


# Steel Structurals

Angles, Channels, Beams, Tees & Fiberglass

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 **WARNING:** These products can potentially expose you to chemicals including Nickel, Chromium, Lead, Cobalt, Mercury and Beryllium, which are known to the state of California to cause cancer and/or birth defects or other reproductive harm. For more information, visit [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)

# Angles - Bar Size

## ASTM A-36, Pickled & Oiled and Galvanized

Tensile Strength: 58,000/80,000 PSI

Yield Point: 36,000 PSI Min.

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Leg	Leg	Thickness	Weight (lbs./ft.)
1/2"	1/2"	1/8	0.38
5/8"	5/8"	1/8	0.48
3/4"	3/4"	1/8	0.59
7/8"	7/8"	1/8	0.70
1"	5/8"	1/8	0.64
1"	3/4"	1/8	0.70
1"	1"	1/8	0.80
		3/16	1.16
		1/4	1.49
1-1/8"	1-1/8"	1/8	0.90
1-1/4"	1-1/4"	1/8	1.01
		3/16	1.48
		1/4	1.92
1-1/2"	1-1/2"	1/8	1.23
		3/16	1.80
		1/4	2.34
		3/8	3.35
1-3/4"	1-3/4"	1/8	1.44
		3/16	2.12
		1/4	2.77

Leg	Leg	Thickness	Weight (lbs./ft.)
2"	1-1/4"	3/16	1.96
		1/4	2.55
2"	1-1/2"	1/8	1.44
		3/16	2.12
		1/4	2.77
2"	2"	1/8	1.65
		3/16	2.44
		1/4	3.19
		5/16	3.92
2-1/2"	1-1/2"	3/16	2.44
		1/4	3.16
		5/16	3.92
2-1/2"	2"	3/16	2.75
		1/4	3.62
		5/16	4.50
		3/8	5.30
2-1/2"	2-1/2"	3/16	3.07
		1/4	4.10
		5/16	5.00
		3/8	5.90
		1/2	7.70

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# Angles - Structural

## ASTM A-36, Pickled & Oiled and Galvanized

Tensile Strength: 58,000/80,000 PSI

Yield Point: 36,000 PSI Min.

Leg	Leg	Thickness	Weight (lbs./ft.)
3"	2"	3/16	3.07
		1/4	4.1
		5/16	5.0
		3/8	5.9
		1/2	7.7
3"	2-1/2"	1/4	4.5
		5/16	5.6
		3/8	6.6
		1/2	8.5
3"	3"	3/16	3.71
		1/4	4.9
		5/16	6.1
		3/8	7.2
		1/2	9.4
3-1/2"	2-1/2"	1/4	4.9
		5/16	6.1
		3/8	7.2
		1/2	9.4
3-1/2"	3"	1/4	5.4
		5/16	6.6
		3/8	7.9
		1/2	10.2
3-1/2"	3-1/2"	1/4	5.8
		5/16	7.2
		3/8	8.5
4"	3"	1/4	5.8
		5/16	7.2
		3/8	8.5
		1/2	11.1
4"	3-1/2"	1/4	6.2
		5/16	7.7
		3/8	9.1
		1/2	11.9
4"	4"	1/4	6.6
		5/16	8.2
		3/8	9.8
		1/2	12.8
		5/8	15.7
		3/4	18.5

Leg	Leg	Thickness	Weight (lbs./ft.)
5"	3"	1/4	6.6
		5/16	8.2
		3/8	9.8
		1/2	12.8
5"	3-1/2"	1/4	7.0
		5/16	8.7
		3/8	10.4
		1/2	13.6
		5/8	16.8
		3/4	19.8
5"	5"	5/16	10.3
		3/8	12.3
		1/2	16.2
		5/8	20.0
		3/4	23.6
6"	3-1/2"	5/16	9.8
		3/8	11.7
		1/2	15.3
6"	4"	5/16	10.3
		3/8	12.3
		1/2	16.2
		5/8	20.0
		3/4	23.6
6"	6"	5/16	12.4
		3/8	14.9
		1/2	19.6
		5/8	24.2
		3/4	28.7
		1	37.4
7"	4"	3/8	13.6
		1/2	17.9
		3/4	26.2
8"	4"	1/2	19.6
		3/4	28.7
		1	37.4
8"	6"	1/2	23.0
		3/4	33.8
		1	44.2
8"	8"	1/2	26.4
		5/8	32.7
		3/4	38.9
		1	51.0

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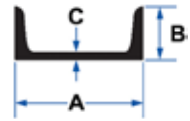


# Channels - Bar Size

## ASTM A-36

Tensile Strength: 58,000/80,000 PSI

Yield Point: 36,000 PSI Min.



"A" Depth	"B" Flange	"C" Web Thickness	Weight (lbs./ft.)
3/4"	3/8	1/8	0.56
1"	1/2	1/8	0.84
1-1/4"	1/2	1/8	1.01
1-1/2"	1/2	1/8	1.12
1-1/2"	9/16	3/16	1.44
1-1/2"	3/4	1/8	1.17

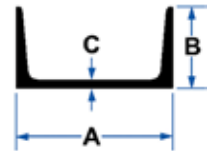
"A" Depth	"B" Flange	"C" Web Thickness	Weight (lbs./ft.)
2"	1/2	1/8	1.43
2"	9/16	3/16	1.86
2"	5/8	1/4	2.28
2"	1	1/8	1.59
2"	1	3/16	2.32
2-1/2"	5/8	3/16	2.27

# Channels - Ship and Car

## ASTM A-36

Tensile Strength: 58,000/80,000 PSI

Yield Point: 36,000 PSI Min.



"A" Depth	Weight (lbs./ft.)	"C" Thickness of Web	"B" Width of Flange	
3"	7.1	.312	1.938	
4"	13.8	.500	2.500	
6"	12.0	.310	2.497	
	15.1	.316	2.941	
	15.3	.340	3.500	
	16.3	.375	3.000	
	18.0	.379	3.504	
7"	19.1	.352	3.452	
	22.7	.503	3.603	
	8"	18.7	.353	2.978
		20.0	.400	3.025
21.4		.375	3.450	
22.8		.427	3.502	
9"	23.9	.400	3.450	
	25.4	.450	3.500	
10"	22.0	.290	3.315	
	25.0	.380	3.405	
	28.5	.425	3.950	
	33.6	.575	4.100	
	41.1	.796	4.321	

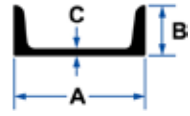
"A" Depth	Weight (lbs./ft.)	"C" Thickness of Web	"B" Width of Flange
12"	31.0	.370	3.670
	35.0	.465	3.765
	40.0	.590	3.890
	45.0	.710	4.010
	50.0	.835	4.135
13"	31.8	.375	4.000
	35.0	.447	4.072
	40.0	.560	4.185
	50.0	.787	4.412
18"	42.7	.450	3.950
	45.8	.500	4.000
	51.9	.600	4.100
	58.0	.700	4.200



# Channels - Structural A-36

## ASTM A-36 Modified

Yield Point: 50,000 PSI Min.



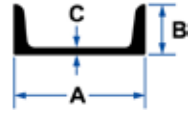
"A" Depth	Weight (lbs./ft.)	"C" Thickness of Web	"B" Width of Flange
3"	3.5	.132	1.375
4"	4.5	.125	1.584

# Channels - Structural

## ASTM A-36

Tensile Strength: 58,000/80,000 PSI

Yield Point: 36,000 PSI Min.



"A" Depth	Weight (lbs./ft.)	"C" Thickness of Web	"B" Width of Flange
3"	4.1	.170	1.410
	5.0	.258	1.498
	6.0	.356	1.596
4"	5.4	.184	1.584
	6.25	.247	1.647
	7.25	.320	1.720
5"	6.7	.190	1.750
	9.0	.325	1.885
6"	8.2	.200	1.920
	10.5	.314	2.034
	13.0	.437	2.157
7"	9.8	.210	2.090
	12.25	.314	2.194
	14.75	.419	2.299
8"	11.5	.220	2.260
	13.75	.303	2.343
	18.75	.487	2.527
9"	13.4	.233	2.433
	15.0	.285	2.485
	20.0	.448	2.648
10"	15.3	.240	2.600
	20.0	.379	2.739
	25.0	.526	2.886
	30.0	.673	3.033
12"	20.7	.282	2.942
	25.0	.387	3.047
	30.0	.510	3.170
15"	33.9	.400	3.400
	40.0	.520	3.520
	50.0	.716	3.716

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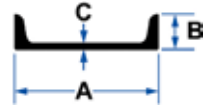
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# Channels - Stair Stringer

ASTM A-36 (Junior)

Tensile Strength: 58,000/80,000 PSI

Yield Point: 36,000 PSI Min.



"A" Depth	Weight (lbs./ft.)	"C" Thickness of Web	"B" Width of Flange
8"	8.5	.179	1.874
10"	8.4	.170	1.500
12"	10.6	.190	1.500
12"	14.3	.250	2.130

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# American Standard I Beam

ASTM A-992/A572-50 (Grade 50)

Tensile Strength: 65,000 PSI Min

Yield Point: 65,000 PSI Max



"A" Depth	Weight (lbs./ft.)	"C" Thickness of Web	"B" Width of Flange
3"	5.7*	.170	2.330
	7.5	.349	2.509
4"	7.7*	.193	2.663
	9.5	.326	2.796
5"	10.0	.214	3.004
6"	12.5	.232	3.332
	17.25	.465	3.565
8"	18.4	.271	4.001
	23.0	.441	4.171
10"	25.4	.311	4.661
	35.0	.594	4.944
12"	31.8	.350	5.000
	35.0	.428	5.078
	40.8	.462	5.252
	50.0	.687	5.477
15"	42.9	.411	5.501
	50.0	.550	5.640
18"	54.7	.461	6.001
	70.0	.711	6.251
20"	66.0	.505	6.255
	75.0	.635	6.385
	86.0	.660	7.060
	96.0	.800	7.200
24"	80.0	.500	7.000
	90.0	.625	7.125
	100.0	.745	7.245
	106.0	.620	7.870
	121.0	.800	8.050

\*Also available in 1045 HR



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# Junior Beams

ASTM A-529-50 (Grade 50)

Tensile Strength: 70,000-100,000 PSI

Yield Point: 50,000 PSI Min



"A" Depth	Weight (lbs./ft.)	"C" Thickness of Web	"B" Width of Flange
6"	4.4	.114	1.844
8"	6.5	.135	2.281
10"	8.0	.141	2.690
10"	9.0	.157	2.690
12"	10.8	.160	3.065
12"	11.8	.177	3.065

# Wide Flange and H Beams

ASTM A992/A572 (Grade 50)

Tensile Strength: 65,000 min. PSI

Yield Point: 50,000 min. - 65,000 max. PSI



Nominal Depth	Weight (lbs./ft.)	"A" Depth of Section	"D" Flange Thickness	"B" Width of Flange	"C" Thickness of Web
<b>W 4 x</b>	13.0	4.16	.345	4.060	.280
<b>W 5 x</b>	16.0 19.0	5.01 5.15	.360 .430	5.000 5.030	.240 .270
<b>W 6 x</b>	9.0 12.0 16.0 15.0 20.0 25.0	5.90 6.03 6.28 5.99 6.20 6.38	.215 .280 .405 .260 .365 .455	3.940 4.000 4.030 5.990 6.020 6.080	.170 .230 .260 .230 .260 .320
<b>W 8 x</b>	10.0 13.0 15.0 18.0 21.0 24.0 28.0 31.0 35.0 40.0 48.0 58.0 67.0	7.89 7.99 8.11 8.14 8.28 7.93 8.06 8.00 8.12 8.25 8.50 8.75 9.00	.205 .255 .315 .330 .400 .400 .465 .435 .495 .560 .685 .810 .935	3.940 4.000 4.015 5.250 5.270 6.495 6.535 7.995 8.020 8.070 8.110 8.220 8.280	.170 .230 .245 .230 .250 .245 .285 .285 .310 .360 .400 .510 .570
<b>W 10 x</b>	12.0 15.0 17.0 19.0 22.0 26.0 30.0 33.0 39.0 45.0 49.0	9.87 9.99 10.11 10.24 10.17 10.33 10.47 9.73 9.92 10.10 9.98	.210 .270 .330 .395 .360 .440 .510 .435 .530 .620 .560	3.960 4.000 4.010 4.020 5.750 5.770 5.810 7.960 7.985 8.020 10.000	.190 .230 .240 .250 .240 .260 .300 .290 .315 .350 .340

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# Wide Flange and H Beams

ASTM A992/A572 Grade 50

Tensile Strength: 65,000 min. PSI

Yield Point: 50,000 min. - 65,000 max. PSI



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Nominal Depth	Weight (lbs./ft.)	"A" Depth of Section	"D" Flange Thickness	"B" Width of Flange	"C" Thickness of Web
<b>W 10 x</b>	54.0	10.09	.615	10.030	.370
	60.0	10.22	.680	10.080	.420
	68.0	10.40	.770	10.130	.470
	77.0	10.60	.870	10.190	.530
	88.0	10.84	.990	10.265	.605
	100.0	11.10	1.120	10.340	.680
	112.0	11.36	1.250	10.415	.755
<b>W 12 x</b>	14.0	11.91	.225	3.970	.200
	16.0	11.99	.265	3.990	.220
	19.0	12.16	.350	4.005	.235
	22.0	12.31	.425	4.030	.260
	26.0	12.22	.380	6.490	.230
	30.0	12.34	.440	6.520	.260
	35.0	12.50	.520	6.560	.300
	40.0	11.94	.515	8.005	.295
	45.0	12.06	.575	8.045	.335
	50.0	12.19	.640	8.080	.370
	53.0	12.06	.575	9.995	.345
	58.0	12.19	.640	10.010	.360
	65.0	12.12	.605	12.000	.390
	72.0	12.25	.670	12.040	.430
	79.0	12.38	.735	12.080	.470
	87.0	12.53	.810	12.125	.515
	96.0	12.71	.900	12.160	.550
	106.0	12.89	.990	12.220	.610
	120.0	13.12	1.105	12.320	.710
	136.0	13.41	1.250	12.400	.790
	152.0	13.71	1.400	12.480	.870
170.0	14.03	1.560	12.570	.960	
190.0	14.38	1.735	12.670	1.060	
210.0	14.71	1.900	12.790	1.180	
230.0	15.05	2.070	12.895	1.285	
252.0	15.41	2.250	13.005	1.395	
279.0	15.85	2.470	13.140	1.530	
305.0	16.32	2.705	13.235	1.625	
336.0	16.82	2.955	13.385	1.775	
<b>W 14 x</b>	22.0	13.74	.335	5.000	.230
	26.0	13.91	.420	5.025	.255
	30.0	13.84	.385	6.730	.270
	34.0	13.98	.455	6.745	.285
	38.0	14.10	.515	6.770	.310
	43.0	13.66	.530	7.995	.305
	48.0	13.79	.595	8.030	.340
	53.0	13.92	.660	8.060	.370
	61.0	13.89	.645	9.995	.375
	68.0	14.04	.720	10.035	.415
	74.0	14.17	.785	10.070	.450
82.0	14.31	.855	10.130	.510	

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# Wide Flange and H Beams

ASTM A992/A572 Grade 50

Tensile Strength: 65,000 min. PSI

Yield Point: 50,000 min. - 65,000 max. PSI



Nominal Depth	Weight (lbs./ft.)	"A" Depth of Section	"D" Flange Thickness	"B" Width of Flange	"C" Thickness of Web
<b>W 14 x</b>	90.0	14.02	.710	14.520	.440
	99.0	14.16	.780	14.565	.485
	109.0	14.32	.860	14.605	.525
	120.0	14.48	.940	14.670	.590
	132.0	14.66	1.030	14.725	.645
	145.0	14.78	1.090	15.500	.680
	159.0	14.98	1.190	15.565	.745
	176.0	15.22	1.310	15.650	.830
	193.0	15.48	1.440	15.710	.890
	211.0	15.72	1.560	15.800	.980
	233.0	16.04	1.720	15.890	1.070
	257.0	16.38	1.890	15.995	1.175
	283.0	16.74	2.070	16.110	1.290
	311.0	17.12	2.260	16.230	1.410
	342.0	17.54	2.470	16.360	1.540
	370.0	17.92	2.660	16.475	1.655
	398.0	18.29	2.845	16.590	1.770
	426.0	18.67	3.035	16.695	1.875
	455.0	19.02	3.210	16.835	2.015
	500.0	19.60	3.500	17.010	2.190
550.0	20.24	3.820	17.200	2.380	
605.0	20.92	4.160	17.415	2.595	
665.0	21.64	4.520	17.650	2.830	
730.0	22.42	4.910	17.890	3.070	
<b>W 16 x</b>	26.0	15.69	.345	5.500	.250
	31.0	15.88	.440	5.525	.275
	36.0	15.86	.430	6.985	.295
	40.0	16.01	.505	6.995	.305
	45.0	16.13	.565	7.035	.345
	50.0	16.26	.630	7.070	.380
	57.0	16.43	.715	7.120	.430
	67.0	16.33	.665	10.235	.395
	77.0	16.52	.760	10.295	.455
	89.0	16.75	.875	10.365	.525
100.0	16.97	.985	10.425	.585	
<b>W 18 x</b>	35.0	17.70	.425	6.000	.300
	40.0	17.90	.525	6.015	.315
	46.0	18.06	.605	6.060	.360
	50.0	17.99	.570	7.495	.355
	55.0	18.11	.630	7.530	.390
	60.0	18.24	.695	7.555	.415
	65.0	18.35	.750	7.590	.450
	71.0	18.47	.810	7.635	.495
	76.0	18.21	.680	11.035	.425
	86.0	18.39	.770	11.090	.480
	97.0	18.59	.870	11.145	.535

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# Wide Flange and H Beams

ASTM A992/A572 Grade 50

Tensile Strength: 65,000 min. PSI

Yield Point: 50,000 min. - 65,000 max. PSI



Steel  
Structurals

Nominal Depth	Weight (lbs./ft.)	"A" Depth of Section	"D" Flange Thickness	"B" Width of Flange	"C" Thickness of Web	
<b>W 18 x</b>	106.0	18.73	.940	11.200	.590	
	119.0	18.97	1.060	11.265	.655	
	130.0	19.25	1.200	11.160	.670	
	143.0	19.49	1.320	11.220	.730	
	158.0	19.72	1.440	11.300	.810	
	175.0	20.04	1.590	11.375	.890	
	192.0	20.35	1.750	11.455	.960	
	211.0	20.67	1.910	11.555	1.060	
	234.0	21.06	2.110	11.650	1.160	
	258.0	21.46	2.300	11.770	1.280	
	283.0	21.85	2.500	11.890	1.400	
	311.0	22.32	2.740	12.005	1.520	
	<b>W 21 x</b>	44.0	20.66	.450	6.500	.350
		48.0	20.62	.430	8.140	.350
50.0		20.83	.535	6.530	.380	
55.0		20.80	.522	8.220	.375	
57.0		21.06	.650	6.555	.405	
62.0		20.99	.615	8.240	.400	
68.0		21.13	.685	8.270	.430	
73.0		21.24	.740	8.295	.455	
83.0		21.43	.835	8.355	.515	
93.0		21.62	.930	8.420	.580	
101.0		21.36	.800	12.290	.500	
111.0		21.51	.875	12.340	.550	
122.0		21.68	.960	12.390	.600	
132.0		21.83	1.035	12.440	.650	
147.0		22.06	1.150	12.510	.720	
166.0		22.48	1.360	12.420	.750	
182.0	22.72	1.480	12.500	.830		
201.0	23.03	1.630	12.575	.910		
<b>W 24 x</b>	55.0	23.57	.505	7.005	.395	
	62.0	23.74	.590	7.040	.430	
	68.0	23.73	.585	8.965	.415	
	76.0	23.92	.680	8.990	.440	
	84.0	24.10	.770	9.020	.470	
	94.0	24.31	.875	9.065	.515	
	103.0	24.53	.980	9.000	.550	
	104.0	24.06	.750	12.750	.500	
	117.0	24.26	.850	12.800	.550	
	131.0	24.48	.960	12.855	.605	
	146.0	24.74	1.090	12.900	.650	
	162.0	25.00	1.220	12.955	.705	
	176.0	25.24	1.340	12.890	.750	
	192.0	25.47	1.460	12.950	.810	
	207.0	25.71	1.570	13.010	.870	
	229.0	26.02	1.730	13.110	.960	

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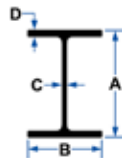
Alro Steel Metals Guide

# Wide Flange and H Beams

ASTM A992/A572 Grade 50

Tensile Strength: 65,000 min. PSI

Yield Point: 50,000 min. - 65,000 max. PSI



Nominal Depth	Weight (lbs./ft.)	"A" Depth of Section	"D" Flange Thickness	"B" Width of Flange	"C" Thickness of Web
<b>W 24 x</b>	250.0	26.34	1.890	13.185	1.040
	279.0	26.73	2.090	13.305	1.160
	306.0	27.13	2.280	13.405	1.260
	335.0	27.52	2.480	13.520	1.380
	370.0	27.99	2.720	13.660	1.520
<b>W 27 x</b>	84.0	26.71	.640	9.960	.460
	94.0	26.92	.745	9.990	.490
	102.0	27.09	.830	10.015	.515
	114.0	27.29	.930	10.070	.570
	129.0	27.63	1.100	10.010	.610
	146.0	27.38	.975	13.965	.605
	161.0	27.59	1.080	14.020	.660
	178.0	27.81	1.190	14.085	.725
	194.0	28.11	1.340	14.035	.750
	217.0	28.43	1.500	14.115	.830
	235.0	28.66	1.610	14.190	.910
	258.0	28.98	1.770	14.270	.980
	281.0	29.29	1.930	14.350	1.060
	307.0	29.61	2.090	14.445	1.160
	336.0	30.00	2.280	14.550	1.260
368.0	30.39	2.480	14.665	1.380	
<b>W 30 x</b>	90.0	29.53	.610	10.400	.470
	99.0	29.65	.670	10.450	.520
	108.0	29.83	.760	10.475	.545
	116.0	30.01	.850	10.495	.565
	124.0	30.17	.930	10.515	.585
	132.0	30.31	1.000	10.545	.615
	148.0	30.67	1.180	10.480	.650
	173.0	30.44	1.065	14.985	.655
	191.0	30.68	1.185	15.040	.710
	211.0	30.94	1.315	15.105	.775
	235.0	31.30	1.500	15.055	.830
	261.0	31.61	1.650	15.155	.930
	292.0	32.01	1.850	15.255	1.020
	326.0	32.40	2.050	15.370	1.140
	357.0	32.80	2.240	15.470	1.240
391.0	33.19	2.440	15.590	1.360	
<b>W 33 x</b>	118.0	32.86	.740	11.480	.550
	130.0	33.09	.855	11.510	.580
	141.0	33.30	.960	11.535	.605
	152.0	33.49	1.055	11.565	.635
	169.0	33.82	1.220	11.500	.670
	201.0	33.68	1.150	15.745	.715
	221.0	33.93	1.275	15.805	.775
	241.0	34.18	1.400	15.860	.830
	263.0	34.53	1.570	15.805	.870
	291.0	34.84	1.730	15.905	.960
	318.0	35.16	1.890	15.985	1.040
	354.0	35.55	2.090	16.100	1.160
387.0	35.95	2.280	16.200	1.260	

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Steel  
Structurals

Alro Steel Metals Guide

# Wide Flange and H Beams

ASTM A992/A572 Grade 50

Tensile Strength: 65,000 min. PSI

Yield Point: 50,000 min. - 65,000 max. PSI



Steel  
Structurals

Nominal Depth	Weight (lbs./ft.)	"A" Depth of Section	"D" Flange Thickness	"B" Width of Flange	"C" Thickness of Web	
<b>W 36 x</b>	135.0	35.55	.790	11.950	.600	
	150.0	35.85	.940	11.975	.625	
	160.0	36.01	1.020	12.000	.650	
	170.0	36.17	1.100	12.030	.680	
	182.0	36.33	1.180	12.075	.725	
	194.0	36.49	1.260	12.115	.765	
	210.0	36.69	1.360	12.180	.830	
	231.0	36.49	1.260	16.470	.760	
	232.0	37.12	1.570	12.120	.870	
	247.0	36.67	1.350	16.510	.800	
	256.0	37.43	1.730	12.215	.960	
	262.0	36.85	1.440	16.550	.840	
	282.0	37.11	1.570	16.595	.885	
	302.0	37.33	1.680	16.655	.945	
	330.0	37.67	1.850	16.630	1.020	
	361.0	37.99	2.010	16.730	1.120	
	395.0	38.41	2.200	16.830	1.220	
	441.0	38.85	2.440	16.965	1.360	
	<b>W 40 x</b>	149.0	38.20	.830	11.810	.630
		167.0	38.59	1.025	11.810	.650
183.0		38.98	1.200	11.810	.650	
211.0		39.37	1.415	11.810	.750	
235.0		39.69	1.575	11.890	.830	
264.0		40.00	1.730	11.930	.960	
278.0		40.16	1.810	11.970	1.025	
294.0		40.39	1.930	12.010	1.060	
327.0		40.79	2.130	12.130	1.180	
199.0		38.67	1.065	15.750	.650	
215.0		38.98	1.220	15.750	.650	
249.0		39.38	1.420	15.750	.750	
277.0		39.69	1.575	15.830	.830	
297.0		39.84	1.650	15.825	.930	
324.0		40.16	1.810	15.910	1.000	
362.0		40.55	2.010	16.020	1.120	
372.0		40.63	2.045	16.065	1.160	
397.0		40.95	2.200	16.120	1.220	
431.0		41.26	2.360	16.220	1.340	
<b>W 44 x</b>		230.0	42.91	1.220	15.750	.710
	262.0	43.31	1.415	15.750	.785	
	290.0	43.62	1.575	15.825	.865	
	335.0	44.02	1.770	15.945	1.025	

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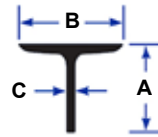


# Tees-Bar Size Hot Rolled

ASTM A-36

Tensile Strength: 58,000/80,000 PSI

Yield Point: 36,000 Min. PSI



"A" Stem	"B" Flange	"C" Stem Thickness	Weight (lbs./ft.)
1	1	1/8	.85
1-1/4	1-1/4	1/8	1.09
1-1/2	1-1/2	1/8 3/16 1/4	1.37 1.90 2.43
2	2	1/4	3.62

Steel  
Structurals

## Special Tee Sections

Alro offers a wide range of Tee sizes from stock. By flame cutting through the length of the web of Standard Wide Flange or I Beams we can furnish Tees to your specification.



Alro has a variety of Tee sizes in stock. Sizes not stocked can be cut from beams.

Alro Steel Metals Guide

# Structural Tolerances

Permissible Variations in Cross Section  
for W, HP, S, M, C and MC Shapes

## Structural Tolerances Permissible variations in Cross Section for W, HP, S, M, C, and MC Shapes

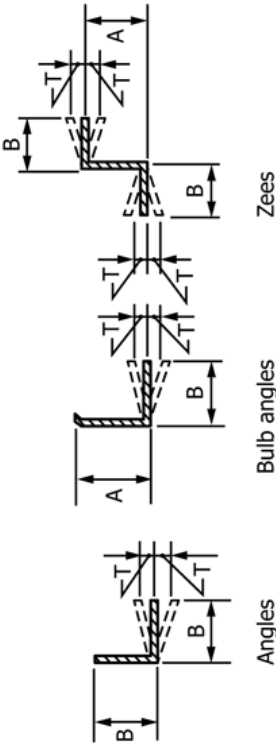
Shape	Section Nominal Sizes (inches)	Depth (inches)		Flange Width (inches)		Flange Out-of-Square, max. in. <sup>a,b</sup>
		Over Theoretical	Under Theoretical	Over Theoretical	Under Theoretical	
W and HP	Up thru 12	1/8	1/8	1/4	3/16	1/4
	Over 12	1/8	1/8	1/4	3/16	5/16
S and M	3 thru 7	3/32	1/16	1/8	1/8	1/32
	Over 7 thru 14 Over 14 thru 24	1/8 3/16	3/32 1/8	5/32 3/16	5/32 3/16	1/32 1/32
C and MC	Up thru 1-1/2	1/32	1/32	1/32	1/32	1/32
	Over 1-1/2 up to 3	1/16	1/16	1/16	1/16	1/32
	3 thru 7	3/32	1/16	1/8	1/8	1/32
	Over 7 thru 14 Over 14	1/8 3/16	3/32 1/8	1/8 1/8	5/32 3/16	1/32 1/32

<sup>a</sup> Applies when flanges of channels are toed in or out. For channels 5/8" and under in depth, the permissible out-of-square is 3/64 in./in. of depth.

<sup>b</sup> Tolerance is per inch of flange width for S, M, C, and MC shapes.

# Structural Tolerances

## Permissible Variations in Cross Section for Angles (L Shapes), Bulb Angles, and Zees



Section	Nominal Sizes (inches)	Permitted Variations in Sectional Dimensions Given, in.										
		A, Depth (inches)		B, Flange Width or Length of Leg (inches)		T, Out of Square per Inch, of B		Permitted Variations Over or Under Theoretical Thickness (inches)				
		Over Theoretical	Under Theoretical	Over Theoretical	Under Theoretical	Over Theoretical	Under Theoretical	Over 3/16 and under	Over 3/16 to 3/8, incl	Over 3/8	Over 3/8	
Angles <sup>A</sup> (L Shapes)	1 and under	...	...	1/32	1/32	...	...	3/128 <sup>B</sup>	3/128 <sup>B</sup>	0.008	0.010	...
	Over 1 to 2, incl	...	...	3/64	3/64	...	...	3/128 <sup>B</sup>	3/128 <sup>B</sup>	0.010	0.010	0.012
	Over 2 to 2 1/2, incl	...	...	1/16	1/16	...	...	3/128 <sup>B</sup>	3/128 <sup>B</sup>	0.012	0.015	0.015
	Over 2 1/2 to 4, incl	...	...	1/8	1/8	...	...	3/128 <sup>B</sup>	3/128 <sup>B</sup>	...	...	...
	Over 4 to 6, incl	...	...	1/8	1/8	...	...	3/128 <sup>B</sup>	3/128 <sup>B</sup>	...	...	...
	Over 6 to 8, incl	...	...	3/16	1/8	...	...	3/128 <sup>B</sup>	3/128 <sup>B</sup>	...	...	...
	Over 8 to 10, incl	...	...	1/4	1/4	...	...	3/128 <sup>B</sup>	3/128 <sup>B</sup>	...	...	...
Over 10	...	...	1/4	3/8	...	...	3/128 <sup>B</sup>	3/128 <sup>B</sup>	...	...	...	
Bulb Angles	(Depth) 3 to 4, incl	1/8	1/16	1/8	1/32	...	...	3/128 <sup>B</sup>	3/128 <sup>B</sup>	...	...	...
	Over 4 to 6, incl	1/8	1/16	1/8	1/8	...	...	3/128 <sup>B</sup>	3/128 <sup>B</sup>	...	...	...
	Over 6	1/8	1/16	3/16	1/8	...	...	3/128 <sup>B</sup>	3/128 <sup>B</sup>	...	...	...
Zeas	3 to 4, incl	1/8	1/16	1/8	1/32	...	...	3/128 <sup>B</sup>	3/128 <sup>B</sup>	...	...	...
	Over 4 to 6, incl	1/8	1/16	1/8	1/8	...	...	3/128 <sup>B</sup>	3/128 <sup>B</sup>	...	...	...

<sup>A</sup> For unequal leg angles, longer leg determines classifications. • <sup>B</sup> 3/128 in./in. = 1-1/2 deg.



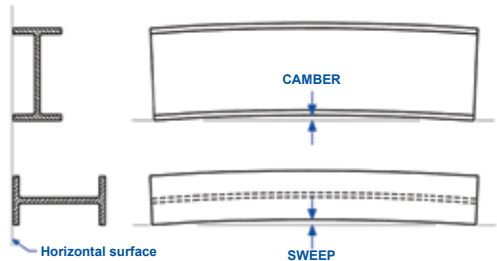
# Structural Tolerances

## Permissible Variations in Wide Flange Shapes Straightness - Camber and Sweep

Wide Flange Shapes	Permissible Variation
All, except following: When certain shapes** with a flange width approximately equal to depth are specified on order as columns:	$1/8" \times \frac{\text{number of feet of total length}^*}{10}$
Lengths of 45 feet and under	$1/8" \times \frac{\text{number of feet of total length}}{10}$ but not over 3/8"
Lengths over 45 feet	$3/8" + 1/8" \times \frac{\text{number of feet of total length} - 45}{10}$

\*Shapes with a flange width less than 6 inches, variation for sweep =  $1/8" \times \frac{\text{number of feet of total length}}{5}$

\*\*Applies only to :  
8 inch deep shapes 31 lbs. per foot and heavier,  
10 inch deep shapes 49 lbs. per foot and heavier,  
12 inch deep shapes 65 lbs. per foot and heavier, and  
14 inch deep shapes 90 lbs. per foot and heavier,  
If other shapes are specified on the order as columns,  
the variation will be subject to negotiation with the manufacturer.



### Ends Out-of-Square

S, M, C, MC Shapes..... 1/64" per inch of depth

S - American Standard Beams C - American Standard Channels

M - Miscellaneous Beams MC - Miscellaneous Channels

### Straightness (Angles, Beams and Channels)

Permissible Variation	
Camber	Under 3    1/4 in. in any 5 ft, or 1/4 x (number of feet of total length/5) 3 and over    1/8 x (number of feet of total length/5) $1/8" \times \frac{\text{number of feet of total length}}{5}$
Sweep	Due to the extreme variations in flexibility of standard beams and channels, sweep tolerances are subject to negotiations for the individual shapes involved.

