

STRUCTURAL
AND
SHIPBUILDING
SHAPES



THE PHOENIX IRON COMPANY

PHOENIXVILLE, PA., U. S. A.

ESTABLISHED 1827

•

DISTRICT OFFICES

ARCHITECTURE
TA685
.P291
1938

PHOENIXVILLE, N. Y.
PHOENIXVILLE, MASS.

NEW YORK, N. Y.
WASHINGTON, D. C.

•

PLANT

5550

PHOENIXVILLE, PA., U. S. A.

1938

SECTIONS ROLLED

BEAMS

Standard—3", 4", 5", 6", 7", 8", 9", 10", 12", 15", 18", 20"

Phoenix—8", 10", 12", 14", 15"

CHANNELS

Standard—3", 4", 5", 6", 7", 8", 9", 10", 12", 15"

Shipbuilding—6", 7", 8", 9", 10", 12", 13", 15"

ANGLES

Equal Legs—8" × 8", 6" × 6", 5" × 5", 4" × 4",
3½" × 3½", 3" × 3", 2½" × 2½", 2" × 2"

Unequal Legs—8" × 6", 8" × 4", 7" × 5", 7" × 4",
6" × 4", 6" × 3½", 5" × 4", 5" × 3½",
5" × 3", 4½" × 3", 4" × 3½", 4" × 3",
3½" × 3", 3½" × 2½", 3" × 2½", 3" × 2", 2½" × 2"

BULB ANGLES

10" × 3½", 9" × 3½", 8" × 3½", 7" × 3½",
7" × 3", 6" × 3", 5" × 2½"

TEES

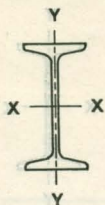
6" × 4½" and 6" × 5¼"

ZEEES

3", 4", 5", 6"

H'S

6" × 6", 8" × 6½"



PROPERTIES
OF
BEAMS

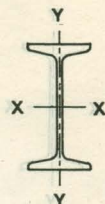


Nominal Size and Section Number	Weight per Foot	Area of Section	Depth of Section	Width of Flange	Web Thickness	AXIS X-X			AXIS Y-Y		
						I	S	r	I	S	r
In.	Lb.	In. ²	In.	In.	In.	In. ⁴	In. ³	In.	In. ⁴	In. ³	In.
20 × 6¾ 208	100.0	29.41	20.00	7.02	.87	1648.6	164.9	7.49	48.68	13.87	1.29
	95.0	27.94	20.00	6.95	.80	1599.5	160.0	7.57	46.89	13.49	1.30
	90.0	26.47	20.00	6.88	.73	1550.5	155.1	7.65	45.17	13.13	1.31
	85.0	25.00	20.00	6.80	.65	1501.5	150.2	7.75	43.50	12.79	1.32
	81.4	23.94	20.00	6.75	.60	1466.2	146.6	7.83	42.35	12.55	1.33
20 × 6¼ 206	75.0	21.90	20.00	6.391	.641	1263.5	126.3	7.60	30.1	9.4	1.17
	70.0	20.42	20.00	6.317	.567	1214.2	121.4	7.71	28.9	9.2	1.19
	65.4	19.08	20.00	6.250	.500	1169.5	116.9	7.83	27.9	8.9	1.21
18 × 6 207	75.0	21.93	18.00	6.332	.792	957.2	106.3	6.61	25.6	8.1	1.08
	70.0	20.46	18.00	6.251	.711	917.5	101.9	6.70	24.5	7.8	1.09
	65.0	18.98	18.00	6.169	.629	877.7	97.5	6.80	23.4	7.6	1.11
	60.0	17.50	18.00	6.087	.547	837.8	93.1	6.92	22.3	7.3	1.13
	54.7	15.94	18.00	6.000	.460	795.5	88.4	7.07	21.2	7.1	1.15
15 × 6½ 161	100.0	29.41	15.00	6.77	1.17	898.6	119.8	5.53	50.30	14.86	1.31
	95.0	27.94	15.00	6.67	1.07	871.1	116.1	5.58	47.74	14.32	1.31
	90.0	26.47	15.00	6.57	.97	843.5	112.5	5.65	45.30	13.79	1.31
	85.0	25.00	15.00	6.47	.87	815.9	108.8	5.71	42.96	13.28	1.31
	81.3	23.91	15.00	6.40	.80	795.5	106.1	5.77	41.31	12.91	1.31
15 × 6 162	75.0	21.85	15.00	6.278	.868	687.2	91.6	5.61	30.6	9.8	1.18
	70.0	20.38	15.00	6.180	.770	659.6	87.9	5.69	28.8	9.3	1.19
	65.0	18.91	15.00	6.082	.672	632.1	84.3	5.78	27.2	8.9	1.20
	60.8	17.68	15.00	6.000	.590	609.0	81.2	5.87	26.0	8.7	1.21
15 × 5½ 164	55.0	16.06	15.00	5.738	.648	508.7	67.8	5.63	17.0	5.9	1.03
	50.0	14.59	15.00	5.640	.550	481.1	64.2	5.74	16.0	5.7	1.05
	45.0	13.12	15.00	5.542	.452	453.6	60.5	5.88	15.0	5.4	1.07
	42.9	12.49	15.00	5.500	.410	441.8	58.9	5.95	14.6	5.3	1.08
15 × 5½ 307	36.0	10.59	15.00	5.56	.34	381.5	50.9	6.00	12.0	4.33	1.07
	33.0	9.71	15.00	5.50	.28	365.0	48.7	6.13	11.6	4.22	1.09
14 × 6¾ 300	34.0	10.00	13.88	6.835	.350	313.8	45.2	5.60	17.5	5.13	1.32
	30.0	8.82	13.88	6.750	.265	294.9	42.5	5.76	16.8	4.99	1.38

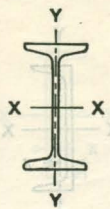
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1938

**PROPERTIES.
OF
BEAMS**



Nominal Size and Section Number	Weight per Foot	Area of Section	Depth of Section	Width of Flange	Web Thick- ness	AXIS X-X			AXIS Y-Y		
						I	S	r	I	S	r
In.	Lb.	In. ²	In.	In.	In.	In. ⁴	In. ³	In.	In. ⁴	In. ³	In.
12 × 5¼ 165	55.0	16.04	12.00	5.600	.810	319.3	53.2	4.46	17.3	6.2	1.04
	50.0	14.57	12.00	5.477	.687	301.6	50.3	4.55	16.0	5.8	1.05
	45.0	13.10	12.00	5.355	.565	284.1	47.3	4.66	14.8	5.5	1.06
	40.8	11.84	12.00	5.250	.460	268.9	44.8	4.77	13.8	5.3	1.08
12 × 5 166	35.0	10.20	12.00	5.078	.428	227.0	37.8	4.72	10.0	3.9	.99
	31.8	9.26	12.00	5.000	.350	215.8	36.0	4.83	9.5	3.8	1.01
12 × 6½ 299	28.0	8.24	11.88	6.569	.314	193.6	32.6	4.85	13.9	4.28	1.30
	25.0	7.35	11.88	6.495	.240	182.8	30.8	4.98	13.4	4.12	1.35
10 × 4¾ 221	40.0	11.69	10.00	5.091	.741	158.0	31.6	3.68	9.4	3.7	.90
	35.0	10.22	10.00	4.944	.594	145.8	29.2	3.78	8.5	3.4	.91
	30.0	8.75	10.00	4.797	.447	133.5	26.7	3.91	7.6	3.2	.93
	25.4	7.38	10.00	4.660	.310	122.1	24.4	4.07	6.9	3.0	.97
10 × 5¾ 289	23.0	6.77	9.90	5.79	.29	112.1	22.6	4.09	9.57	3.30	1.19
	21.0	6.18	9.90	5.74	.24	107.5	21.7	4.17	9.30	3.24	1.22
9 × 4¾ 209	35.0	10.29	9.00	4.76	.72	111.8	24.8	3.30	7.21	3.03	.84
	30.0	8.82	9.00	4.60	.56	101.9	22.6	3.40	6.37	2.77	.85
	25.0	7.35	9.00	4.43	.39	92.0	20.4	3.54	5.60	2.53	.87
	21.8	6.41	9.00	4.33	.29	85.6	19.0	3.65	5.16	2.38	.90
8 × 4 210	25.5	7.43	8.00	4.262	.532	68.1	17.0	3.03	4.7	2.2	.80
	23.0	6.71	8.00	4.171	.441	64.2	16.0	3.09	4.4	2.1	.81
	20.5	5.97	8.00	4.079	.349	60.2	15.1	3.18	4.0	2.0	.82
	18.4	5.34	8.00	4.000	.270	56.9	14.2	3.26	3.8	1.9	.84
8 × 5¼ 298	23.0	6.77	8.00	5.47	.46	65.4	16.4	3.10	7.07	2.59	1.02
	21.0	6.18	8.00	5.40	.38	62.3	15.6	3.18	6.80	2.52	1.05
	19.0	5.59	8.00	5.32	.31	59.2	14.8	3.26	6.45	2.42	1.08
	17.0	5.00	8.00	5.25	.24	56.0	14.0	3.35	6.16	2.35	1.11
7 × 3¾ 211	20.0	5.83	7.00	3.860	.450	41.9	12.0	2.68	3.1	1.6	.74
	17.5	5.09	7.00	3.755	.345	38.9	11.1	2.77	2.9	1.6	.76
	15.3	4.43	7.00	3.660	.250	36.2	10.4	2.86	2.7	1.5	.78



PROPERTIES OF BEAMS
AND H COLUMNS



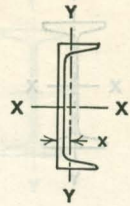
Nominal Size and Section Number	Weight per Foot	Area of Section	Depth of Section	Width of Flange	Web Thickness	AXIS X-X			AXIS Y-Y		
						I	S	r	I	S	r
In.	Lb.	In. ²	In.	In.	In.	In. ⁴	In. ³	In.	In. ⁴	In. ³	In.
6 × 3½ 212	17.25	5.02	6.00	3.565	.465	26.0	8.7	2.28	2.3	1.3	.68
	14.75	4.29	6.00	3.443	.343	23.8	7.9	2.36	2.1	1.2	.69
	12.5	3.61	6.00	3.330	.230	21.8	7.3	2.46	1.8	1.1	.72
5 × 3 214	14.75	4.29	5.00	3.284	.494	15.0	6.0	1.87	1.7	1.0	.63
	12.25	3.56	5.00	3.137	.347	13.5	5.4	1.95	1.4	.91	.63
	10.0	2.87	5.00	3.000	.210	12.1	4.8	2.05	1.2	.82	.65
4 × 2¾ 213	10.5	3.05	4.00	2.870	.400	7.1	3.5	1.52	1.0	.70	.57
	9.5	2.76	4.00	2.796	.326	6.7	3.3	1.56	.91	.65	.58
	8.5	2.46	4.00	2.723	.253	6.3	3.2	1.60	.83	.61	.58
	7.7	2.21	4.00	2.660	.190	6.0	3.0	1.64	.77	.58	.59
3 × 2½ 222	7.5	2.17	3.00	2.509	.349	2.9	1.9	1.15	.59	.47	.52
	6.5	1.88	3.00	2.411	.251	2.7	1.8	1.19	.51	.43	.52
	5.7	1.64	3.00	2.330	.170	2.5	1.7	1.23	.46	.40	.53

H COLUMNS

6 × 6 287	27.5	8.09	6.00	6.063	.438	49.3	16.4	2.47	16.0	5.3	1.41
	25.0	7.35	6.00	5.938	.313	47.0	15.7	2.53	14.9	5.0	1.43
6 × 6 286	22.5	6.62	6.00	6.063	.375	41.0	13.7	2.49	12.2	4.0	1.36
	20.0	5.88	6.00	5.938	.250	38.8	12.9	2.57	11.4	3.8	1.39
8 × 6½ 310	27.0	7.94	8.00	6.610	.355	88.51	22.13	3.34	17.43	5.27	1.48
	24.0	7.06	8.00	6.500	.245	83.81	20.95	3.45	16.52	5.08	1.53



PROPERTIES
OF
STANDARD CHANNELS

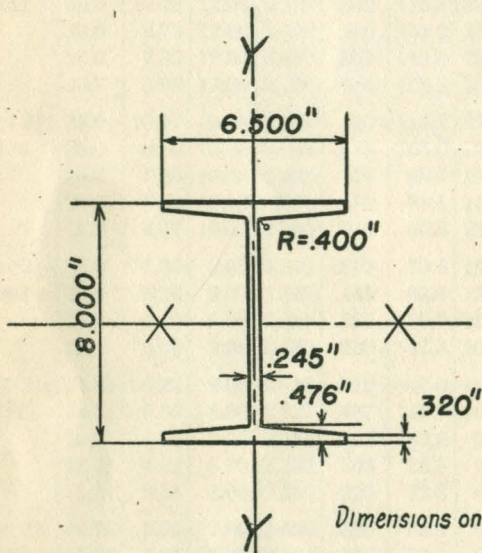


Nominal Size and Section Number	Weight per Foot	Area of Section	Depth of Section	Width of Flange	Web Thick- ness	AXIS X-X			AXIS Y-Y			
						I	S	r	I	S	r	x
						In. ⁴	In. ³	In.	In. ⁴	In. ³	In.	In.
15 × 3½	55.0	16.11	15.00	3.814	.814	429.0	57.2	5.16	12.1	4.1	.87	.82
140	50.0	14.64	15.00	3.716	.716	401.4	53.6	5.24	11.2	3.8	.87	.80
	45.0	13.17	15.00	3.618	.618	373.9	49.8	5.33	10.3	3.6	.88	.79
	40.0	11.70	15.00	3.520	.520	346.3	46.2	5.44	9.3	3.4	.89	.78
	35.0	10.23	15.00	3.422	.422	318.7	42.5	5.58	8.4	3.2	.91	.79
	33.9	9.90	15.00	3.400	.400	312.6	41.7	5.62	8.2	3.2	.91	.79
12 × 3	40.0	11.73	12.00	3.415	.755	196.5	32.8	4.09	6.6	2.5	.75	.72
141	35.0	10.26	12.00	3.292	.632	178.8	29.8	4.18	5.9	2.3	.76	.69
	30.0	8.79	12.00	3.170	.510	161.2	26.9	4.28	5.2	2.1	.77	.63
	25.0	7.32	12.00	3.047	.387	143.5	23.9	4.43	4.5	1.9	.79	.68
	20.7	6.03	12.00	2.940	.280	128.1	21.4	4.61	3.9	1.7	.81	.70
10 × 2½	35.0	10.27	10.00	3.180	.820	115.2	23.0	3.34	4.6	1.9	.67	.69
130	30.0	8.80	10.00	3.033	.673	103.0	20.6	3.42	4.0	1.7	.67	.65
	25.0	7.33	10.00	2.886	.526	90.7	18.1	3.52	3.4	1.5	.68	.62
	20.0	5.86	10.00	2.739	.379	78.5	15.7	3.66	2.8	1.3	.70	.61
	15.3	4.47	10.00	2.600	.240	66.9	13.4	3.87	2.3	1.2	.72	.64
9 × 2½	25.0	7.33	9.00	2.812	.612	70.5	15.7	3.10	3.0	1.4	.64	.61
233	20.0	5.86	9.00	2.648	.448	60.6	13.5	3.22	2.4	1.2	.65	.59
	15.0	4.39	9.00	2.485	.285	50.7	11.3	3.40	1.9	1.0	.67	.59
	13.4	3.89	9.00	2.430	.230	47.3	10.5	3.49	1.8	.97	.67	.61
8 × 2¼	21.25	6.23	8.00	2.619	.579	47.6	11.9	2.77	2.2	1.1	.60	.59
122	18.75	5.49	8.00	2.527	.487	43.7	10.9	2.82	2.0	1.0	.60	.57
	16.25	4.76	8.00	2.435	.395	39.8	9.9	2.89	1.8	.94	.61	.56
	13.75	4.02	8.00	2.343	.303	35.8	9.0	2.99	1.5	.86	.62	.56
	11.5	3.36	8.00	2.260	.220	32.3	8.1	3.10	1.3	.79	.63	.58
7 × 2¼	19.75	5.79	7.00	2.509	.629	33.1	9.4	2.39	1.8	.96	.56	.58
136	17.25	5.05	7.00	2.404	.524	30.1	8.6	2.44	1.6	.86	.56	.55
	14.75	4.32	7.00	2.299	.419	27.1	7.7	2.51	1.4	.79	.57	.53
	12.25	3.58	7.00	2.194	.314	24.1	6.9	2.59	1.2	.71	.58	.53
	9.8	2.85	7.00	2.090	.210	21.1	6.0	2.72	.98	.63	.59	.55

1938A

PROPERTIES
OF
BEAMS

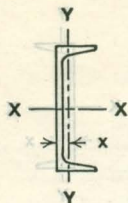
Nominal Size and Section Number	Weight per Foot	Area of Section	Depth of Section	Width of Flange	Web Thickness	AXIS X-X			AXIS Y-Y		
						I	S	r	I	S	r
In.	Lb.	In. ²	In.	In.	In.	In. ⁴	In. ³	In.	In. ⁴	In. ³	In.
8 × 6½	27	7.91	8.00	6.610	.355	88.51	22.13	3.34	17.43	5.27	1.48
310	24	7.06	8.00	6.500	.215	83.81	20.95	3.45	16.52	5.08	1.53



3.20
4.76
7.96
3.98

Dimensions on sketch are for 24 lb. Beam.

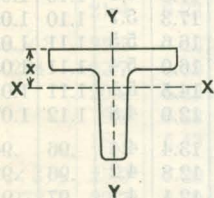
8" x 6.5"
27, 24 LBS.



PROPERTIES OF STANDARD CHANNELS



Nominal Size and Section Number	Weight per Foot	Area of Section	Depth of Section	Width of Flange	Web Thickness	AXIS X-X			AXIS Y-Y			
						I	S	r	I	S	r	x
In.	Lb.	In. ²	In.	In.	In.	In. ⁴	In. ³	In.	In. ⁴	In. ³	In.	In.
6 × 2	15.5	4.54	6.00	2.279	.559	19.5	6.5	2.07	1.3	.73	.53	.55
144	13.0	3.81	6.00	2.157	.437	17.3	5.8	2.13	1.1	.65	.53	.52
	10.5	3.07	6.00	2.034	.314	15.1	5.0	2.22	.87	.57	.53	.50
	8.2	2.39	6.00	1.920	.200	13.0	4.3	2.34	.70	.50	.54	.52
5 × 1¾	11.5	3.36	5.00	2.032	.472	10.4	4.1	1.76	.82	.54	.49	.51
120	9.0	2.63	5.00	1.885	.325	8.8	3.5	1.83	.64	.45	.49	.48
	6.7	1.95	5.00	1.750	.190	7.4	3.0	1.95	.48	.38	.50	.49
4 × 1⅝	7.25	2.12	4.00	1.720	.320	4.5	2.3	1.47	.44	.35	.46	.46
118	6.25	1.82	4.00	1.647	.247	4.1	2.1	1.50	.38	.32	.45	.46
	5.4	1.56	4.00	1.580	.180	3.8	1.9	1.56	.32	.29	.45	.46
3 × 1½	6.0	1.75	3.00	1.596	.356	2.1	1.4	1.08	.31	.27	.42	.46
116	5.0	1.46	3.00	1.498	.258	1.8	1.2	1.12	.25	.24	.41	.44
	4.1	1.19	3.00	1.410	.170	1.6	1.1	1.17	.20	.21	.41	.44



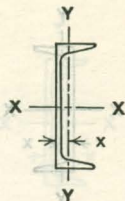
PROPERTIES OF TEE BARS



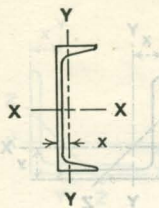
Section Number	Dimensions				Weight per Foot	Area of Section	AXIS X-X				AXIS Y-Y		
	Depth of Tee	Width of Flange	Thickness				I	S	r	x	I	S	r
			Flange	Stem									
In.	In.	In.	In.	Lb.	In. ²	In. ⁴	In. ³	In.	In.	In. ⁴	In. ³	In.	
203	5¼	6	1	1¼ to 1⅜	39.4	11.59	27.9	7.9	1.55	1.74	18.6	6.2	1.27
202	4½	6	¾	1⅝ to 1⅞	28.2	8.29	14.3	4.6	1.31	1.37	13.8	4.6	1.29



PROPERTIES OF SPECIAL CHANNELS



Nominal Size and Section Number	Weight per Foot	Area of Section	Depth of Section	Width of Flange	Web Thick- ness	AXIS X-X			AXIS Y-Y				
						I	S	r	I	S	r	x	
In.	Lb.	In. ²	In.	In.	In.	In. ⁴	In. ³	In.	In. ⁴	In. ³	In.	In.	
15 × 4 124	75.0	22.06	15.00	4.491	1.116	584.0	77.9	5.14	25.9	7.6	1.08	1.08	
	69.1	20.32	15.00	4.375	1.000	551.5	73.5	5.21	23.9	7.2	1.09	1.06	
	65.9	19.38	15.00	4.312	.937	533.9	71.2	5.25	22.9	7.0	1.09	1.04	
	62.8	18.47	15.00	4.251	.876	516.8	68.9	5.29	21.9	6.8	1.09	1.03	
	59.6	17.53	15.00	4.188	.813	499.1	66.6	5.34	20.9	6.6	1.09	1.02	
	56.4	16.59	15.00	4.126	.751	481.5	64.2	5.39	19.9	6.4	1.10	1.02	
	53.2	15.65	15.00	4.063	.688	463.8	61.8	5.44	19.0	6.2	1.10	1.01	
50.0	14.71	15.00	4.000	.625	446.2	59.5	5.51	18.0	6.0	1.11	1.01		
13 × 4 246	55.0	16.18	13.00	4.525	.900	334.4	51.4	4.55	18.1	5.1	1.06	1.00	
	50.0	14.66	13.00	4.412	.787	312.9	48.1	4.62	16.7	4.9	1.07	.98	
	45.0	13.18	13.00	4.298	.673	292.0	44.9	4.71	15.3	4.6	1.08	.97	
	40.0	11.71	13.00	4.185	.560	271.4	41.7	4.82	13.9	4.3	1.09	.97	
	37.0	10.82	13.00	4.117	.492	258.9	39.8	4.89	13.0	4.2	1.10	.98	
	35.0	10.24	13.00	4.072	.447	250.7	38.6	4.95	12.5	4.0	1.10	.99	
	31.8	9.30	13.00	4.000	.375	237.5	36.5	5.05	11.6	3.9	1.11	1.01	
12 × 4 308	50.0	14.64	12.00	4.135	.835	267.9	44.6	4.28	17.8	5.8	1.10	1.06	
	48.6	14.22	12.00	4.100	.800	262.8	43.8	4.30	17.3	5.7	1.10	1.05	
	46.6	13.62	12.00	4.050	.750	255.6	42.6	4.33	16.6	5.5	1.11	1.05	
	44.5	13.02	12.00	4.000	.700	248.4	41.4	4.37	16.0	5.4	1.11	1.05	
	40.0	11.70	12.00	3.890	.590	232.6	38.8	4.46	14.5	5.1	1.11	1.05	
	35.0	10.22	12.00	3.767	.467	214.9	35.8	4.58	12.9	4.8	1.12	1.07	
12 × 3½ 181	49.4	14.53	12.00	4.000	.875	253.4	42.2	4.18	13.4	4.4	.96	.94	
	46.9	13.79	12.00	3.939	.814	244.6	40.8	4.21	12.8	4.2	.96	.92	
	44.3	13.03	12.00	3.875	.750	235.4	39.2	4.25	12.1	4.1	.97	.91	
	41.8	12.29	12.00	3.814	.689	226.6	37.8	4.29	11.5	4.0	.97	.91	
	39.2	11.53	12.00	3.750	.625	217.4	36.2	4.34	10.9	3.8	.97	.90	
	36.7	10.79	12.00	3.689	.564	208.6	34.8	4.40	10.3	3.7	.98	.90	
	34.1	10.03	12.00	3.625	.500	199.4	33.2	4.46	9.7	3.6	.98	.90	
Y-Y	31.6	9.29	12.00	3.564	.439	190.6	31.8	4.53	9.1	3.4	.99	.91	
	29.0	8.53	12.00	3.500	.375	181.4	30.2	4.61	8.4	3.3	.99	.93	
	12 × 3½ 276	41.1	12.00	12.00	3.700	.700	217.8	36.3	4.26	11.3	4.0	.97	.89
		37.0	10.80	12.00	3.600	.600	203.4	33.9	4.34	10.3	3.8	.98	.89
32.9		9.60	12.00	3.500	.500	189.0	31.5	4.44	9.4	3.6	.99	.89	
30.9	9.00	12.00	3.450	.450	181.8	30.3	4.50	8.9	3.5	.99	.90		



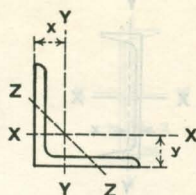
PROPERTIES
OF
SPECIAL CHANNELS



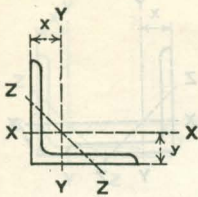
Nominal Size and Section Number	Weight per Foot	Area of Section	Depth of Section	Width of Flange	Web Thickness	AXIS X-X			AXIS Y-Y			
						I	S	r	I	S	r	x
In.	Lb.	In. ²	In.	In.	In.	In. ⁴	In. ³	In.	In. ⁴	In. ³	In.	In.
10 × 3½	35.1	10.23	10.00	3.700	.675	133.6	26.7	3.61	10.4	3.8	1.01	.95
275	31.7	9.23	10.00	3.600	.575	125.2	25.0	3.68	9.5	3.6	1.01	.95
	28.3	8.23	10.00	3.500	.475	116.9	23.4	3.77	8.6	3.4	1.02	.96
	26.6	7.73	10.00	3.450	.425	112.7	22.5	3.82	8.1	3.3	1.02	.97
	24.9	7.23	10.00	3.400	.375	108.6	21.7	3.88	7.6	3.2	1.03	.98
10 × 3½	25.3	7.38	10.00	3.550	.425	106.0	21.2	3.79	7.9	3.0	1.04	.94
283	23.6	6.88	10.00	3.500	.375	101.8	20.4	3.85	7.5	2.9	1.04	.96
	21.9	6.38	10.00	3.450	.325	97.6	19.5	3.91	7.0	2.8	1.05	.98
9 × 3½	31.6	9.21	9.00	3.700	.650	99.4	22.1	3.29	9.7	3.6	1.03	.98
274	28.5	8.31	9.00	3.600	.550	93.4	20.7	3.35	8.8	3.4	1.03	.98
	25.4	7.41	9.00	3.500	.450	87.3	19.4	3.43	8.0	3.2	1.04	1.00
	23.9	6.96	9.00	3.450	.400	84.3	18.7	3.48	7.5	3.1	1.04	1.01
8 × 3½	28.2	8.23	8.00	3.700	.625	71.8	18.0	2.95	9.0	3.4	1.05	1.02
273	25.5	7.43	8.00	3.600	.525	67.6	16.9	3.02	8.2	3.2	1.05	1.02
	22.8	6.63	8.00	3.500	.425	63.3	15.8	3.09	7.4	3.0	1.05	1.04
	21.4	6.23	8.00	3.450	.375	61.2	15.3	3.13	6.9	2.9	1.05	1.05
8 × 3	25.5	7.43	8.00	3.225	.600	62.6	15.6	2.90	5.8	2.5	.89	.86
284	22.7	6.63	8.00	3.125	.500	58.3	14.6	2.97	5.3	2.3	.89	.85
	20.0	5.83	8.00	3.025	.400	54.0	13.5	3.05	4.7	2.2	.90	.86
	19.3	5.63	8.00	3.000	.375	53.0	13.2	3.07	4.5	2.1	.90	.87
	18.7	5.43	8.00	2.975	.350	51.9	13.0	3.09	4.4	2.1	.90	.88
7 × 3½	25.0	7.30	7.00	3.700	.600	49.9	14.3	2.62	8.3	3.2	1.07	1.06
272	22.7	6.60	7.00	3.600	.500	47.1	13.5	2.67	7.5	3.0	1.07	1.07
	20.3	5.90	7.00	3.500	.400	44.2	12.6	2.74	6.7	2.8	1.07	1.09
	19.1	5.55	7.00	3.400	.350	42.8	12.2	2.78	6.3	2.7	1.07	1.11
7 × 3	20.0	5.82	7.00	3.100	.475	40.2	11.5	2.63	4.7	2.1	.90	.88
285	17.6	5.12	7.00	3.000	.375	37.3	10.7	2.70	4.2	2.0	.90	.90
	16.4	4.77	7.00	2.950	.325	35.9	10.3	2.74	3.9	1.9	.90	.91
6 × 3½	18.0	5.29	6.00	3.632	.472	27.8	9.3	2.30	6.0	2.3	1.06	1.04
271	15.3	4.47	6.00	3.500	.340	25.3	8.4	2.38	5.1	2.1	1.07	1.08



PROPERTIES OF ANGLES EQUAL LEGS



Size and Section Number	Thickness	Weight per Foot	Area of Section	AXIS X-X AND AXIS Y-Y				AXIS Z-Z
				I	S	r	x or y	r
In.	In.	Lb.	In. ²	In. ⁴	In. ³	In.	In.	In.
8 × 8 240	1¼	63.5	19.12	106.5	19.2	2.40	2.45	1.55
	1⅝	56.9	16.73	98.0	17.5	2.42	2.41	1.56
	1⅞	54.0	15.87	93.5	16.7	2.43	2.39	1.56
	1	51.0	15.00	89.0	15.8	2.44	2.37	1.56
	15/16	48.1	14.12	84.3	14.9	2.44	2.34	1.56
	7/8	45.0	13.23	79.6	14.0	2.45	2.32	1.57
	13/16	42.0	12.34	74.7	13.1	2.46	2.30	1.57
	3/4	38.9	11.44	69.7	12.2	2.47	2.28	1.57
	11/16	35.8	10.53	64.6	11.3	2.48	2.25	1.58
	5/8	32.7	9.61	59.4	10.3	2.49	2.23	1.58
	9/16	29.6	8.68	54.1	9.3	2.50	2.21	1.58
1/2	26.4	7.75	48.6	8.4	2.50	2.19	1.59	
6 × 6 127	1¼	46.9	13.79	41.9	10.3	1.77	1.95	1.16
	1⅝	42.2	12.41	38.8	9.5	1.78	1.91	1.16
	1⅞	39.5	11.71	37.1	9.0	1.79	1.89	1.16
	1	37.4	11.00	35.5	8.6	1.80	1.86	1.17
	15/16	35.3	10.37	33.7	8.1	1.80	1.84	1.17
	7/8	33.1	9.73	31.9	7.6	1.81	1.82	1.17
	13/16	31.0	9.09	30.1	7.2	1.82	1.80	1.17
	3/4	28.7	8.44	28.2	6.7	1.83	1.78	1.17
	11/16	26.5	7.78	26.2	6.2	1.83	1.75	1.17
	5/8	24.2	7.11	24.2	5.7	1.84	1.73	1.18
	9/16	21.9	6.43	22.1	5.1	1.85	1.71	1.18
1/2	19.6	5.75	19.9	4.6	1.86	1.68	1.18	
7/16	17.2	5.06	17.7	4.1	1.87	1.66	1.19	
3/8	14.9	4.36	15.4	3.5	1.88	1.64	1.19	
5/16	12.5	3.68	13.0	3.0	1.89	1.62	1.20	



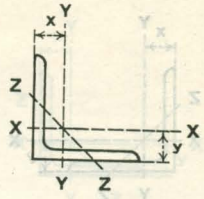
PROPERTIES OF ANGLES EQUAL LEGS



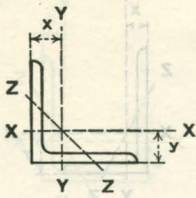
Size and Section Number	Thickness	Weight per Foot	Area of Section	AXIS X-X AND AXIS Y-Y				AXIS Z-Z
				I	S	r	x or y	r
In.	In.	Lb.	In. ²	In. ⁴	In. ³	In.	In.	In.
5 × 5 126	1	30.6	9.00	19.6	5.8	1.48	1.61	.97
	15/16	28.9	8.50	18.7	5.5	1.48	1.59	.97
	7/8	27.2	7.98	17.8	5.2	1.49	1.57	.97
	13/16	25.4	7.46	16.8	4.9	1.50	1.55	.97
	3/4	23.6	6.94	15.7	4.5	1.51	1.52	.97
	11/16	21.8	6.40	14.7	4.2	1.51	1.50	.98
	5/8	20.0	5.86	13.6	3.9	1.52	1.48	.98
	9/16	18.1	5.31	12.4	3.5	1.53	1.46	.98
	1/2	16.2	4.75	11.3	3.2	1.54	1.43	.98
	7/16	14.3	4.18	10.0	2.8	1.55	1.41	.98
4 × 4 14	3/8	12.3	3.61	8.7	2.4	1.56	1.39	.99
	5/16	10.1	2.97	7.4	2.0	1.57	1.37	.99
	1	25.4	7.47	9.4	3.6	1.12	1.36	.76
	15/16	23.9	7.03	9.0	3.4	1.13	1.34	.76
	7/8	22.3	6.56	8.6	3.2	1.15	1.31	.76
	13/16	19.9	5.85	8.1	3.0	1.18	1.29	.77
	3/4	18.5	5.44	7.7	2.8	1.19	1.27	.78
	11/16	17.1	5.03	7.2	2.6	1.19	1.25	.78
	5/8	15.7	4.61	6.7	2.4	1.20	1.23	.78
	9/16	14.3	4.18	6.1	2.2	1.21	1.21	.78
3 × 3 12	1/2	12.8	3.75	5.6	2.0	1.22	1.18	.78
	7/16	11.3	3.31	5.0	1.8	1.23	1.16	.78
	3/8	9.8	2.86	4.4	1.5	1.23	1.14	.79
	5/16	8.2	2.40	3.7	1.3	1.24	1.12	.79
	1/4	6.6	1.94	3.0	1.1	1.25	1.09	.80



PROPERTIES OF ANGLES EQUAL LEGS



Size and Section Number	Thickness	Weight per Foot	Area of Section	AXIS X-X AND AXIS Y-Y				AXIS Z-Z
				I	S	r	x or y	r
In.	In.	Lb.	In. ²	In. ⁴	In. ³	In.	In.	In.
3½ × 3½ 15	7/8	18.3	5.38	5.5	2.4	1.01	1.19	.66
	13/16	17.1	5.03	5.3	2.3	1.02	1.17	.67
	¾	16.0	4.69	5.0	2.1	1.03	1.15	.68
	11/16	14.8	4.34	4.7	2.0	1.04	1.12	.68
	5/8	13.6	3.98	4.3	1.8	1.04	1.10	.68
	9/16	12.4	3.62	4.0	1.7	1.05	1.08	.68
	1/2	11.1	3.25	3.6	1.5	1.06	1.06	.68
	7/16	9.8	2.87	3.3	1.3	1.07	1.04	.68
	3/8	8.5	2.48	2.9	1.2	1.07	1.01	.69
	5/16	7.2	2.09	2.5	.98	1.08	.99	.69
3 × 3 16	1/4	5.8	1.69	2.0	.79	1.09	.97	.69
	3/16	4.4	1.29	1.6	.60	1.10	.94	.69
	7/8	16.5	4.85	3.3	1.7	.86	1.06	.57
	13/16	15.5	4.56	3.2	1.6	.86	1.04	.57
	¾	14.4	4.24	3.0	1.5	.87	1.02	.57
	11/16	13.0	3.82	2.8	1.4	.87	1.00	.57
	5/8	11.5	3.36	2.6	1.3	.88	.98	.58
	9/16	10.4	3.06	2.4	1.2	.89	.95	.58
	1/2	9.4	2.75	2.2	1.1	.90	.93	.58
	7/16	8.3	2.43	2.0	.95	.91	.91	.58
3 × 3 16	3/8	7.2	2.11	1.8	.83	.91	.89	.58
	5/16	6.1	1.78	1.5	.71	.92	.87	.59
	1/4	4.9	1.44	1.2	.58	.93	.84	.59
	3/16	3.7	1.09	.96	.44	.94	.82	.60



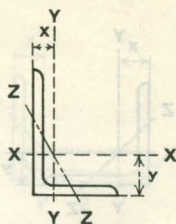
PROPERTIES OF ANGLES
EQUAL LEGS



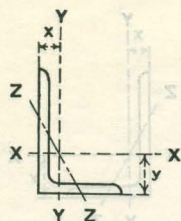
Size and Section Number	Thickness	Weight per Foot	Area of Section	AXIS X-X AND AXIS Y-Y				AXIS Z-Z
				I	S	r	x or y	r
In.	In.	Lb.	In. ²	In. ⁴	In. ³	In.	In.	In.
2½ × 2½ 17	5/8	9.6	2.82	1.4	.87	.72	.85	.47
	9/16	8.6	2.53	1.3	.80	.73	.83	.47
	1/2	7.7	2.25	1.2	.72	.74	.81	.49
	7/16	6.8	2.00	1.1	.65	.75	.78	.49
	3/8	5.9	1.73	.98	.57	.75	.76	.49
	5/16	5.0	1.47	.85	.48	.76	.74	.49
	1/4	4.1	1.19	.70	.39	.77	.72	.49
3/16	3.07	.90	.55	.30	.78	.69	.49	
2 × 2 18	7/16	5.3	1.56	.54	.40	.59	.66	.39
	3/8	4.7	1.36	.48	.35	.59	.64	.39
	5/16	3.92	1.15	.42	.30	.60	.61	.39
	1/4	3.19	.94	.35	.25	.61	.59	.39
	3/16	2.44	.71	.27	.19	.62	.57	.39



PROPERTIES OF ANGLES UNEQUAL LEGS



Size and Section Number	Thick-ness	Weight per Foot	Area of Section	AXIS X-X				AXIS Y-Y				AXIS Z-Z
				I	S	r	y	I	S	r	x	r
In.	In.	Lb.	In. ²	In. ⁴	In. ³	In.	In.	In. ⁴	In. ³	In.	In.	In.
8 × 6 197	1 1/8	49.3	14.48	88.9	16.8	2.48	2.70	42.5	9.9	1.71	1.70	1.28
	1 1/16	46.8	13.75	84.9	15.9	2.48	2.68	40.7	9.4	1.72	1.68	1.28
	1	44.2	13.00	80.8	15.1	2.49	2.65	38.8	8.9	1.73	1.65	1.28
	15/16	41.7	12.25	76.6	14.3	2.50	2.63	36.9	8.4	1.73	1.63	1.28
	7/8	39.1	11.48	72.3	13.4	2.51	2.61	34.9	7.9	1.74	1.61	1.28
	13/16	36.5	10.72	67.9	12.6	2.52	2.59	32.8	7.4	1.75	1.59	1.28
	3/4	33.8	9.94	63.4	11.7	2.53	2.56	30.7	6.9	1.76	1.56	1.29
	11/16	31.2	9.15	58.8	10.8	2.54	2.54	28.6	6.4	1.77	1.54	1.29
	5/8	28.5	8.36	54.1	9.9	2.54	2.52	26.3	5.9	1.77	1.52	1.29
	9/16	25.7	7.56	49.3	9.0	2.55	2.50	24.0	5.3	1.78	1.50	1.30
	1/2	23.0	6.75	44.3	8.0	2.56	2.47	21.7	4.8	1.79	1.47	1.30
	7/16	20.2	5.93	39.2	7.1	2.57	2.45	19.3	4.2	1.80	1.45	1.31
8 × 4 312	1	37.4	11.00	69.6	14.1	2.52	3.05	11.6	3.9	1.03	1.05	.85
	15/16	35.3	10.37	66.1	13.3	2.52	3.02	11.1	3.7	1.03	1.02	.85
	7/8	33.1	9.73	62.5	12.5	2.53	3.00	10.5	3.5	1.04	1.00	.85
	13/16	31.0	9.09	58.7	11.7	2.54	2.98	10.0	3.3	1.05	.98	.85
	3/4	28.7	8.44	54.9	10.9	2.55	2.95	9.4	3.1	1.05	.95	.85
	11/16	26.5	7.78	51.0	10.1	2.56	2.93	8.7	2.9	1.06	.93	.85
	5/8	24.2	7.11	46.9	9.2	2.57	2.91	8.1	2.6	1.07	.91	.86
	9/16	21.9	6.43	42.8	8.4	2.58	2.88	7.4	2.4	1.07	.88	.86
	1/2	19.6	5.75	38.5	7.5	2.59	2.86	6.7	2.2	1.08	.86	.86
	7/16	17.2	5.06	34.1	6.6	2.60	2.83	6.0	1.9	1.09	.83	.87



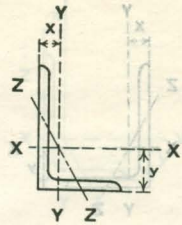
PROPERTIES OF ANGLES UNEQUAL LEGS



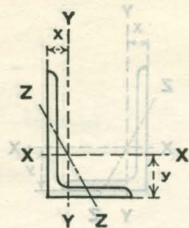
Size and Section Number	Thick-ness	Weight per Foot	Area of Section	AXIS X-X				AXIS Y-Y				AXIS Z-Z
				I	S	r	y	I	S	r	x	r
				In. ⁴	In. ³	In.	In.	In. ⁴	In. ³	In.	In.	In.
7 × 5 241	1 3/16	32.6	9.59	43.8	9.4	2.19	2.34	18.6	5.1	1.43	1.34	1.11
	3/4	30.0	8.82	40.9	8.7	2.20	2.32	17.4	4.7	1.44	1.32	1.11
	1 1/16	27.4	8.06	38.0	8.1	2.21	2.30	16.2	4.4	1.45	1.29	1.12
	5/8	24.8	7.29	35.0	7.4	2.22	2.28	15.0	4.0	1.45	1.27	1.12
	9/16	22.3	6.56	31.8	6.7	2.23	2.26	13.7	3.7	1.46	1.25	1.12
	1/2	19.8	5.82	28.6	6.0	2.24	2.23	12.3	3.3	1.47	1.23	1.13
	7/16	17.3	5.09	25.4	5.3	2.25	2.20	11.0	2.9	1.48	1.20	1.13
	3/8	14.7	4.32	22.2	4.6	2.26	2.18	9.6	2.5	1.49	1.18	1.13
7 × 4 311	1	34.0	10.00	47.7	10.9	2.18	2.60	11.2	3.9	1.06	1.10	.85
	15/16	32.1	9.43	45.4	10.3	2.19	2.58	10.7	3.7	1.07	1.08	.86
	7/8	30.2	8.86	42.9	9.7	2.20	2.55	10.2	3.5	1.07	1.05	.86
	13/16	28.2	8.28	40.4	9.0	2.21	2.53	9.6	3.2	1.08	1.03	.86
	3/4	26.2	7.69	37.8	8.4	2.22	2.51	9.1	3.0	1.09	1.01	.86
	11/16	24.2	7.09	35.1	7.8	2.23	2.49	8.5	2.8	1.09	.99	.86
	5/8	22.1	6.48	32.4	7.1	2.24	2.46	7.8	2.6	1.10	.96	.86
	9/16	20.0	5.87	29.6	6.5	2.24	2.44	7.2	2.4	1.11	.94	.87
	1/2	17.9	5.25	26.7	5.8	2.25	2.42	6.5	2.1	1.11	.92	.87
6 × 4 91	1	30.6	9.00	30.8	8.0	1.85	2.17	10.8	3.8	1.09	1.17	.86
	15/16	28.9	8.50	29.3	7.6	1.86	2.14	10.3	3.6	1.10	1.14	.86
	7/8	27.2	7.98	27.7	7.2	1.86	2.12	9.8	3.4	1.11	1.12	.86
	13/16	25.4	7.47	26.2	6.7	1.87	2.10	9.2	3.2	1.11	1.10	.86
	3/4	23.6	6.94	24.5	6.3	1.88	2.08	8.7	3.0	1.12	1.08	.86
	11/16	21.8	6.40	22.8	5.8	1.89	2.06	8.1	2.8	1.13	1.06	.86
	5/8	20.0	5.86	21.1	5.3	1.90	2.03	7.5	2.5	1.13	1.03	.86
	9/16	18.1	5.31	19.3	4.8	1.90	2.01	6.9	2.3	1.14	1.01	.87
	1/2	16.2	4.75	17.4	4.3	1.91	1.99	6.3	2.1	1.15	.99	.87
	7/16	14.3	4.18	15.5	3.8	1.92	1.96	5.6	1.9	1.16	.96	.87
	3/8	12.3	3.61	13.5	3.3	1.93	1.94	4.9	1.6	1.17	.94	.88
	5/16	10.3	3.03	11.4	2.8	1.94	1.92	4.2	1.3	1.18	.92	.88



PROPERTIES OF ANGLES UNEQUAL LEGS



Size and Section Number	Thick-ness	Weight per Foot	Area of Section	AXIS X-X				AXIS Y-Y				AXIS Z-Z
				I	S	r	y	I	S	r	x	r
In.	In.	Lb.	In. ²	In. ⁴	In. ³	In.	In.	In. ⁴	In. ³	In.	In.	In.
6 × 3½ 92	1	28.9	8.50	29.2	7.8	1.85	2.26	7.2	2.9	.92	1.01	.74
	15/16	27.3	8.03	27.8	7.4	1.86	2.24	6.9	2.7	.93	.99	.74
	7/8	25.7	7.56	26.4	7.0	1.87	2.22	6.6	2.6	.93	.97	.75
	13/16	24.0	7.06	24.9	6.6	1.88	2.20	6.2	2.4	.94	.95	.75
	3/4	22.4	6.56	23.3	6.1	1.89	2.18	5.8	2.3	.94	.93	.75
	11/16	20.6	6.06	21.7	5.6	1.89	2.15	5.5	2.1	.95	.90	.75
	5/8	18.9	5.55	20.1	5.2	1.90	2.13	5.1	1.9	.96	.88	.75
	9/16	17.1	5.03	18.4	4.7	1.91	2.11	4.7	1.8	.96	.86	.75
	1/2	15.3	4.50	16.6	4.2	1.92	2.08	4.3	1.6	.97	.83	.76
	7/16	13.5	3.97	14.8	3.7	1.93	2.06	3.8	1.4	.98	.81	.76
5 × 4 41	3/8	11.7	3.42	12.9	3.3	1.94	2.04	3.3	1.2	.99	.79	.77
	5/16	9.8	2.88	10.9	2.7	1.95	2.01	2.9	1.0	1.00	.76	.77
	7/8	24.2	7.12	16.4	5.0	1.52	1.71	9.2	3.3	1.14	1.21	.84
	13/16	22.7	6.68	15.5	4.7	1.53	1.68	8.7	3.1	1.15	1.18	.84
	3/4	21.1	6.21	14.6	4.4	1.54	1.66	8.2	2.9	1.15	1.16	.84
	11/16	19.5	5.74	13.6	4.1	1.54	1.64	7.7	2.7	1.16	1.14	.84
	5/8	17.8	5.24	12.6	3.7	1.55	1.62	7.1	2.5	1.17	1.12	.84
	9/16	16.2	4.76	11.6	3.4	1.56	1.60	6.6	2.3	1.18	1.10	.85
	1/2	14.5	4.26	10.5	3.1	1.57	1.57	6.0	2.0	1.18	1.07	.85
	7/16	12.8	3.76	9.3	2.7	1.58	1.55	5.3	1.8	1.19	1.05	.85
5 × 3½ 93	3/8	11.0	3.24	8.1	2.3	1.59	1.53	4.7	1.6	1.20	1.03	.86
	5/16	9.3	2.74	6.9	2.0	1.60	1.51	4.0	1.3	1.21	1.01	.86
	7/8	22.7	6.68	15.7	4.9	1.53	1.79	6.2	2.5	.96	1.04	.75
	13/16	21.3	6.26	14.8	4.6	1.54	1.77	5.9	2.4	.97	1.02	.75
	3/4	19.8	5.81	13.9	4.3	1.55	1.75	5.6	2.2	.98	1.00	.75
	11/16	18.3	5.37	13.0	4.0	1.56	1.72	5.2	2.1	.98	.97	.75
	5/8	16.8	4.92	12.0	3.7	1.56	1.70	4.8	1.9	.99	.95	.75
	9/16	15.2	4.47	11.0	3.3	1.57	1.68	4.5	1.7	1.00	.93	.75
	1/2	13.6	4.00	10.0	3.0	1.58	1.66	4.1	1.6	1.01	.91	.75
	7/16	12.0	3.53	8.9	2.6	1.59	1.63	3.6	1.4	1.01	.88	.76
5 × 3 88	3/8	10.4	3.05	7.8	2.3	1.60	1.61	3.2	1.2	1.02	.86	.76
	5/16	8.7	2.56	6.6	1.9	1.61	1.59	2.7	1.0	1.03	.84	.77
	1/4	7.0	2.06	5.4	1.6	1.62	1.57	2.2	.84	1.03	.82	.76



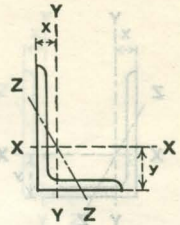
PROPERTIES OF ANGLES
UNEQUAL LEGS



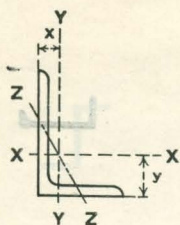
Size and Section Number	Thick-ness	Weight per Foot	Area of Section	AXIS X-X				AXIS Y-Y				AXIS Z-Z
				I	S	r	y	I	S	r	x	r
				In. ⁴	In. ³	In.	In.	In. ⁴	In. ³	In.	In.	In.
5 × 3 42	13/16	19.9	5.85	14.0	4.5	1.55	1.86	3.7	1.7	.80	.86	.64
	3/4	18.5	5.44	13.2	4.2	1.55	1.84	3.5	1.6	.80	.84	.64
	11/16	17.1	5.03	12.3	3.9	1.56	1.82	3.3	1.5	.81	.82	.64
	5/8	15.7	4.61	11.4	3.5	1.57	1.80	3.1	1.4	.81	.80	.64
	9/16	14.3	4.18	10.4	3.2	1.58	1.77	2.8	1.3	.82	.77	.65
	1/2	12.8	3.75	9.5	2.9	1.59	1.75	2.6	1.1	.83	.75	.65
	7/16	11.3	3.31	8.4	2.6	1.60	1.73	2.3	1.0	.84	.73	.65
	3/8	9.8	2.86	7.4	2.2	1.61	1.70	2.0	.89	.84	.70	.65
	5/16	8.2	2.40	6.3	1.9	1.61	1.68	1.8	.75	.85	.68	.66
	1/4	6.6	1.94	5.1	1.5	1.62	1.66	1.4	.61	.86	.66	.66
4 1/2 × 3 43	3/4	17.3	5.09	9.7	3.4	1.39	1.63	3.4	1.6	.82	.88	.64
	11/16	16.0	4.71	9.1	3.1	1.39	1.60	3.2	1.5	.83	.85	.64
	5/8	14.7	4.32	8.4	2.9	1.40	1.58	3.0	1.4	.83	.83	.64
	9/16	13.3	3.91	7.8	2.6	1.41	1.56	2.8	1.3	.85	.81	.64
	1/2	11.9	3.50	7.0	2.4	1.42	1.54	2.5	1.1	.85	.79	.65
	7/16	10.6	3.12	6.3	2.1	1.43	1.51	2.3	1.0	.85	.76	.65
	3/8	9.1	2.68	5.5	1.8	1.44	1.49	2.0	.88	.86	.74	.66
5/16	7.7	2.26	4.7	1.5	1.44	1.47	1.7	.75	.87	.72	.66	
4 × 3 1/2 94	13/16	18.5	5.44	7.8	2.9	1.19	1.36	5.5	2.3	1.01	1.11	.72
	3/4	17.3	5.06	7.3	2.8	1.20	1.34	5.2	2.2	1.01	1.09	.72
	11/16	16.0	4.68	6.9	2.6	1.21	1.32	4.9	2.0	1.02	1.07	.72
	5/8	14.7	4.30	6.4	2.4	1.22	1.29	4.5	1.8	1.03	1.04	.72
	9/16	13.3	3.90	5.9	2.2	1.23	1.27	4.2	1.7	1.03	1.02	.72
	1/2	11.9	3.50	5.3	1.9	1.23	1.25	3.8	1.5	1.04	1.00	.72
	7/16	10.6	3.09	4.8	1.7	1.24	1.23	3.4	1.4	1.05	.98	.72
	3/8	9.1	2.67	4.2	1.5	1.25	1.21	3.0	1.2	1.06	.96	.73
	5/16	7.7	2.25	3.6	1.3	1.26	1.18	2.6	1.0	1.07	.93	.73
	1/4	6.2	1.82	2.9	1.0	1.27	1.16	2.1	.82	1.08	.91	.73



PROPERTIES OF ANGLES
UNEQUAL LEGS



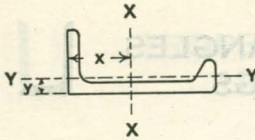
Size and Section Number	Thick-ness	Weight per Foot	Area of Section	AXIS X-X				AXIS Y-Y				AXIS Z-Z
				I	S	r	y	I	S	r	x	r
In.	In.	Lb.	In. ²	In. ⁴	In. ³	In.	In.	In. ⁴	In. ³	In.	In.	In.
4 × 3 44	7/8	19.1	5.62	7.7	3.0	1.21	1.46	3.7	1.8	.83	.96	.64
	13/16	17.1	5.03	7.3	2.9	1.21	1.44	3.5	1.7	.83	.94	.64
	3/4	16.0	4.69	6.9	2.7	1.22	1.42	3.3	1.6	.84	.92	.64
	11/16	14.8	4.34	6.5	2.5	1.22	1.39	3.1	1.5	.84	.89	.64
	5/8	13.6	3.98	6.0	2.3	1.23	1.37	2.9	1.4	.85	.87	.64
	9/16	12.4	3.62	5.6	2.1	1.24	1.35	2.7	1.2	.86	.85	.64
	1/2	11.1	3.25	5.1	1.9	1.25	1.33	2.4	1.1	.86	.83	.64
	7/16	9.8	2.87	4.5	1.7	1.25	1.30	2.2	1.0	.87	.80	.64
	3/8	8.5	2.48	4.0	1.5	1.26	1.28	1.9	.87	.88	.78	.64
	5/16	7.2	2.09	3.4	1.2	1.27	1.26	1.7	.73	.89	.76	.65
	1/4	5.8	1.69	2.8	1.0	1.28	1.24	1.4	.60	.90	.74	.65
	3/16	4.5	1.32	2.1	.76	1.28	1.21	1.1	.45	.90	.71	.65
3 1/2 × 3 95	13/16	15.8	4.65	5.0	2.2	1.04	1.23	3.3	1.7	.85	.98	.62
	3/4	14.7	4.31	4.7	2.1	1.04	1.21	3.2	1.5	.85	.96	.62
	11/16	13.6	4.00	4.4	1.9	1.05	1.19	3.0	1.4	.86	.94	.62
	5/8	12.5	3.67	4.1	1.8	1.06	1.17	2.8	1.3	.87	.92	.62
	9/16	11.4	3.34	3.8	1.6	1.07	1.15	2.6	1.2	.87	.90	.62
	1/2	10.2	3.00	3.5	1.5	1.07	1.13	2.3	1.1	.88	.88	.62
	7/16	9.1	2.65	3.1	1.3	1.08	1.10	2.1	.98	.89	.85	.62
	3/8	7.9	2.30	2.7	1.1	1.09	1.08	1.9	.85	.90	.83	.62
	5/16	6.6	1.93	2.3	.95	1.10	1.06	1.6	.72	.90	.81	.63
	1/4	5.4	1.56	1.9	.78	1.11	1.04	1.3	.59	.91	.79	.63
3/16	4.2	1.24	1.5	.60	1.12	1.02	.96	.43	.92	.77	.63	
3 1/2 × 2 1/2 90	11/16	12.5	3.68	4.1	1.9	1.06	1.27	1.7	.99	.69	.77	.53
	5/8	11.5	3.38	3.8	1.7	1.07	1.25	1.6	.92	.69	.75	.53
	9/16	10.4	3.06	3.6	1.6	1.08	1.23	1.5	.84	.70	.73	.53
	1/2	9.4	2.75	3.2	1.4	1.09	1.20	1.4	.76	.70	.70	.53
	7/16	8.3	2.43	2.9	1.3	1.09	1.18	1.2	.68	.71	.68	.54
	3/8	7.2	2.11	2.6	1.1	1.10	1.16	1.1	.59	.72	.66	.54
	5/16	6.1	1.78	2.2	.93	1.11	1.14	.94	.50	.73	.64	.54
	1/4	4.9	1.44	1.8	.75	1.12	1.11	.78	.41	.74	.61	.54
	3/16	3.71	1.09	1.4	.55	1.13	1.09	.61	.31	.75	.59	.54



PROPERTIES OF ANGLES UNEQUAL LEGS



Size and Section Number	Thick-ness	Weight per Foot	Area of Section	AXIS X-X				AXIS Y-Y				AXIS Z-Z
				I	S	r	y	I	S	r	x	r
In.	In.	Lb.	In. ²	In. ⁴	In. ³	In.	In.	In. ⁴	In. ³	In.	In.	In.
3 × 2 1/2 86	5/8	11.0	3.23	2.5	1.3	.90	1.05	1.6	.91	.71	.80	.52
	9/16	9.5	2.79	2.3	1.2	.91	1.02	1.4	.82	.72	.77	.52
	1/2	8.5	2.50	2.1	1.0	.91	1.00	1.3	.74	.72	.75	.52
	7/16	7.6	2.21	1.9	.93	.92	.98	1.2	.66	.73	.73	.52
	3/8	6.6	1.92	1.7	.81	.93	.96	1.0	.58	.74	.71	.52
	5/16	5.6	1.62	1.4	.69	.94	.93	.90	.49	.74	.68	.53
	1/4	4.5	1.31	1.2	.56	.95	.91	.74	.40	.75	.66	.53
3/16	3.4	1.00	.91	.43	.95	.89	.58	.31	.76	.64	.53	
3 × 2 109	5/8	10.5	3.09	2.3	1.2	.90	1.13	.78	.56	.53	.63	.43
	9/16	9.3	2.74	2.1	1.1	.91	1.11	.73	.52	.54	.61	.43
	1/2	7.7	2.25	1.9	1.0	.92	1.08	.67	.47	.55	.58	.43
	7/16	6.8	2.00	1.7	.89	.93	1.06	.61	.42	.55	.56	.43
	3/8	5.9	1.73	1.5	.78	.94	1.04	.54	.37	.56	.54	.43
	5/16	5.0	1.47	1.3	.66	.95	1.02	.47	.32	.57	.52	.43
	1/4	4.1	1.19	1.1	.54	.95	.99	.39	.26	.57	.49	.43
3/16	3.1	.91	.84	.41	.97	.97	.31	.20	.58	.47	.44	
2 1/2 × 2 184	1/2	6.8	2.00	1.1	.70	.75	.88	.64	.46	.56	.63	.42
	7/16	6.1	1.78	1.0	.62	.76	.85	.58	.41	.57	.60	.42
	3/8	5.3	1.55	.91	.55	.77	.83	.51	.36	.58	.58	.42
	5/16	4.5	1.31	.79	.47	.78	.81	.45	.31	.58	.56	.42
	1/4	3.62	1.06	.65	.38	.78	.79	.37	.25	.59	.54	.42
	3/16	2.75	.81	.51	.29	.79	.76	.29	.20	.60	.51	.43

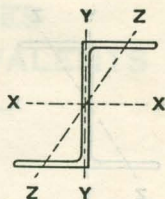


PROPERTIES OF BULB ANGLES

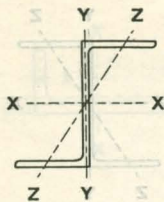
Nominal Size and Section Number	Thickness		Weight per Foot	Area of Section	AXIS X-X				AXIS Y-Y			
	Web	Flange			I	S	r	x	I	S	r	y
	In.	In.			In. ⁴	In. ³	In.	In.	In. ⁴	In. ³	In.	In.
10 × 3½ 290	.70	.64	34.7	10.20	125.6	23.4	3.51	4.69	6.8	2.4	.81	.79
	.64	.61	32.3	9.49	118.1	22.1	3.53	4.69	6.2	2.2	.81	.77
	.58	.58	29.9	8.78	110.7	20.9	3.55	4.70	5.6	2.0	.80	.75
	.52	.485	27.2	7.98	102.9	19.6	3.59	4.80	5.1	1.8	.80	.72
	.46	.455	24.8	7.28	95.4	18.4	3.62	4.82	4.6	1.6	.80	.70
	.40	.425	22.4	6.57	88.0	17.2	3.66	4.85	4.1	1.5	.79	.68
9 × 3½ 291	.68	.62	30.8	9.03	90.1	18.2	3.16	4.11	6.3	2.2	.83	.80
	.62	.59	28.6	8.38	84.6	17.2	3.18	4.10	5.7	2.1	.83	.78
	.56	.56	26.4	7.74	79.0	16.1	3.20	4.10	5.2	1.9	.82	.75
	.50	.465	23.8	7.00	73.3	15.1	3.24	4.19	4.7	1.7	.82	.72
	.44	.435	21.6	6.35	67.7	14.1	3.27	4.21	4.2	1.5	.82	.70
	.38	.405	19.4	5.70	62.2	13.1	3.30	4.22	3.7	1.4	.81	.68
8 × 3½ 292	.58	.55	24.3	7.14	57.0	12.7	2.83	3.53	5.2	1.9	.85	.78
	.52	.52	22.3	6.55	53.0	11.8	2.85	3.52	4.7	1.7	.84	.76
	.46	.43	20.0	5.87	48.9	11.1	2.89	3.61	4.2	1.5	.85	.72
	.40	.40	18.0	5.28	44.9	10.2	2.92	3.61	3.7	1.3	.84	.70
	.34	.37	16.0	4.70	40.9	9.4	2.95	3.62	3.3	1.2	.84	.69
	.30	.35	14.0	4.12	37.0	8.6	2.98	3.62	3.0	1.1	.84	.67
7 × 3½ 293	.56	.54	21.1	6.19	37.5	9.2	2.46	2.95	4.8	1.8	.88	.80
	.50	.51	19.3	5.67	34.7	8.6	2.48	2.93	4.3	1.6	.87	.78
	.44	.41	17.1	5.03	32.0	8.0	2.52	3.03	3.9	1.4	.88	.74
	.38	.38	15.3	4.50	29.2	7.3	2.55	3.02	3.4	1.2	.87	.72
	.32	.35	13.6	3.98	26.4	6.7	2.58	3.01	3.0	1.1	.87	.71
	.28	.32	12.0	3.40	23.5	6.0	2.61	3.00	2.7	1.0	.86	.69
7 × 3 294	.56	.54	20.2	5.91	35.4	9.0	2.45	3.08	3.1	1.3	.72	.69
	.50	.51	18.4	5.40	32.8	8.3	2.46	3.07	2.8	1.2	.72	.67
	.44	.41	16.4	4.81	30.2	7.8	2.50	3.15	2.5	1.0	.72	.64
	.38	.38	14.7	4.30	27.5	7.1	2.53	3.15	2.2	.93	.72	.62
	.32	.35	12.9	3.79	24.9	6.5	2.56	3.15	1.9	.82	.71	.60
	.28	.32	11.3	3.20	22.0	5.8	2.59	3.14	1.7	.79	.70	.58
6 × 3 295	.52	.49	16.6	4.86	21.4	6.1	2.10	2.53	2.8	1.2	.76	.70
	.46	.46	15.0	4.41	19.7	5.6	2.11	2.51	2.5	1.1	.75	.68
	.40	.365	13.2	3.87	17.9	5.2	2.15	2.59	2.2	.91	.75	.64
	.34	.335	11.7	3.42	16.2	4.7	2.18	2.58	1.9	.80	.75	.63
	.28	.305	10.1	2.97	14.5	4.3	2.21	2.58	1.6	.70	.74	.61
	.24	.28	8.5	2.40	12.6	3.8	2.24	2.57	1.4	.65	.73	.59
5 × 2½ 296	.48	.44	12.6	3.68	11.1	3.8	1.74	2.12	1.5	.75	.63	.61
	.42	.41	11.3	3.30	10.1	3.5	1.75	2.10	1.3	.67	.63	.58
	.36	.33	9.8	2.88	9.1	3.1	1.78	2.06	1.1	.56	.63	.55
	.30	.30	8.5	2.50	8.1	2.7	1.81	2.03	.97	.49	.62	.53
	.24	.27	7.3	2.13	7.1	2.4	1.83	2.01	.81	.42	.62	.51
	.20	.25	6.1	1.75	6.1	2.1	1.86	1.99	.65	.35	.61	.49



PROPERTIES
OF
ZEE BARS



Section Number	Depth of Web	Width of Flanges	Thickness of Web and Flanges	Weight per Foot	Area of Section	AXIS X-X			AXIS Y-Y			AXIS Z-Z
						I	S	r	I	S	r	r
						In. ⁴	In. ³	In.	In. ⁴	In. ³	In.	In.
243	6 1/8	3 5/8	7/8	34.6	10.18	50.2	16.4	2.22	19.2	6.0	1.37	.83
	6 1/16	3 9/16	13/16	32.0	9.41	46.1	15.2	2.22	17.3	5.5	1.36	.82
	6	3 1/2	3/4	29.4	8.65	42.1	14.0	2.21	15.4	4.9	1.34	.81
242	6 1/8	3 5/8	1 1/16	28.1	8.26	43.2	14.1	2.29	16.3	5.0	1.41	.84
	6 1/16	3 9/16	5/8	25.4	7.47	38.9	12.8	2.28	14.4	4.4	1.39	.82
	6	3 1/2	9/16	22.8	6.71	34.6	11.5	2.28	12.6	3.9	1.37	.81
149	6 1/8	3 5/8	1/2	21.1	6.21	34.4	11.2	2.36	12.9	3.8	1.44	.84
	6 1/16	3 9/16	7/16	18.4	5.41	29.8	9.8	2.35	11.0	3.3	1.43	.83
	6	3 1/2	3/8	15.7	4.62	25.3	8.4	2.35	9.1	2.8	1.41	.83
234	5 1/8	3 3/8	13/16	28.4	8.35	28.7	11.2	1.86	14.4	4.8	1.31	.76
	5 1/16	3 5/16	3/4	26.0	7.65	26.2	10.3	1.85	12.8	4.4	1.30	.74
	5	3 1/4	1 1/16	23.7	6.97	23.7	9.5	1.84	11.4	3.9	1.28	.73
235	5 1/8	3 3/8	5/8	22.6	6.65	24.5	9.6	1.92	12.1	3.9	1.35	.76
	5 1/16	3 5/16	9/16	20.2	5.94	21.8	8.6	1.91	10.5	3.5	1.33	.75
	5	3 1/4	1/2	17.9	5.26	19.2	7.7	1.91	9.1	3.0	1.31	.74



PROPERTIES OF ZEE BARS



Section Number	Depth of Web In.	Width of Flanges In.	Thickness of Web and Flanges In.	Weight per Foot Lb.	Area of Section In. ²	AXIS X-X			AXIS Y-Y			AXIS Z-Z
						I	S	r	I	S	r	r
						In. ⁴	In. ³	In.	In. ⁴	In. ³	In.	In.
236	5 1/8	3 3/8	7/16	16.4	4.82	19.1	7.4	1.99	9.2	2.9	1.38	.77
	5 1/16	3 5/16	3/8	14.0	4.12	16.2	6.4	1.99	7.7	2.5	1.37	.76
	5	3 1/4	5/16	11.6	3.41	13.4	5.3	1.98	6.2	2.0	1.35	.75
237	4 1/8	3 3/16	3/4	23.0	6.76	15.0	7.3	1.49	11.2	4.0	1.29	.68
	4 1/16	3 1/8	11/16	20.9	6.15	13.5	6.7	1.48	10.0	3.6	1.27	.67
	4	3 1/16	5/8	18.9	5.56	12.1	6.1	1.48	8.7	3.2	1.25	.66
238	4 1/8	3 3/16	9/16	18.0	5.29	12.7	6.2	1.55	9.3	3.2	1.33	.68
	4 1/16	3 1/8	1/2	15.9	4.68	11.2	5.5	1.55	8.0	2.8	1.31	.67
	4	3 1/16	7/16	13.8	4.06	9.7	4.8	1.55	6.7	2.4	1.29	.66
239	4 1/8	3 3/16	3/8	12.5	3.68	9.6	4.7	1.62	6.8	2.3	1.36	.69
	4 1/16	3 1/8	5/16	10.3	3.03	7.9	3.9	1.62	5.5	1.8	1.34	.68
	4	3 1/16	1/4	8.2	2.41	6.3	3.1	1.62	4.2	1.4	1.33	.67
231	3 1/16	2 3/4	9/16	14.3	4.21	5.3	3.4	1.12	5.7	2.3	1.17	.54
	3	2 11/16	1/2	12.6	3.71	4.6	3.1	1.12	4.9	2.0	1.15	.53
230	3 1/16	2 3/4	7/16	11.5	3.38	4.6	3.0	1.17	4.8	1.9	1.19	.55
	3	2 11/16	3/8	9.8	2.88	3.9	2.6	1.16	3.9	1.6	1.17	.54
229	3 1/16	2 3/4	5/16	8.5	2.50	3.6	2.4	1.21	3.6	1.4	1.21	.56
	3	2 11/16	1/4	6.7	1.97	2.9	1.9	1.21	2.8	1.1	1.19	.55

WEIGHTS AND MEASURES ENGLISH AND METRIC EQUIVALENTS

1 pound (lb.)	=	453.6	grammes
100 lbs.	=	45.36	kilos
112 lbs.	=	50.80	kilos
1 net ton (2000 lbs.)	=	907.2	kilos
1 gross ton (2240 lbs.)	=	1016	kilos
1 kilo	=	2.2046	lbs.
100 kilos	=	220.46	lbs.
1 metric ton (1000 kilos)	=	2204.6	lbs. = 0.9842 gross ton = 1.1023 net ton
1 inch	=	25.40	millimeters
1 foot (12 inches)	=	30.48	centimeters
1 yard (3 feet)	=	91.44	centimeters
1 mile (1760 yards)	=	1609.35	meters
1 millimeter	=	0.03937	inch
1 centimeter	=	0.3937	inch
1 meter	=	39.37	inches = 3.2808 feet
1 kilometer	=	0.62137	mile = 1093.6 yards
1 square inch	=	{ 6.4516 645.16	square centimeters square millimeters
1 square foot	=	0.0929	square meter
1 square yard	=	0.8361	square meter
1 square millimeter	=	0.00155	square inch
1 square centimeter	=	0.155	square inch
1 square meter	=	{ 10.7639 1.196	square feet square yards
1 pound per foot	=	1.4882	kilos per meter
1 pound per yard	=	0.4961	kilo per meter
1 pound per square inch	=	0.0703	kilo per square centimeter
1 pound per square foot	=	4.8825	kilo per square meter
1 kilo per meter	=	0.6720	pound per foot
1 kilo per square millimeter	=	1422.32	pounds per square inch
1 kilo per square centimeter	=	14.2232	pounds per square inch
1 kilo per square meter	=	{ 0.2048 1.8433	pound per square foot pounds per square yard

ENGLISH AND METRIC EQUIVALENTS WEIGHTS AND MEASURES

BY THE METRIC COMMISSION

1963

