam or channel before splitting, except

$$\text{camber} = \frac{1}{8} \text{ in.} \times \frac{(\text{total length, ft})}{5}$$

Standard Mill Practice

*Angles, bar size

PERMISSIBLE VARIATIONS IN CROSS SECTION



^a Specified Length of Leg, in.	Variations from Thickness for Thickness Given, Over and Under, in.			B Length of Leg Over and Under, in.	T, Out of Square per Inch of B, in.
	$\frac{3}{16}$ and Under	Over $\frac{3}{16}$ to $\frac{3}{8}$ incl.	Over $\frac{3}{8}$		
1 and under	0.008	0.010		$\frac{1}{32}$	$\frac{3}{128}^b$
Over 1 to 2, inc.	0.010	0.010	0.012	$\frac{3}{64}$	$\frac{3}{128}^b$
Over 2 to 3, excl.	0.012	0.015	0.015	$\frac{1}{16}$	$\frac{3}{128}^b$
^a The longer leg of an unequal angle determines the size for permissible variations. ^b $\frac{3}{128}$ -in. per in. = $1\frac{1}{2}$ degrees.					

PERMISSIBLE VARIATIONS IN LENGTH

Section	Variations Over Specified Length for Lengths Given No Variation Under				
	5 to 10 ft. excl.	10 to 20 ft. excl.	20 to 30 ft. excl.	30 to 40 ft. excl.	40 to 65 Ft. incl.
All sizes of bar-size angles	$\frac{5}{8}$	1	$1\frac{1}{2}$	2	$2\frac{1}{2}$

OTHER PERMISSIBLE VARIATIONS

Camber = $\frac{1}{4}$ in. in any 5 ft, or $\frac{1}{4}$ in. $\times \frac{(\text{total length, ft})}{5}$

Straightness: Because of warpage, permissible variations for straightness do not apply to bars if any subsequent heating operation has been performed.

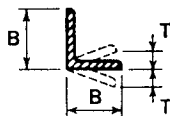
Ends Out-of-Square: $\frac{3}{128}$ -in. per in. of leg length or $1\frac{1}{2}$ degrees. Variation based on longer leg of an unequal angle.

* A member is "bar size" when its greatest cross-sectional dimension is less than 3 in.

Standard Mill Practice

*Angles, structural size

PERMISSIBLE VARIATIONS IN CROSS SECTION



Section	Nominal Size, in. ^a	B Length of Leg, in.		T, Out of Square per Inch of B, in.
		Over Theoretical	Under Theoretical	
Angles	3 to 4, incl.	1/8	3/32	3/128 ^b
	Over 4 to 6, incl.	1/8	1/8	3/128 ^b
	Over 6	3/16	1/8	3/128 ^b
^a For unequal leg angles, longer leg determines classification. ^b 3/128-in. per in. = 1 1/2 degrees.				

PERMISSIBLE VARIATIONS IN LENGTH

Section	Variations Over Specified Length for Lengths Given No Variation Under									
	To 30 ft., incl.		Over 30 to 40 ft., incl.		Over 40 to 50 ft., incl.		Over 50 to 65 ft., incl.		Over 65 ft.	
Angles	Over	Under	Over	Over	Under	Over	Under	Over	Over	Under
	1/2	1/4	3/4	1/4	1	1/4	1 1/8	1/4	1 1/4	1/4

OTHER PERMISSIBLE VARIATIONS

Area and Weight Variation: ± 2.5% theoretical or specified amount.

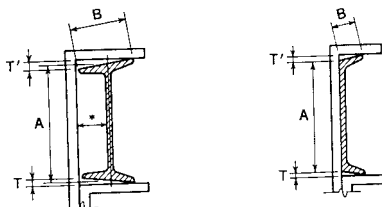
Ends Out-of-Square: 3/128 in. per in. of leg length, or 1 1/2 degrees. Variations based on the longer leg of an unequal angle.

Camber = 1/8 in. x $\frac{(\text{total length, ft.})}{5}$, applied to either leg

Standard Mill Practice

S Shapes, M Shapes and channels

PERMISSIBLE VARIATIONS IN CROSS SECTION



Section	Nominal Size, in.	A, Depth, In. ^a		B, Flange Width, In.		T + T ^b Out of Square per Inch of B, In.
		Over Theoretical	Under Theoretical	Over Theoretical	Under Theoretical	
S shapes and M shapes	3 to 7, incl.	$\frac{3}{32}$	$\frac{1}{16}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{32}$
	Over 7 to 14, incl.	$\frac{1}{8}$	$\frac{3}{32}$	$\frac{5}{32}$	$\frac{5}{32}$	$\frac{1}{32}$
	Over 14 to 24, incl.	$\frac{3}{16}$	$\frac{1}{8}$	$\frac{3}{16}$	$\frac{3}{16}$	$\frac{1}{32}$
Channels	Over 7 to 14, incl.	$\frac{3}{32}$	$\frac{1}{16}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{32}$
	Over 7 to 14, incl.	$\frac{1}{8}$	$\frac{3}{32}$	$\frac{1}{8}$	$\frac{5}{32}$	$\frac{1}{32}$
	Over 14	$\frac{3}{16}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{3}{16}$	$\frac{1}{32}$

^aA is measured at centerline of web for beams; and at back of web for channels.

^bT + T applies when flanges of channels are tied in or out.

PERMISSIBLE VARIATIONS IN LENGTH

Section	Variations from Specified Length for Lengths Given, in.									
	To 30 ft., incl.		Over 30 to 40 ft., incl.		Over 40 to 50 ft., incl.		Over 50 to 65 ft., incl.		Over 65 ft.	
S shapes, M shapes and Channels	Over	Under	Over	Over	Under	Over	Under	Over	Over	Under
	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{3}{4}$	$\frac{1}{4}$	1	$\frac{1}{4}$	$1\frac{1}{8}$	$\frac{1}{4}$	$1\frac{1}{4}$	$\frac{1}{4}$

OTHER PERMISSIBLE VARIATIONS

Area and Weight Variation: $\pm 2.5\%$ theoretical or specified amount.

Ends Out-of-Square: $\frac{3}{128}$ in. per in. of leg length, or $1\frac{1}{2}$ degrees. Variations based on the longer leg of an unequal angle.

Camber = $\frac{1}{8}$ in. x $\frac{(\text{total length, ft})}{5}$, applied to either leg

Standard Mill Practice

Steel pipe and tubing

DIMENSION AND WEIGHT TOLERANCES

Round Tubing and Pipe

ASTM A53

ASTM A618

Weight – The weight of the pipe as specified in Table X2 and Table X3 (ASTM Specification A53) shall not vary by more than $\pm 10\%$.

Note that the weight tolerance of $\pm 10\%$ is determined from the weights of the customary lifts of pipe as produced for shipment by the mill, divided by the number of feet of pipe in the lift. On pipe sizes over 4 in. where individual lengths may be weighed, the weight tolerance is applicable to the individual length.

Diameter – For pipe 2 in. and over in nominal diameter, the outside diameter shall not vary more than ± 1 percent from the standard specified.

Thickness – The minimum wall thickness at any point shall be not more than 12.5 percent under the nominal wall thickness specified.

Outside Dimensions – For round hot formed structural tubing 2 in. and over in nominal size, the outside diameter shall not vary more than ± 1 percent from the standard specified.

Mass (A618 only) – The mass of structural tubing shall not be less than the specified value by more than 3.5 percent.

Length – Structural tubing is commonly produced in random mill lengths, in multiple lengths, and in definite cut lengths. When cut lengths are specified for structural tubing, the length tolerances shall be in accordance with the following table:

	22 ft. and under		Over 22 ft. to 44 ft., incl.
	Over	Under	Over
Length tolerance for specified cut lengths, in.	1/2	1/4	3/4

Straightness – The permissible variation for straightness of structural tubing shall be 1/8 in. times the number of feet of total length divided by 5.

Standard Mill Practice

Steel pipe and tubing

DIMENSION AND WEIGHT TOLERANCES

Square and Rectangular Tubing

ASTM A500 and ASTM A618

Outside Dimensions – The specified dimensions, measured across the flats at positions at least 2 in. from either end of square or rectangular tubing and including an allowance for convexity or concavity, shall not exceed the plus and minus tolerance shown in the following table:

Largest Outside Dimension Across Flats, in.	Tolerance ^a Plus and Minus, in.
2½ and under	0.020
Over 2½ to 3½, incl.	0.025
Over 3½ to 5½, incl.	0.030
Over 5½	1 percent

^a The respective outside dimension tolerances include the allowances for convexity and concavity.

Lengths – Structural tubing is commonly produced in random mill lengths, in multiple lengths, and in definite cut lengths. When cut lengths are specified for structural tubing, the length tolerances shall be in accordance with the following table:

	22 ft. and under		Over 22 ft. to 44 ft., incl.	
	Over	Under	Over	Under
Length tolerance for specified cut lengths, in.	½	¼	¾	¼

Mass (A816 only) – The mass of structural tubing shall not be less than the specified value by more than 3.5 percent.

Straightness – The permissible variation for straightness of structural tubing shall be 1/8 in. times the number of feet of total length divided by 5.

Straightness of Sides – For square or rectangular structural tubing, adjacent sides may deviate from 90 degrees by a tolerance of plus or minus 2 degrees max.

Radius of Corners – For square or rectangular structural tubing, the radius of any outside corner of the section shall not exceed three times the specified wall thickness.

Twist – The tolerances for twist or variation with respect to axial alignment of the section, for square and rectangular structural tubing, shall be as shown in the following table:

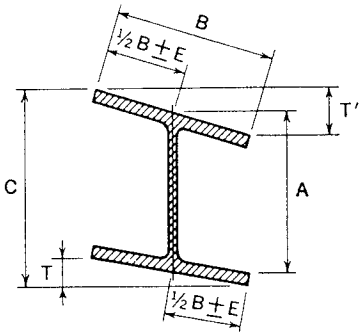
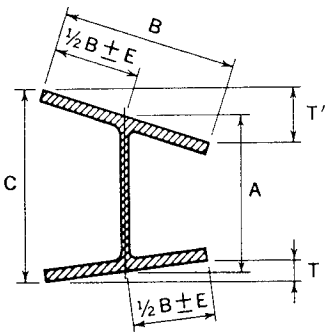
Specified Dimension of Longest Side, in.	Maximum Twist per 3 ft. of Length, in.
1½ and under	0.050
Over 1½ to 2½, incl.	0.062
Over 2½ to 4, incl.	0.075
Over 4 to 6, incl.	0.087
Over 6 to 8, incl.	0.100
Over 8	0.112

Twist is measured by holding down one end of a square or rectangular tube on a flat surface plate with the bottom side of the tube parallel to the surface plate and noting the height that either corner, at the opposite end of the bottom side of the tube, extends above the surface plate.

Wall Thickness (A500 only) – The tolerance for wall thickness exclusive of the weld area shall be plus and minus 10 percent of the nominal wall thickness specified. The wall thickness is to be measured at the center of the flat.

Standard Mill Practice

W shapes, HP shapes



PERMISSIBLE VARIATIONS IN CROSS SECTION

Section Nominal Size, in.	A, Depth, In.		B, Flange Width, In.		T + T Flanges, Out of Square, Max, In.	E ^a Web off Center Max, In.	C, Max, Depth at any Cross- Section over Theoretical Depth, In.
	Over Theoretical	Under Theoretical	Over Theoretical	Under Theoretical			
To 12, incl.	1/8	1/8	1/4	3/16	1/4	3/16	1/4
Over 12	1/8	1/8	1/4	3/16	5/16	3/16	1/4

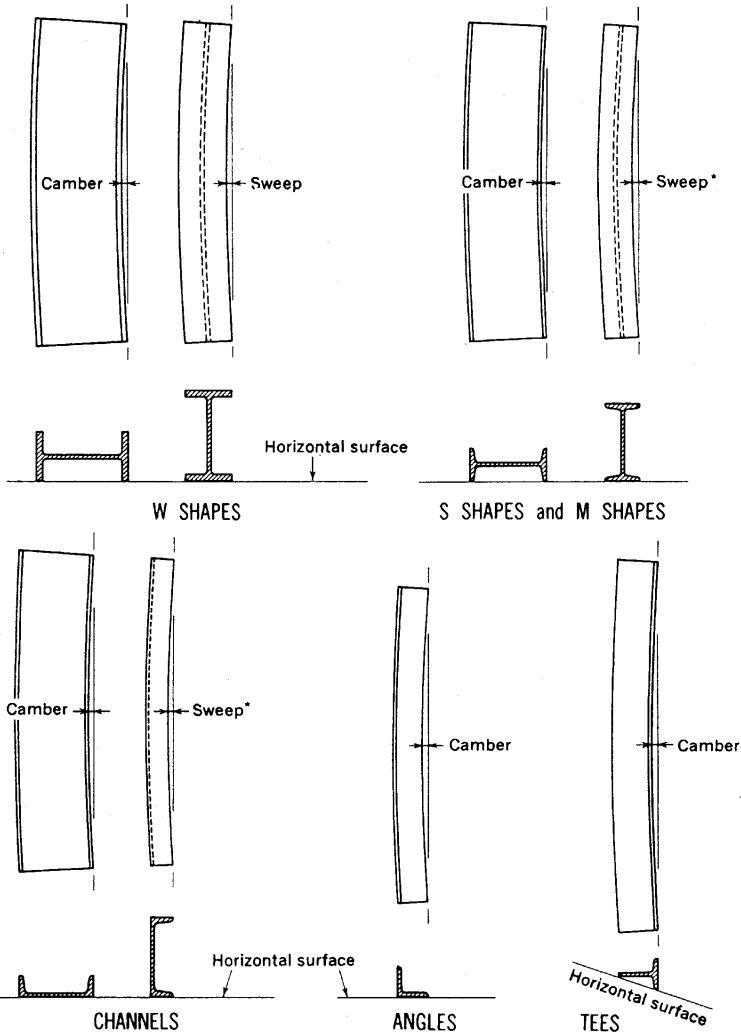
^aVariation of 5/16-in. max. for sections over 426 lb./ft.

PERMISSIBLE VARIATIONS IN LENGTH

W Shapes	30 ft. and Under		Over 30 ft.	
	Over	Under	Over	Under
Beams 24 in. and under in nominal depth	3/8	3/8	3/8 plus 1/16 for each additional 5 ft. or fraction thereof	3/8
Beams over 24 in. nominal depth all columns	1/2	1/2	1/2 plus 1/16 for each additional 5 ft. or fraction thereof	1/2

Standard Mill Practice

Positions for measuring camber
and sweep



* Due to the extreme variations in flexibility of these shapes, straightness for tolerances for sweep are subject to negotiations between manufacturer and purchaser for individual sections involved.

Useful Information

Surface of frustum of cone or pyramid = sum of circumference of both ends x $\frac{1}{2}$ slant height plus area of both ends.

Content of frustum of cone or pyramid = multiply area of two ends and get square root.
Add the 2 areas and x $\frac{1}{4}$ altitude.

Doubling the diameter of a pipe increases its capacity four times.

A gallon of water (U.S. standard) weighs $8\frac{1}{8}$ lbs. and contains 231 cubic inches.

A cubic foot of water contains $7\frac{1}{2}$ gallons, 1728 cubic inches, and weighs $62\frac{1}{2}$ lbs.

To find the pressure in pounds per square inch of a column of water,
multiply the height of the column in feet by 0.434.

Steam rising from water at its boiling point (212° F) has a pressure
equal to the atmosphere (14.7 lbs. to the square inch)

A standard horse power: the evaporation of 30 lbs. of water per hour
from a feed water temperature of 100° F into steam at 70 lbs. gauge pressure.

To find capacity of tanks any size, given dimensions of cylinder in inches, to find its capacity
in U.S. gallons: square the diameter, multiply by the length and by 0.0034.

To ascertain heating surface in tubular boilers, multiply $\frac{2}{3}$ the circumference
of the boiler by length of boiler in inches and add to it the area of all the tubes.

To find circumference of a circle, multiply diameter by 3.1416.

To find diameter of a circle, multiply circumference by 0.31831.

To find area of a circle, multiply square of diameter by 0.7854

Area of a rectangle = length multiplied by breadth.

Doubling the diameter of a circle increases its area four times.

To find area of triangle, multiply base by $\frac{1}{2}$ perpendicular height.

Area of ellipse = product both diameter x 0.7854.

Area of parallelogram = base x altitude.

To find side of an inscribed square, multiply diameter by 0.7071 or
multiply circumference by 0.2251 or divide circumference by 4.4428

Side of an inscribed cube = radius of sphere x 1.1547

To find side of an equal square, multiply diameter by 0.8862.

Square. A side multiplied by 1.4142 equals diameter of its circumscribing circle

A side multiplied by 4.443 equals circumference of its circumscribing circle.

A side multiplied by 1.128 equals diameter of an equal circle

A side multiplied by 3.547 equals circumference of an equal circle

To find cubic inches in a ball, multiply cube of diameter by 0.5236.

To find cubic contents of a cone, multiply area of base by $\frac{1}{4}$ the altitude.

Useful Information

TEMPERATURE CONVERSION

A Fahrenheit degree is smaller than a Celsius (Centigrade degree, one Fahrenheit degree being $\frac{5}{9}$ of a Celsius degree.

To convert Fahrenheit degrees into Celsius, subtract 32, multiply by 5, and divide by 9.

To convert Celsius into Fahrenheit, multiply 9, divide by 5, and add 32.

The freezing point of water is 32° F, 0° C. The boiling point is 212° F, 100° C.

WEIGHTS AND MEASURES

AVOIRDUPOIS WEIGHT

27 $\frac{11}{32}$	1 dram
16 drams	1 ounce
16 ounces	1 pound
25 pounds	1 quarter
4 quarters	1 cwt.
2,000 pounds	1 short ton
2,240 pounds	1 long ton

TROY WEIGHT

24 grains	1 pwt.
20 pwt.	1 ounce
12 ounces	1 pound
Used for weighing gold, silver and jewels	

CUBIC MEASURE

1.728 cubic inches	1 cubic foot
27 cubic feet	1 cubic yard
128 cubic feet	1 cord (wood)
40 cubic feet	1 ton (shipping)
2,150.42 cubic in.....	1 standard bu.
231 cubic in. ..	1 U.S. standard gallon
1 cubic ft.	about $\frac{4}{5}$ of a bushel

DRY MEASURE

2 pints	1 quart
8 quarts	1 peck
4 pecks	1 bushel

LIQUID MEASURE

4 gills	1 pint
2 pints	1 quart
4 quarts	1 gallon
31 $\frac{1}{2}$ gallons	1 barrel

IMPERIAL LIQUID MEASURE

1 U.S. gal.	0.833 Imperial gal.
1 U.S. gal.	3.785 liters
1 Imperial gal.	1.201 U.S. gal.
1 Imperial gal.	4.546 liters
1 liter	0.264 U.S. gal.
1 liter	0.220 Imperial gal.

LONG MEASURE

12 inches	1 foot
3 feet	1 yard
5 $\frac{1}{2}$ yards	1 rod
40 rods	1 furlong
8 furlongs	1 sta. mile
3 miles	1 league

MARINER'S MEASURE

6 feet	1 fathom
120 fathoms	1 cable length
7 $\frac{1}{3}$ cable lengths	1 mile
5,280 feet	1 statute mile
6,080.2 feet	1 nautical mile

SQUARE MILE

144 sq. inches	1 sq.ft.
9 sq. ft.	1 sq. yard
30 $\frac{1}{4}$ sq. yards	1 sq. rod
40 sq. rods	1 rood
4 roods	1 acre
640 acres	1 sq.mile

Useful Information

METRIC EQUIVALENTS

LINEAR MEASURE

1 centimeter	0.3937 inches
1 inch	2.54 centimeters
1 decimeter ...	0.937 in. / 0.328 foot
1 foot	3.048 decimeter
1 meter	39.37 in./ 1.0936 yds.
1 yard	0.9144 meter
1 dekameter	1.9884 rods
1 rod	0.5029 dekameter
1 kilometer	0.621 mile
1 mile	1.609 kilometers

SQUARE MEASURE

1 sq. centimeter.....	0.1550 sq. in.
1 sq. in.	6.452 sq. centimeters
1 sq. decimeter	0.1076 sq.ft.
1 sq. ft.	9.2903 sq.dec.
1 sq. meter	1.196 sq. yds.
1 sq.yd.	0.8361 sq. meter
1 acre	160 sq.rods

1 sq. rod	0.00625 acre
1 hectare	2.47 acres
1 acre	0.4047 hectare
1 sq. kilometer	0.386 sq. mile
1 sq. mile	2.59 sq. kilometer

MEASURE OF VOLUME

1 cubic centimeter.....	0.61 cu. in.
1 cubic in.	16.39 cubic cent.
1 cubic decimeter ...	0.0353 cubic ft.
1 cubic foot	28.317 cubic dec.
1 cubic meter	1.308 cubic yds.
1 cubic yard.....	0.7646 cubic meter
1 stere	0.2759 cord
1 cord	3.624 steres
1 liter 0.906 qt. dry...	1.0567 qts. liq.
1 qt. dry	1.101 liters
1 qt. liquid	0.9463 liter
1 dekaliter	2.6417 gal./1.135 pecks
1 gal.	0.3785 dekaliter
1 peck	0.881 dekaliter

1 hektoliter	2.8375 bushels
1 bushel	0.3524 hektoliter

WEIGHTS

1 gram	0.03527 ounce
1 ounce	28.35 grams
1 kilogram	2.2046 pounds
1 pound	0.4536 kilogram
1 metric ton	0.98421 English ton
1 English ton.....	1.016 metric ton

APPROXIMATE METRIC EQUIVALENTS

1 decimeter	4 inches
1 liter	1.06 qts liq./0.9 qts. dry
1 meter	1.1 yards
1 kilometer	$\frac{5}{8}$ of a mile
1 hektoliter	$2\frac{5}{8}$ bushels
1 hectare	$2\frac{1}{2}$ acres
1 kilogram	$2\frac{1}{2}$ lbs.
1 stere or cubic meter ...	$\frac{1}{4}$ of a cord
1 metric ton	2,204.6 lbs.

FRACTION AND DECIMAL CHART

$\frac{1}{64}$	0.15625	$\frac{17}{64}$	0.265625	$\frac{33}{64}$	0.515625	$\frac{49}{64}$	0.765625
$\frac{1}{32}$	0.03125	$\frac{9}{32}$	0.28125	$\frac{17}{32}$	0.53125	$\frac{25}{32}$	0.78125
$\frac{3}{64}$	0.046875	$\frac{19}{64}$	0.296875	$\frac{35}{64}$	0.546875	$\frac{51}{64}$	0.796875
$\frac{1}{16}$	0.0625	$\frac{5}{16}$	0.3125	$\frac{9}{16}$	0.5625	$\frac{13}{16}$	0.8125
$\frac{5}{64}$	0.078125	$\frac{21}{64}$	0.328125	$\frac{37}{64}$	0.578125	$\frac{53}{64}$	0.828125
$\frac{3}{32}$	0.09375	$\frac{11}{32}$	0.34375	$\frac{19}{32}$	0.59375	$\frac{27}{32}$	0.84375
$\frac{7}{64}$	0.109375	$\frac{23}{64}$	0.359375	$\frac{39}{64}$	0.609375	$\frac{55}{64}$	0.859375
$\frac{1}{8}$	0.125	$\frac{3}{8}$	0.375	$\frac{5}{8}$	0.625	$\frac{7}{8}$	0.875
$\frac{9}{64}$	0.140625	$\frac{25}{64}$	0.390625	$\frac{41}{64}$	0.640625	$\frac{57}{64}$	0.890625
$\frac{5}{32}$	0.15625	$\frac{13}{32}$	0.40625	$\frac{21}{32}$	0.65625	$\frac{29}{32}$	0.90625
$\frac{11}{64}$	0.171875	$\frac{27}{64}$	0.421875	$\frac{43}{64}$	0.671875	$\frac{59}{64}$	0.921875
$\frac{3}{16}$	0.1875	$\frac{7}{16}$	0.4375	$\frac{11}{16}$	0.6875	$\frac{15}{16}$	0.9375
$\frac{13}{64}$	0.203125	$\frac{29}{64}$	0.453125	$\frac{45}{64}$	0.703125	$\frac{61}{64}$	0.953125
$\frac{7}{32}$	0.21875	$\frac{15}{32}$	0.46875	$\frac{23}{32}$	0.71875	$\frac{31}{32}$	0.96875
$\frac{15}{64}$	0.234375	$\frac{31}{64}$	0.484375	$\frac{47}{64}$	0.734375	$\frac{63}{64}$	0.984375
$\frac{1}{4}$	0.250	$\frac{1}{2}$	0.500	$\frac{3}{4}$	0.750	1.....	1.000

