PACEMAKER

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WE ARE THE

CUSTOMER SERVICE COMPANY

WHO WE ARE

As the leading supplier of metals in Central New York, we are carrying on the tradition of "setting the pace" in excellent quality and service that our founder built his business on in 1956.

OUR MISSION

To be the premier metals and piping distributor by providing the products, expertise and customer service to help our customers succeed.

WHO WE SERVE

We proudly service OEM's, job shops, precision machine shops, in-plant maintenance, steel and sheet metal fabrication, construction, HVAC, municipalities, medical, government and aerospace industries.

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ANGLES – BAR SIZES

Stock Lengths 20', & 40' as indicated

Size In Inches A		B		C	Estimated Weight, Lbs. Per Foot	20-Ft. Length	40-Ft. Length
1/2	x	1/2	x	1/8	.38	7.6	–
5/8	x	5/8	x	1/8	.48	9.6	–
3/4	x	3/4	x	1/8	.59	11.8	–
7/8	x	7/8	x	1/8	.70	14.0	–
1	x	5/8	x	1/8	.64	12.8	–
1	x	3/4	x	1/8	.70	14	28
1	x	1	x	1/8	1.16	23.2	46.4
1	x	1	x	1/4	1.49	29.8	59.6
1 1/8	x	1 1/8	x	1/8	.90	18.0	36.0
1 1/4	x	1 1/4	x	1/8	1.01	20.2	40.4
				3/16	1.48	29.6	59.2
				1/4	1.92	38.4	76.8
1 3/8	x	7/8	x	1/8	.91	18.2	36.4
				3/16	1.32	26.4	52.8
1 1/2	x	1 1/4	x	3/16	1.64	32.8	65.6
1 1/2	x	1 1/2	x	1/8	1.23	24.6	49.2
				3/16	1.80	36.0	72.0
				1/4	2.34	46.8	93.6
				5/16	2.86	57.2	114.4
				3/8	3.35	67.0	134.0
1 3/4	x	1 1/4	x	1/8	1.23	24.6	49.2
				3/16	1.80	36.0	72.0
				1/4	2.34	46.8	93.6
1 3/4	x	1 3/4	x	1/8	1.44	28.8	57.6
				3/16	2.12	42.4	84.8
				1/4	2.77	55.4	110.8
2	x	1 1/4	x	3/16	1.96	39.2	78.4
				1/4	2.55	51.0	102.0
2	x	1 1/2	x	1/8	1.44	28.8	57.6
				3/16	2.12	42.4	84.8
				1/4	2.77	55.4	110.8
2	x	2	x	1/8	1.65	33.0	66.0
				3/16	2.44	48.8	97.6
				1/4	3.19	63.8	127.6
				5/16	3.92	78.4	156.8
				3/8	4.70	94.0	188.0
				1/2	5.92	118.4	236.8
2 1/2	x	1 1/2	x	3/16	2.44	48.8	97.6
				1/4	3.19	63.8	127.6
				5/16	3.92	78.4	156.8
2 1/2	x	2	x	3/16	2.75	55.0	110.0
				1/4	3.62	72.4	144.8
				5/16	4.50	90.0	180.0
				3/8	5.30	106.0	212.0
2 1/2	x	2 1/2	x	3/16	3.07	61.4	122.8
				1/4	4.10	82.0	164.0
				5/16	5.00	100.0	200.0
				3/8	5.90	118.0	236.0
				1/2	7.70	154.0	308.0

Size In Inches			Estimated Weight, Lbs.		
A	B	C	Per Foot	20-Ft. Lgth	30-Ft. Lgth
3	x 2	x 3/16	3.07	61	92
		1/4	4.1	82	123
		5/16	5.0	100	150
		3/8	5.9	118	177
		1/2	7.7	154	231
3	x 2 1/2	x 1/4	4.5	90	135
		5/16	5.6	112	168
		3/8	6.6	132	198
		1/2	8.5	170	255
3	x 3	x 3/16	3.71	74	111
		1/4	4.9	98	147
		5/16	6.1	122	183
		3/8	7.2	144	216
		1/2	9.4	188	282
3 1/2	x 2 1/2	x 1/4	4.9	98	147
		5/16	6.1	122	183
		3/8	7.2	144	216
		1/2	9.4	188	282
3 1/2	x 3	x 1/4	5.4	108	162
		5/16	6.6	132	198
		3/8	7.9	158	237
		1/2	10.2	204	306
3 1/2	x 3 1/2	x 1/4	5.8	116	174
		5/16	7.2	144	216
		3/8	8.5	170	255
		1/2	11.1	222	333
4	x 3	x 1/4	5.8	116	174
		5/16	7.2	144	216
		3/8	8.5	170	255
		1/2	11.1	222	333
4	x 3 1/2	x 1/4	6.2	124	186
		5/16	7.7	154	231
		3/8	9.1	182	273
		1/2	11.9	238	357
4	x 4	x 1/4	6.6	132	198
		5/16	8.2	164	246
		3/8	9.8	196	294
		1/2	12.8	256	384
		5/8	15.7	314	471
		3/4	18.5	370	555

Size In Inches			Estimated Weight, Lbs.		
A	B	C	Per Foot	20-Ft. Lgth	30-Ft. Lgth
5	x 3	x 1/4	6.6	132	198
		5/16	8.2	164	246
		3/8	9.8	196	294
		1/2	12.8	256	384
5	x 3 1/2	x 1/4	7.0	140	210
		5/16	8.7	174	261
		3/8	10.4	208	312
		1/2	13.6	272	408
		5/8	16.8	336	504
		3/4	19.8	396	594
5	x 5	x 5/16	10.3	206	309
		3/8	12.3	246	369
		1/2	16.2	324	486
		5/8	20.0	400	600
		3/4	23.6	472	708
6	x 3 1/2	x 1/4	7.9	158	237
		5/16	9.8	196	294
		3/8	11.7	234	351
		1/2	15.3	306	459
6	x 4	x 5/16	10.3	206	309
		3/8	12.3	246	369
		1/2	16.2	324	486
		5/8	20.0	400	600
		3/4	23.6	472	708
6	x 6	x 5/16	12.4	248	372
		3/8	14.9	298	447
		1/2	19.6	392	588
		3/4	28.7	574	861
		1	37.4	748	1122
7	x 4	x 3/8	13.6	272	408
		1/2	17.9	358	537
		5/8	22.1	442	663
		3/4	26.2	524	786
8	x 4	x 1/2	19.6	392	588
		5/8	24.2	484	726
		3/4	28.7	574	861
8	x 6	x 1/2	23.0	460	690
		3/4	33.8	676	1014
		1	44.2	884	1326
8	x 8	x 1/2	26.4	528	792
		5/8	32.7	654	981
		3/4	38.9	778	1167
		1	51.0	1020	1530
9	x 4	x 1/2	21.3	426	639

CHANNEL – BAR SIZES

Stock Lengths 20' and 30'

Size in Inches			Estimated Weight, Lbs.		Size in Inches			Estimated Weight, Lbs.	
A	B	C	Per Foot	20-Ft. Length	A	B	C	Per Foot	20-Ft. Length
3/4	3/8	1/8	.56	11.2	1 1/2	3/4	1/8	1.17	23.4
1	3/8	1/8	.68	13.6	2	1/2	1/8	1.43	28.6
1	1/2	1/8	.84	16.8	2	9/16	3/16	1.86	37.2
1 1/4	1/2	1/8	1.01	20.2	2	5/8	1/4	2.28	45.6
1 1/2	1/2	1/8	1.12	22.4	2	1	1/8	1.78	35.6
1 1/2	9/16	3/16	1.44	28.8	2	1	3/16	2.57	51.4
					2 1/2	5/8	3/16	2.27	45.4

CHANNEL – STANDARD STRUCTURAL SIZES

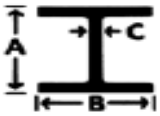
AISI Designation	A Depth in Inches	B Flange Width Inches	C Web Thickness Inches	Weight, Lbs. Per Foot	20-Ft. Length
C3 x 4.1	3	1.410	.170	4.1	82
C3 x 5	3	1.498	.258	5.0	100
C3 x 6	3	1.596	.356	6.0	120
C4 x 5.4	4	1.584	.184	5.4	108
C4 x 6.25	4	1.647	.247	6.25	125
C4 x 7.25	4	1.721	.321	7.25	145
C5 x 6.7	5	1.750	.190	6.7	134
C5 x 9	5	1.885	.325	9.0	180
C6 x 8.2	6	1.920	.200	8.2	164
C6 x 10.5	6	2.034	.314	10.5	210
C6 x 13	6	2.157	.437	13.0	260
C7 x 9.8	7	2.090	.210	9.8	196
C7 x 12.25	7	2.194	.314	12.25	245
C7 x 14.75	7	2.299	.419	14.75	295
C8 x 11.5	8	2.260	.220	11.5	230
C8 x 13.75	8	2.343	.303	13.75	275
C8 x 18.75	8	2.527	.487	18.75	375
C9 x 13.4	9	2.433	.233	13.4	268
C9 x 15	9	2.485	.285	15.0	300
C9 x 20	9	2.648	.448	20.0	400
C10 x 15.3	10	2.600	.240	15.3	306
C10 x 20	10	2.739	.379	20.0	400
C10 x 25	10	2.886	526	25.0	500
C10 x 30	10	3.033	.673	30.0	600
C12 x 20.7	12	2.942	.282	20.7	414
C12 x 25	12	3.047	.387	25.0	500
C12 x 30	12	3.170	.510	30.0	600
C15 x 33.9	15	3.400	.400	33.9	678
C15 x 40	15	3.520	.520	40.0	800
C15 x 50	15	3.716	.716	50.0	1000

MISCELLANEOUS CHANNELS – STRUCTURAL SIZES

AISI Designation	A Depth In Inches	B Flange Width Inches	C Web Thickness Inches	Weight, Lbs. Per Foot	20-Ft. Length	40-Ft. Length
MC3 x 7.1	3	1.938	.312	7.1	142	284
MC4 x 13.8	4	2.500	.500	13.8	276	552
MC6 x 12.0	6	2.497	.310	12.0	240	480
MC6 x 15.3	6	3.500	.340	15.3	306	612
MC6 x 16.3	6	3.000	.375	16.3	326	652
MC6 X 18.0	6	3.504	.379	18.0	360	720
MC7 x 19.1	7	3.452	.352	19.1	382	764
MC7 x 22.7	7	3.603	.503	22.7	454	908
MC8 x 8.5	8	1.875	.188	8.5	170	340
MC8 x 18.7	8	2.978	.353	18.7	374	748
MC8 x 20.0	8	3.025	.400	20.0	400	800
MC8 x 21.4	8	3.450	.375	21.4	428	856
MC8 x 22.8	8	3.502	.427	22.8	456	912
MC9 x 23.9	9	3.450	.400	23.9	478	956
MC9 x 25.4	9	3.500	.450	25.4	508	1016
MC10 x 6.5	10	1.125	.150	6.5	130	260
MC10 x 8.4	10	1.500	.170	8.4	168	336
MC10 x 22.0	10	3.376	.312	22.0	440	880
MC10 x 25.0	10	3.405	.380	25.0	500	1000
MC10 x 28.5	10	3.950	.425	28.5	570	1140
MC10 x 33.6	10	4.100	.575	33.6	672	1344
MC12 x 10.6	12	1.500	.190	10.6	212	424
MC12 x 31.0	12	3.670	.370	31.0	620	1240
MC12 x 35.0	12	3.767	.467	35.0	700	1400
MC12 x 37.0	12	3.600	.600	37.0	740	1480
MC12 x 45.0	12	4.012	.712	45.0	900	1800
MC12 x 50.0	12	4.135	.835	50.0	1000	2000
MC13 x 31.8	13	4.000	.375	31.8	636	1272
MC13 x 40.0	13	4.185	.560	40.0	800	1600
MC13 x 50.0	13	4.412	.787	50.0	1000	2000
MC18 x 42.7	18	3.950	.450	42.7	854	1708
MC18 x 45.8	18	4.000	.500	45.8	916	1832
MC18 x 51.9	18	4.100	.600	51.9	1038	2076
MC18 x 58.0	18	4.200	.700	58.0	1160	2320

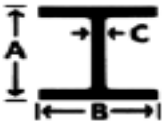
STANDARD ("I") BEAMS

AISI Designation	A Depth In Inches	B Flange Width Inches	C Web Thickness Inches	Weight, Lbs. Per Foot	20-Ft. Length	40-Ft. Length
S3 x 5.7	3	2.330	.170	5.7	114	228
S3 x 7.5	3	2.509	.349	7.5	150	300
S4 x 7.7	4	2.663	.193	7.7	154	308
S4 x 9.5	4	2.796	.326	9.5	190	380
S5 x 10	5	3.004	.214	10.0	200	400
S5 x14.75	5	3.284	.494	14.75	295	590
S6 x 12.5	6	3.332	.232	12.5	250	500
S6 X17.25	6	3.565	.465	17.25	345	690
S7 x 15.3	7	3.662	.252	15.3	306	612
S7 x 20	7	3.860	.450	20.0	400	800
S8 x 18.4	8	4.001	.271	18.4	368	736
S8 x 23	8	4.171	.441	23.0	460	920
S10 x 25.4	10	4.661	.311	25.4	508	1016
S10 x 35	10	4.944	.594	35.0	700	1400
S12 x 31.8	12	5.000	.350	31.8	636	1272
S12 x 35	12	5.078	.428	35.0	700	1400
S12 x 40.8	12	5.252	.462	40.8	816	1632
S12 x 50	12	5.477	.687	50.0	100	2000
S15 x 42.9	15	5.501	.411	42.9	858	1716
S15 x 50	15	5.640	.550	50.0	1000	2000
S18 x 54.7	18	6.001	.461	54.7	1094	2188
S18 x 70	18	6.251	.711	70.0	1400	2800
S20 x 66	20	6.255	.505	66.0	1320	2640
S20 x 75	20	6.385	.635	75.0	1500	3000
S20 x 86	20	7.060	.660	86.0	1720	3440
S20 x 96	20	7.200	.800	96.0	1920	3840
S24 x 80	24	7.000	.500	80.0	1600	3200
S24 x 90	24	7.125	.625	90.0	1800	3600
S24 x 100	24	7.245	.745	100.0	2000	4000
S24 x 106	24.5	7.870	.620	106.0	2120	4240
S24 x 121	24.5	8.050	.800	121.0	2420	4840



WIDE FLANGE (W) AND MISCELLANEOUS SHAPES (M)

AISI Designation	A Depth In Inches	B Flange Width Inches	C Web Thickness Inches	Weight, Lbs. Per Foot	20-Ft. Length	40-Ft. Length
W4 x 13.0	4.16	4.060	.280	13.0	260	520
M4 x 13.0	4.00	3.940	.254	13.0	260	520
W5 x 16.0	5.01	5.000	.240	16.0	320	640
M5 x 18.9	5.00	5.003	.316	18.9	378	756
W5 x 19.0	5.15	5.030	.270	19.0	380	760
M6 x 4.4	6.00	1.844	.114	4.4	88	176
W6 X 9.0	5.90	3.940	.170	9.0	180	360
W6 X12.0	6.03	4.000	.230	12.0	240	480
W6 X15.0	5.99	5.990	.230	15.0	300	600
W6 X16.0	6.28	4.030	.260	16.0	320	640
W6 X20.0	6.20	6.020	.260	20.0	400	800
W6 X25.0	6.38	6.080	.320	25.0	500	1000
M8 x 6.5	8.00	2.281	.135	6.5	130	260
W8 x 10.0	7.89	3.940	.170	10.0	200	400
W8 x 13.0	7.99	4.000	.230	13.0	260	520
W8 x 15.0	8.11	4.015	.245	15.0	300	600
W8 x 18.0	8.14	5.250	.230	18.0	360	720
W8 x 21.0	8.28	5.270	.250	21.0	420	840
W8 x 24.0	7.93	6.495	.245	24.0	480	960
W8 x 28.0	8.06	6.535	.285	28.0	560	1120
W8 x 31.0	8.00	7.995	.285	31.0	620	1240
W8 x 35.0	8.12	8.020	.310	35.0	700	1400
W8 x 40.0	8.25	8.070	.360	40.0	800	1600
W8 x 48.0	8.50	8.110	.400	48.0	960	1920
W8 x 58.0	8.75	8.220	.510	58.0	1160	2320
W8 x 67.0	9.00	8.280	.570	67.0	1340	2680
M10 x 9.0	10.00	2.690	.157	9.0	180	360
W10 x 12.0	9.87	3.960	.190	12.0	240	480
W10 x 15.0	9.99	4.000	.230	15.0	300	600
W10 x 17.0	10.11	4.010	.240	17.0	340	680
W10 x 19.0	10.24	4.020	.250	19.0	380	760
W10 x 22.0	10.17	5.750	.240	22.0	440	880
W10 x 26.0	10.33	5.770	.260	26.0	520	1040
W10 x 30.0	10.47	5.810	.300	30.0	600	1200
W10 x 33.0	9.73	7.960	.290	33.0	660	1320
W10 x 39.0	9.92	7.985	.315	39.0	780	1560
W10 x 45.0	10.10	8.020	.350	45.0	900	1800
W10 x 49.0	9.98	10.000	.340	49.0	980	1960
W10 x 54.0	10.09	10.030	.370	54.0	1080	2160
W10 X60.0	10.22	10.080	.420	60.0	1200	2400
W10 X68.0	10.40	10.130	.470	68.0	1360	2720
W10 X77.0	10.60	10.190	.530	77.0	1540	3080
W10 X88.0	10.84	10.265	.605	88.0	1760	3520
W10 X100.0	11.10	10.340	.680	100.0	2000	4000

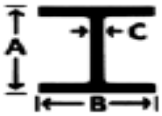


WIDE FLANGE (W) AND MISCELLANEOUS SHAPES (M)

(Continued)

AISI Designation	A Depth in Inches	B Flange Width Inches	C Web Thickness Inches	Weight, Lbs. Per Foot	20-Ft. Length	40-Ft. Length
M12 x 11.8	12.00	3.065	.177	11.8	236	472
W12 x 14.0	11.91	3.970	.200	14.0	280	560
W12 x 16.0	11.99	3.990	.220	16.0	320	640
W12 x 19.0	12.16	4.005	.235	19.0	380	760
W12 x 22.0	12.31	4.030	.260	22.0	440	880
W12 x 26.0	12.22	6.490	.230	26.0	520	1040
W12 x 30.0	12.34	6.520	.260	30.0	600	1200
W12 x 35.0	12.50	6.560	.300	35.0	700	1400
W12 x 40.0	11.94	8.005	.295	40.0	800	1600
W12 x 45.0	12.06	8.045	.335	45.0	900	1800
W12 x 50.0	12.19	8.080	.370	50.0	1000	2000
W12 x 53.0	12.06	9.995	.345	53.0	1060	2120
W12 x 58.0	12.19	10.010	.360	58.0	1160	2320
W12 x 65.0	12.12	12.000	.390	65.0	1300	2600
W12 x 72.0	12.25	12.040	.430	72.0	1440	2880
W12 x 79.0	12.38	12.080	.470	79.0	1580	3160
W12 x 87.0	12.53	12.125	.515	87.0	1740	3480
W12 x 96.0	12.71	12.160	.550	96.0	1920	3840
W12 x106.0	12.89	12.220	.610	106.0	2120	4240
W12 x120.0	13.12	12.320	.710	120.0	2400	4800
W12 x136.0	13.41	12.400	.790	136.0	2720	5440
M14 x 22.0	13.72	5.000	.230	22.0	440	880
W14 x 26.0	13.91	5.025	.255	26.0	520	1040
W14 x 30.0	13.84	6.730	.270	30.0	600	1200
W14 x 34.0	13.98	6.745	.285	34.0	680	1360
W14 x 38.0	14.10	6.770	.310	38.0	760	1520
W14 x 43.0	13.66	7.995	.305	43.0	860	1720
W14 x 48.0	13.79	8.030	.340	48.0	960	1920
W14 x 53.0	13.92	8.060	.370	53.0	1060	2120
W14 x 61.0	13.89	9.995	.375	61.0	1220	2440
W14 x 68.0	14.04	10.035	.415	68.0	1360	2720
W14 x 74.0	14.17	10.070	.450	74.0	1480	2960
W14 x 82.0	14.31	10.130	.510	82.0	1640	3280
W14 x 90.0	14.02	14.520	.440	90.0	1800	3600
W14 X99.0	14.16	14.565	.485	99.0	1980	3960
W14 X109.0	14.32	14.605	.525	109.0	2180	4360
W14 X120.0	14.48	14.670	.590	120.0	2400	4800
W14 X132.0	14.66	14.725	.645	132.0	2640	5280
W14 X159.0	14.98	15.565	.745	159.0	3180	6360
W16 X26.0	15.69	5.500	.250	26.0	520	1040
W16 X31.0	15.88	5.525	.275	31.0	620	1240
W16 X36.0	15.86	6.985	.295	36.0	720	1440
W16 X40.0	16.01	6.995	.305	40.0	800	1600
W16 X45.0	16.13	7.035	.345	45.0	900	1800
W16 X50.0	16.26	7.070	.380	50.0	1000	2000

(Continued on next page)



WIDE FLANGE (W) AND MISCELLANEOUS SHAPES (M)

(Continued)

AISI Designation	A Depth In Inches	B Flange Width Inches	C Web Thickness Inches	Weight, Lbs.		
				Per Foot	20-Ft. Length	40-Ft. Length
M16 x 57.0	16.43	7.120	.430	57.0	1140	2280
W16 x 67.0	16.33	10.235	.395	67.0	1340	2680
W16 x 77.0	16.52	10.295	.455	77.0	1540	3080
W16 x 89.0	16.75	10.365	.525	89.0	1780	3560
W16 x100.0	16.97	10.425	.585	100.0	2000	4000
W18 x 35.0	17.70	6.000	.300	35.0	700	1400
W18 x 40.0	17.90	6.015	.315	40.0	800	1600
W18 x 46.0	18.06	6.060	.360	46.0	920	1840
W18 x 50.0	17.99	7.495	.355	50.0	1000	2000
W18 x 55.0	18.11	7.530	.390	55.0	1100	2200
W18 x 60.0	18.24	7.555	.415	60.0	1200	2400
W18 x 65.0	18.35	7.590	.450	65.0	1300	2600
W18 x 71.0	18.47	7.635	.495	71.0	1420	2840
W18 x 76.0	18.21	11.035	.425	76.0	1520	3040
W18 x 86.0	18.39	11.090	.480	86.0	1720	3440
W18 x 97.0	18.59	11.145	.535	97.0	1940	3880
W18 x106.0	18.73	11.200	.590	106.0	2120	4240
W18 x119.0	18.97	11.265	.655	119.0	2380	4760
W21 x 44.0	20.66	6.500	.350	44.0	880	1760
W21 x 57.0	21.06	6.555	.405	57.0	1140	2280
W21 x 62.0	20.99	8.240	.400	62.0	1240	2480
M21 x 68.0	21.13	8.270	.430	68.0	1360	2720
W21 x 73.0	21.24	8.295	.455	73.0	1460	2920
W21 x 83.0	21.43	8.355	.515	83.0	1660	3320
W21 x101.0	21.36	12.290	.500	101.0	2020	4040
W24 x 55.0	23.57	7.005	.395	55.0	1800	2200
W24 x 68.0	23.73	8.965	.415	68.0	1360	2720
W24 x 76.0	23.92	8.990	.440	76.0	1520	3040
W24 x 84.0	24.10	9.020	.470	84.0	1680	3360
W24 x 94.0	24.31	9.065	.515	94.0	1880	3760
W24 x104.0	24.06	12.750	.500	104.0	2080	4160
W24 x117.0	24.26	12.800	.550	117.0	2340	4680
W24 x131.0	24.48	12.855	.605	131.0	2620	5240
W24 x146.0	24.74	12.900	.650	146.0	2920	5840
W24 X162.0	25.00	12.955	.705	162.0	3240	6480
W27 X94.0	26.92	9.990	.490	94.0	1880	3760
W27 X102.0	27.09	10.015	.515	102.0	2040	4080
W27 X114.0	27.29	10.070	.570	114.0	2280	4560
W27 X146.0	27.38	13.965	.605	146.0	2920	5840
W27 X161.0	27.59	14.020	.660	161.0	3220	6440
W30 X108.0	29.83	10.475	.545	108.0	2160	4320
W30 X116.0	30.01	10.495	.565	116.0	2320	4640
W30 X124.0	30.17	10.515	.585	124.0	2480	4960
W30 X132.0	30.31	10.545	.615	132.0	2640	5280

BAR SIZE TEES

Stocked in Lengths of 20'

Size In Inches					Estimated Weight, Lbs.	
Flange A		Stem B		Thickness C	Per Foot	20-Ft. Length
1	x	1	x	1/8	.85	17.0
1 1/4	x	1 1/4	x	1/8	1.09	21.8
				3/16	1.55	31.0
1 1/2	x	1 1/2	x	3/16	1.90	38.0
				1/4	2.43	48.6
1 3/4	x	1 3/4	x	3/16	2.16	43.2
2	x	2	x	1/4	3.62	72.4
2 1/2	x	2 1/2	x	1/4	4.60	92.0

ROUND REINFORCING BARS
Deformed – Grade 40
Stock Lengths 20

Bar Designation Number	Size In Inches	Estimated Weight, Lbs.		
		Per Foot	20' Bar	40' Bar
3	3/8	.3759	7.517	15.04
4	1/2	.6682	13.36	26.73
5	5/8	1.044	20.88	41.76
6	3/4	1.504	30.07	60.16
7	7/8	2.046	40.93	81.84
8	1	2.673	53.46	106.9

HOT ROLLED MILD STEEL BARS

HOT ROLLED MILD STEEL ROUNDS

Stock Lengths 20'

Size in Inches	Estimated Weight, Lbs. Per Foot	20-Ft. Bar	Size in Inches	Estimated Weight, Lbs. Per Foot	20-Ft. Bar
3/16	.0940	1.879	1 1/8	3.383	67.66
1/4	.1671	3.341	1/4	4.176	83.53
5/16	.2610	5.220	3/8	5.053	101.1
23/64	.3452	6.904	1/2	6.014	120.3
3/8	.3759	7.517	5/8	7.058	141.2
7/16	.5116	10.23	3/4	8.186	163.7
31/64	.6271	12.54	7/8	9.397	187.9
1/2	.6682	13.36	2	10.69	213.8
9/16	.8457	16.91	1/8	12.07	241.4
39/64	.9925	19.85	1/4	13.53	270.6
5/8	1.044	20.88	3/8	15.08	301.5
47/64	1.442	28.83	1/2	16.71	334.1
3/4	1.504	30.07	5/8	18.42	368.4
55/64	1.974	39.48	3/4	20.21	404.3
7/8	2.046	40.93	7/8	22.09	441.9
63/64	2.590	51.80			
1	2.673	53.46			
1/16	3.017	60.35			

HOT ROLLED MILD STEEL SQUARES

Stock Lengths 20'

Size in Inches	Estimated Weight, Lbs. Per Foot	20-Ft. Bar	Size in Inches	Estimated Weight, Lbs. Per Foot	20-Ft. Bar
1/4	.2127	4.254	1 5/8	8.987	179.7
5/16	.3323	6.647	3/4	10.42	208.4
3/8	.4786	9.572	7/8	11.96	239.3
7/16	.6514	13.03	2	13.61	272.3
1/2	.8508	17.02	1/4	17.23	344.6
5/8	1.329	26.59	1/2	21.27	425.4
3/4	1.914	38.29	3/4	25.74	514.7
7/8	2.606	52.11	3	30.63	612.6
1	3.403	68.06	1/4	35.95	718.9
1/8	4.307	86.14	1/2	41.69	833.8
1/4	5.318	106.4	4	54.45	1089
3/8	6.434	128.7	1/2	68.91	1378
1/2	7.657	153.1	5	85.08	1702
			6	122.5	2450

HOT ROLLED MILD STEEL BARS

HOT ROLLED MILD STEEL FLATS

Stock Lengths 20'

Size In Inches	Est. Wt., Lbs. Per Foot	Est. Wt., Lbs. 20-Ft. Bar
1/8 and 3/16 thick – See Flats, Page 15		
1/4 x		
3/8	.3191	6.381
1/2	.4254	8.508
5/8	.5318	10.64
3/4	.6381	12.76
7/8	.7445	14.89
1	.8508	17.02
1 1/8	.9572	19.14
1 1/4	1.064	21.27
1 3/8	1.170	23.40
1 1/2	1.276	25.52
1 5/8	1.383	27.65
1 3/4	1.489	29.78
2	1.702	34.03
2 1/4	1.914	38.29
2 1/2	2.127	42.54
2 3/4	2.340	46.79
3	2.552	51.05
3 1/4	2.765	55.30
3 1/2	2.978	59.56
3 3/4	3.191	63.81
4	3.403	68.06
4 1/4	3.616	72.32
4 1/2	3.829	76.57
5	4.254	85.08
5 1/2	4.679	93.59
6	5.105	102.1
6 1/2	5.530	110.6
7	5.956	119.1
7 1/2	6.381	127.6
8	6.806	136.1
9	7.657	153.1
10	8.508	170.2
11	9.359	187.2
12	10.21	204.2
5/16 x		
1/2	.5318	10.64
5/8	.6647	13.29
3/4	.7976	15.95
7/8	.9306	18.61
1	1.064	21.27
1 1/8	1.196	23.93
1 1/4	1.329	26.59
1 1/2	1.595	31.91
1 3/4	1.861	37.22
2	2.127	42.54
2 1/4	2.393	47.86
2 1/2	2.659	53.18
2 3/4	2.925	58.49
3	3.191	63.81
3 1/4	3.456	69.13
3 1/2	3.722	74.45
4	4.254	85.08
4 1/2	4.786	95.72
5	5.318	106.4
5 1/2	5.849	117.0
6	6.381	127.6
7	7.445	148.9
8	8.508	170.2
3/8 x		
1/2	.6381	12.76
5/8	.7976	15.95
3/4	.9572	19.14
7/8	1.117	22.33
1	1.276	25.52
1 1/8	1.436	28.71
1 1/4	1.595	31.91
1 3/8	1.755	35.10
1 1/2	1.914	38.29
1 5/8	2.074	41.48
1 3/4	2.233	44.67
2	2.552	51.05
2 1/4	2.871	57.43
2 1/2	3.191	63.81
2 3/4	3.510	70.19
3	3.829	76.57
3 1/4	4.148	82.95
3 1/2	4.467	89.33
3 3/4	4.786	95.72
4	5.105	102.1
4 1/4	5.424	108.5
4 1/2	5.743	114.9
5	6.381	127.6
5 1/2	7.019	140.4
6	7.657	153.1
6 1/2	8.295	165.9
7	8.933	178.7
7 1/2	9.572	191.4
8	10.21	204.2
9	11.49	229.8
10	12.76	255.2
11	14.04	280.8
12	15.31	306.3
7/16 x		
1	1.489	29.78
1 1/4	1.861	37.22
1 1/2	2.233	44.67
2	2.978	59.56
2 1/2	3.722	74.45
3	4.467	89.33
1/2 x		
5/8	1.064	21.27
3/4	1.276	25.52
7/8	1.489	29.78
1	1.702	34.03
1 1/8	1.914	38.29
1 1/4	2.127	42.54
1 3/8	2.340	46.79
1 1/2	2.552	51.05
1 5/8	2.765	55.30
1 3/4	2.978	59.56
2	3.403	68.06
2 1/4	3.829	76.57
2 1/2	4.254	85.08
2 3/4	4.679	93.59
3	5.105	102.1
3 1/4	5.530	110.6
3 1/2	5.956	119.1
3 3/4	6.381	127.6
4	6.806	136.1
4 1/2	7.657	153.1
5	8.508	170.2
5 1/2	9.359	187.2
6	10.21	204.2
6 1/2	11.06	221.2
6 3/4	11.49	229.8
7	11.91	238.2
8	13.61	272.3
9	15.31	306.3
10	17.02	340.3
11	18.72	374.4
12	20.42	408.4
5/8 x		
3/4	1.595	31.91
7/8	1.861	37.22
1	2.127	42.54
1 1/8	2.393	47.86
1 1/4	2.659	53.18
1 1/2	3.191	63.81
1 5/8	3.456	69.13
1 3/4	3.722	74.45
2	4.254	85.08
2 1/4	4.786	95.72
2 1/2	5.318	106.4
2 3/4	5.849	117.0
3	6.381	127.6
3 1/4	6.913	138.3
3 1/2	7.445	148.9
4	8.508	170.2
4 1/2	9.572	191.4
5	10.64	212.7
5 1/2	11.70	234.0
6	12.76	255.2
7	14.89	297.8
8	17.02	340.3
9	19.14	382.8
10	21.27	425.4
12	25.52	510.5
3/4 x		
7/8	2.233	44.67
1	2.552	51.05
1 1/8	2.871	57.43
1 1/4	3.191	63.81
1 1/2	3.829	76.57
1 5/8	4.148	82.95
1 3/4	4.467	89.33
2	5.105	102.1
2 1/4	5.743	114.9
2 1/2	6.381	127.6
2 3/4	7.019	140.4
3	7.657	153.1
3 1/4	8.295	165.9
3 1/2	8.933	178.7
4	10.21	204.2
4 1/2	11.49	229.7
5	12.76	255.2
5 1/2	14.04	280.8
6	15.31	306.3
7	17.87	357.3
8	20.42	408.4
10	25.52	510.5
12	30.63	612.6
7/8 x		
1	2.978	59.56
1 1/4	3.722	74.45
1 1/2	4.467	89.33
1 3/4	5.211	104.2
2	5.956	119.1
2 1/4	6.700	134.0
2 1/2	7.445	148.9
2 3/4	8.189	163.8
3	8.933	178.7
3 1/2	10.42	208.4
4	11.91	238.2
4 1/2	13.40	268.0
5	14.89	297.8
5 1/2	16.38	327.6
6	17.87	357.3
7	20.84	416.9
8	23.82	476.4

(Continued next page)

HOT ROLLED MILD STEEL FLATS

Stock Lengths 20'

Size In Inches	Est. Wt., Lbs. Per Foot	Est. Wt., Lbs. 20-Ft. Bar
1 x		
1¼	4.254	85.08
1½	5.105	102.1
1¾	5.956	119.1
2	6.806	136.1
2¼	7.657	153.1
2½	8.508	170.2
2¾	9.359	187.2
3	10.21	204.2
3¼	11.06	221.2
3½	11.91	238.2
4	13.61	272.3
4½	15.31	306.3
5	17.02	340.3
5½	18.72	374.4
6	20.42	408.4
7	23.82	476.4
8	27.23	544.5
10	34.03	680.6
12	40.84	816.8
1 1/8 x		
2	7.657	153.1
3	11.49	229.7
4	15.31	306.3
5	19.14	382.9
6	22.97	459.4
1 1/4 x		
1½	6.381	127.6
1¾	7.445	148.9
2	8.508	170.2
2¼	9.572	191.4
2½	10.64	212.7
2¾	11.70	234.0
3	12.76	255.2
3¼	13.82	276.4
3½	14.89	297.8
4	17.02	340.3
4½	19.14	382.9
5	21.27	425.4
5½	23.40	467.9
6	25.52	510.5
7	29.78	595.6
8	34.03	680.6
1 1/2 x		
1¾	8.933	178.7
2	10.21	204.2
2¼	11.49	229.7
2½	12.76	255.2
2¾	14.04	280.8
3	15.31	306.3
3½	17.87	357.3
4	20.42	408.4
4½	22.97	459.4
4¾	24.25	485.0
5	25.52	510.5
5½	28.08	561.5
6	30.63	612.6
7	35.73	714.7
8	40.84	816.8
1 3/4 x		
2	11.91	238.2
2½	14.89	297.8
3	17.87	357.3
3½	20.84	416.9
4	23.82	476.4
4½	26.80	536.0
5	29.78	595.6
5½	32.76	655.1
6	35.73	714.7
2 x		
2¼	15.31	306.3
2½	17.02	340.3
3	20.42	408.4
3½	23.82	476.4
4	27.23	544.5
4½	30.63	612.6
5	34.03	680.6
6	40.84	816.8
7	47.64	952.9
8	54.45	1089
2 1/4 x		
4	30.63	612.6
2 1/2 x		
3	25.52	510.5
3½	29.78	595.6
4	34.03	680.6
4½	38.29	765.7
5	42.54	850.8
6	51.05	1021
8	68.06	1361
3 x		
4	40.84	816.8
4½	45.94	918.9
5	51.05	1021
6	61.26	1225

MILD STEEL HALF ROUNDS

Stock Lengths 20'

Size In Inches	Estimated Weight, Lbs. Per Foot	20-Ft. Bar
½	.334	6.68
⅝	.522	10.44
¾	.751	15.02
1		1.335 26.70
1½	3.004	60.08

SQUARE STEEL TUBING

Outside Dimensions	Wall Thickness	Weight Per Foot
3/8 x 3/8	.049	.2172
	.065	.2740
1/2 x 1/2	.035	.2213
	.049	.3005
	.065	.3845
5/8 x 5/8	.028	.2273
	.035	.2808
	.049	.3838
	.065	.4950
	.083	.6118
3/4 x 3/4	.028	.2749
	.035	.3403
	.049	.4671
	.065	.6055
	.083	.7530
	.120	1.028
7/8 x 7/8	.028	.3225
	.035	.3998
	.049	.5504
	.065	.7160
	.083	.8940
	.095	1.008
1 x 1	.028	.3701
	.035	.4593
	.049	.6337
	.065	.8265
	.072	.9090
	.083	1.035
	.095	1.169
	.109	1.321
	.120	1.436
1 1/8 x 1 1/8	.035	.5188
	.049	.7170
	.065	.9370
	.083	1.176
	.095	1.331
	.109	1.506
	.120	1.640
1 1/4 x 1 1/4	.035	.5780
	.049	.8000
	.065	1.047
	.083	1.317
	.095	1.492
	.109	1.691
	.120	1.844
	.188	2.610

Outside Dimensions	Wall Thickness	Weight Per Foot
1 1/2 x 1 1/2	.035	.6977
	.049	.9670
	.065	1.268
	.083	1.599
	.095	1.815
	.109	2.062
	.120	2.252
	.134	2.489
	.188	3.350
1 3/4 x 1 3/4	.035	.8163
	.049	1.134
	.065	1.490
	.083	1.882
	.095	2.138
	.109	2.432
	.120	2.660
	.134	2.945
2 x 2	.065	1.710
	.083	2.164
	.095	2.461
	.109	2.830
	.120	3.060
	.134	3.401
	.148	3.728
	.188	4.320
	.220	5.326
	.250	5.410
2 1/4 x 2 1/4	.065	1.932
	.083	2.446
	.095	2.784
	.109	3.174
	.120	3.476
	.134	3.856
	.148	4.231
	.180	5.067
2 1/2 x 2 1/2	.065	2.152
	.083	2.728
	.095	3.107
	.109	3.580
	.120	3.910
	.134	4.312
	.148	4.734
	.188	5.610
	.250	7.110

SQUARE STEEL TUBING

(Cont.)

Outside Dimensions	Wall Thickness	Weight Per Foot
3 x 3	.065	2.594
	.083	3.292
	.095	3.753
	.109	4.286
	.120	4.700
	.134	5.223
	.188	6.870
	.203	7.722
	.250	8.810
	.313	10.58
3¼ x 3¼	.083	3.575
	.095	4.076
	.109	4.656
	.120	5.108
	.134	5.679
	.180	7.515
3½ x 3½	.083	3.857
	.095	4.399
	.109	5.027
	.120	5.516
	.125	5.610
	.134	6.134
	.148	6.747
	.188	8.150
	.250	10.51
	.313	12.70
4 x 4	.083	4.422
	.120	6.330
	.188	9.450
	.250	12.21
	.313	14.83
	.375	17.27
	.500	21.63
4½ x 4½	.188	10.70
	.250	13.91
5 x 5	.188	11.97
5 x 5	.250	15.62
	.313	19.08
	.375	22.37
	.500	28.43
5½ x 5½	.188	13.25
	.250	17.32
	.313	21.21
	.375	24.93
6 x 6	.188	14.56
	.350	19.02
	.313	23.34
	.375	27.48
	.500	35.24
7 x 7	.188	17.13
	.250	22.42
	.313	27.63
	.375	32.58
	.500	42.05
8 x 8	.188	19.63
	.250	25.82
	.313	31.84
	.375	37.69
	.500	48.85
9 x 9	.188	22.18
	.250	29.23
	.313	36.10
	.375	55.66
	.500	55.66
10 x 10	.188	24.73
	.250	32.63
	.375	47.90
	.500	62.46
12 x 12	.188	29.84
	.250	39.43
	.375	58.10
	.500	76.07

RECTANGULAR STEEL TUBING

Outside Dimensions	Wall Thickness s	Weight Per Foot
3/4 x 1/2	.065	.4950
1 x 1/2	.065	.6055
1 1/4 x 1/2	.065	.7160
1 1/2 x 3/4	.065	.9370
	.120	1.640
1 1/2 x 1	.049	.8000
	.065	1.048
	.083	1.317
	.095	1.492
	.109	1.691
	.120	1.844
2 x 1	.065	1.269
	.083	1.600
	.095	1.815
	.109	2.062
	.120	2.252
2 x 1 1/4	.065	1.379
	.083	1.741
	.095	1.977
	.109	2.247
	.120	2.456
2 x 1 1/2	.065	1.490
	.083	1.882
	.095	2.138
	.109	2.433
	.120	2.660
2 1/2 x 1	.065	1.490
	.083	1.882
	.095	2.138
	.109	2.443
	.120	2.660
2 1/2 x 1 1/2	.065	1.711
	.083	2.164
	.095	2.461
	.109	2.803
	.120	3.068
	.134	3.401
	.180	4.454
	.188	4.490
	.250	5.400

Outside Dimensions	Wall Thickness s	Weight Per Foot
3 x 1	.065	1.711
	.083	2.164
	.095	2.461
	.109	2.830
	.120	3.060
3 x 1 1/2	.065	1.932
	.083	2.446
	.095	2.784
	.109	3.174
	.120	3.476
	.134	3.856
	.148	4.231
	.180	5.067
	.188	5.070
3 x 2	.065	2.153
	.083	2.728
	.095	3.107
	.109	3.544
	.120	3.884
	.134	4.312
	.148	4.734
	.188	5.590
	.250	7.110
3 x 2 1/2	.065	2.374
	.083	3.011
	.095	3.430
	.109	3.915
	.120	4.292
	.134	4.767
	.148	5.237
	.180	6.291
3 1/2 x 1	.065	1.932
	.083	2.446
	.095	2.784
	.109	3.174
	.120	3.476

Outside Dimensions	Wall Thickness s	Weight Per Foot
3 1/2 x 1 1/2	.065	2.153
	.083	2.728
	.095	3.107
	.109	3.544
	.120	3.884
3 1/2 x 2 1/2	.065	2.595
	.083	3.293
	.095	3.753
	.109	4.286
	.120	4.700
	.134	5.223
	.148	5.741
	.188	6.903
4 x 1 1/2	.065	2.374
	.083	3.011
	.095	3.430
	.109	3.915
	.120	4.292
	.134	4.767
	.148	5.237
	.180	6.291
4 x 2	.065	2.595
	.083	3.293
	.095	3.753
	.109	4.286
	.120	4.700
	.134	5.223
	.148	5.741
	.188	6.870
	.250	8.810
4 x 2 1/2	.083	3.575
	.095	4.076
	.109	4.656
	.120	5.108
	.134	5.679
	.148	6.244
	.180	7.515

RECTANGULAR STEEL TUBING (cont.)

Outside Dimensions	Wall Thickness	Weight Per Foot
4 x 3	.083	3.857
	.095	4.399
	.109	5.027
	.120	5.516
	.134	6.134
	.148	6.747
	.188	8.150
	.250	10.51
	.313	12.70
5 x 2	.109	5.027
	.120	5.516
	.134	6.134
	.148	6.747
	.188	8.150
	.250	10.51
5 x 2 1/2	.109	5.397
	.120	5.924
	.134	6.590
	.148	7.250
	.180	8.739
5 x 3	.120	6.330
	.188	9.420
	.250	12.21
	.313	14.83
	.375	17.27
	.500	21.63
5 x 4	.188	10.70
	.250	13.91
6 x 2	.188	9.420
	.250	12.21
	.313	14.83
6 x 3	.120	7.150
	.188	10.70
	.250	13.91
	.375	19.82
6 x 4	.188	11.97
	.250	15.62
	.313	19.08
	.375	22.37
	.500	28.43
7 X 3	.188	12.30
	.250	15.62
	.313	19.08
	.375	22.37
7 x 4	.188	13.25
	.250	17.32
	.313	21.21
	.375	24.93
7 x 5	.188	14.53
	.250	19.02
	.313	23.34
	.375	27.48
	.500	35.24
8 x 2	.188	11.97
	.250	15.62
	.313	19.08
	.375	22.37
8 x 3	.188	13.25
	.250	17.32
	.313	21.22
	.375	24.93
8 x 4	.188	14.53
	.250	19.02
	.313	23.34
	.375	27.48
	.500	35.24
8 x 6	.188	17.08
	.250	22.42
	.313	27.59
	.375	32.58
	.500	42.05
9 x 3	.188	14.53
	.250	19.02
	.313	23.34
	.375	27.48
9 x 5	.188	17.08
	.250	22.42
	.313	27.59
	.375	32.58
9 x 7	.188	19.63
	.250	25.82
	.313	31.84
	.375	37.69
10 x 2	.188	14.53
	.250	19.02
	.313	23.34
	.375	27.48
10 x 3	.250	20.72
10 x 4	.188	17.08
	.250	22.42
	.313	27.59
	.375	32.58
10 x 5	.188	18.35
	.250	24.12
10 x 6	.188	19.63
	.250	25.82
	.313	31.84
	.375	37.69
	.500	48.85
10 x 8	.375	42.79
	.500	55.66
12 x 2	.188	17.08
12 x 4	.188	19.63
	.250	25.82
	.313	31.84
	.375	37.69
12 x 6	.188	22.18
	.250	29.23
	.313	36.10
	.375	42.79
	.500	55.66

1018 COLD FINISHED ROUNDS

Stock Lengths: 12'

Size In Inches	Est. Wt., Lbs. Per Foot
1/8	.0418
5/32	.0653
3/16	.0940
7/32	.1279
1/4	.1671
9/32	.2114
5/16	.2610
11/32	.3158
3/8	.3759
13/32	.4411
7/16	.5116
15/32	.5873
1/2	.6682
17/32	.7544
9/16	.8457
19/32	.9425
5/8	1.044
11/16	1.263
23/32	1.381
3/4	1.504
49/64	1.567
13/16	1.765
7/8	2.046
15/16	2.349
1	2.673
1/64	2.757
1/32	2.843
1/16	3.017
1/8	3.383
3/16	3.769
1/4	4.176
5/16	4.604
3/8	5.053
7/16	5.523
1/2	6.014
9/16	6.526
5/8	7.058
11/16	7.612
3/4	8.186
13/16	8.781
7/8	9.397

Size In Inches	Est. Wt., Lbs. Per Foot
1 15/16	10.03
2	10.69
1/16	11.37
1/8	12.07
3/16	12.79
1/4	13.53
5/16	14.29
3/8	15.08
7/16	15.88
1/2	16.71
9/16	17.55
5/8	18.42
11/16	19.31
3/4	20.21
13/16	21.14
7/8	22.09
15/16	23.06
3	24.06
1/16	25.07
1/8	26.10
3/16	27.16
1/4	28.23
5/16	29.33
3/8	30.45
7/16	31.58
1/2	32.74
9/16	33.92
5/8	35.12
11/16	36.35
3/4	37.59
7/8	40.14
15/16	41.44
4	42.77
1/8	45.48
3/16	46.87
1/4	48.28
5/16	49.71

Size In Inches	Est. Wt., Lbs. Per Foot
4 3/8	51.16
7/16	52.63
1/2	54.13
9/16	55.64
5/8	57.18
11/16	58.73
3/4	60.31
7/8	63.52
15/16	65.16
5	66.82
1/8	70.21
1/4	73.67
5/16	75.44
3/8	77.22
7/16	79.03
1/2	80.86
5/8	84.57
3/4	88.37
7/8	92.26
15/16	94.23
6	96.22
1/8	100.3
1/4	104.4
3/8	108.6
1/2	112.9
3/4	121.8
7	131.0
1/4	140.5
1/2	150.4
3/4	160.5
8	171.1
1/2	193.1
9	216.5
1/2	241.2
10	267.3
1/2	294.7
11	323.4
1/2	353.5
12	384.9

1018 COLD DRAWN HEXAGONS

Stock Lengths 10' to 12'

Size In Inches	Est. Wt., Lbs. Per Foot	Est. Wt., Lbs. 12-Ft. Bar	Size In Inches	Est. Wt., Lbs. Per Foot	Est. Wt., Lbs. 12-Ft. Bar	Size In Inches	Est. Wt., Lbs. Per Foot	Est. Wt., Lbs. 12-Ft. Bar
3/16	.1036	1.243	1	2.947	35.37	2	11.79	141.5
1/4	.1842	2.210	1/16	3.327	39.93	1/8	13.31	159.7
5/16	.2878	3.454	1/8	3.730	44.76	1/4	14.92	179.0
3/8	.4145	4.973	3/16	4.156	49.87	3/8	16.62	199.5
7/16	.5641	6.769	1/4	4.605	55.26	7/16	17.51	210.1
1/2	.7368	8.842	5/16	5.077	60.93	1/2	18.42	221.0
9/16	.9325	11.19	3/8	5.572	66.87	5/8	20.31	243.7
5/8	1.151	13.82	7/16	6.090	73.08	3/4	22.29	267.5
11/16	1.393	16.72	1/2	6.631	79.56	3	26.53	318.3
3/4	1.658	19.89	9/16	7.196	86.35	1/8	28.78	345.4
7/8	2.257	27.08	5/8	7.783	93.39	1/4	31.13	373.6
15/16	2.590	31.08	3/4	9.026	108.3	1/2	36.10	433.2
			13/16	9.682	116.2	3/4	41.45	497.3
			7/8	10.36	124.3	4	47.16	565.9

1018 COLD FINISHED SQUARES

KEY STOCK

Stock Lengths 12'

Size In Inches	Est. Wt., Lbs. Per Foot	Est. Wt., Lbs. 12-Ft. Bar	Size In Inches	Est. Wt., Lbs. Per Foot	Est. Wt., Lbs. 12-Ft. Bar	Size In Inches	Est. Wt., Lbs. Per Foot	Est. Wt., Lbs. 12-Ft. Bar
1/8	.0531	.6381	1	3.403	40.84	2 1/4	17.23	206.7
3/16	.1196	1.436	1/16	3.842	46.10	3/8	19.20	230.4
1/4	.2127	2.552	1/8	4.307	51.69	1/2	21.27	255.2
5/16	.3323	3.988	3/16	4.799	57.59	5/8	23.45	281.4
3/8	.4786	5.743	1/4	5.318	63.81	3/4	25.74	308.8
7/16	.6514	7.817	5/16	5.863	70.35	3	30.63	367.5
1/2	.8508	10.21	3/8	6.434	77.21	1/4	35.95	431.4
9/16	1.077	12.92	7/16	7.032	84.39	1/2	41.69	500.3
5/8	1.329	15.95	1/2	7.657	91.89	3/4	47.86	574.3
11/16	1.609	19.30	9/16	8.309	99.71	4	54.45	653.4
3/4	1.914	22.97	5/8	8.987	107.8	1/2	68.91	827.0
13/16	2.247	26.96	3/4	10.42	125.1	5	85.08	1021
7/8	2.606	31.27	7/8	11.96	143.6	1/2	102.9	1235
15/16	2.991	35.89	2	13.61	163.4	6	122.5	1470
			1/8	15.37	184.4			

1018 COLD DRAWN FLATS

Stock Lengths 10' and 12'

Size In Inches	Est. Wt., Lbs. Per Foot
1/8 x	
3/16	.0798
1/4	.1064
5/16	.1329
3/8	.1595
7/16	.1861
1/2	.2127
9/16	.2393
5/8	.2659
11/16	.2925
3/4	.3191
7/8	.3722
1	.4254
1 1/8	.4786
1 1/4	.5318
1 3/8	.5849
1 1/2	.6381
1 3/4	.7445
2	.8508
2 1/4	.9572
2 1/2	1.064
2 3/4	1.170
3	1.276
3 1/2	1.489
4	1.702
4 1/2	1.914
5	2.127
6	2.552
8	3.403
10	4.254
12	5.105
3/16 x	
1/4	.1595
5/16	.1994
3/8	.2393
7/16	.2792
1/2	.3191
5/8	.3988
3/4	.4786
7/8	.5583
1	.6381
1 1/8	.7179
1 1/4	.7976
1 3/8	.8774
1 1/2	.9572
1 3/4	1.117
1 7/8	1.196
2	1.276
2 1/4	1.436
2 1/2	1.595
2 3/4	1.755
3	1.914
3 1/4	2.074
3 1/2	2.233
3 3/4	2.393
4	2.552
4 1/2	2.871
5	3.191
6	3.829

Size In Inches	Est. Wt., Lbs. Per Foot
3/16 x	
8	5.105
9	5.743
10	6.381
12	7.657
1/4 x	
5/16	.2659
3/8	.3191
7/16	.3722
1/2	.4254
9/16	.4786
5/8	.5318
3/4	.6381
7/8	.7445
1	.8508
1 1/8	.9572
1 1/4	1.064
1 3/8	1.170
1 1/2	1.276
1 5/8	1.383
1 3/4	1.489
1 7/8	1.595
2	1.702
2 1/4	1.914
2 1/2	2.127
2 3/4	2.340
3	2.552
3 1/4	2.765
3 1/2	2.978
3 3/4	3.191
4	3.403
4 1/4	3.616
4 1/2	3.829
4 3/4	4.041
5	4.254
5 1/4	4.467
5 1/2	4.679
5 3/4	4.892
6	5.105
6 1/2	5.530
7	5.956
8	6.806
9	7.657
10	8.508
11	9.359
12	10.21
14 5/8	12.44
5/16 x	
3/8	.3988
7/16	.4653
1/2	.5318
9/16	.5982
5/8	.6647
3/4	.7976
7/8	.9306
1	1.064
1 1/8	1.196
1 1/4	1.329
1 3/8	1.462

Size In Inches	Est. Wt., Lbs. Per Foot	
5/16 x		
1 1/2	1.595	
1 5/8	1.729	
1 3/4	1.861	
2	2.127	
2 1/4	2.393	
2 1/2	2.659	
2 3/4	2.925	
3	3.191	
3 1/2	3.722	
4	4.254	
4 1/2	4.786	
5	5.318	
5 1/2	5.849	
6	6.381	
8	8.508	
10	10.64	
12	12.76	
3/8 x		
7/16	.5583	
1/2	.6381	
9/16	.7179	
5/8	.7976	
3/4	.9572	
7/8	1.117	
1	1.276	
1 1/8	1.436	
1 1/4	1.595	
1 3/8	1.755	
1 1/2	1.914	
1 5/8	2.074	
1 3/4	2.233	
1 7/8	2.393	
2	2.552	
2 1/4	2.871	
2 1/2	3.191	
2 3/4	3.510	
3	3.829	
3 1/4	4.148	
3 1/2	4.467	
3 3/4	4.786	
4	5.105	
4 1/4	5.424	
4 1/2	5.743	
4 3/4	6.062	
5	6.381	
5 1/4	6.700	
5 1/2	7.019	
5 3/4	7.338	
6	7.657	
6 1/2	8.295	
7	8.933	
8	10.21	
9	11.49	
10	12.76	
11	14.04	
12	15.31	
13 1/2	17.23	206.7
14 5/8	18.66	224.0

1018 COLD DRAWN FLATS (Continued)

Stock Lengths 10' and 12'

Size In Inches	Est. Wt., Lbs. Per Foot	Est. Wt., Lbs. 12-Ft. Bar
7/16 x		
1/2	.7445	8.933
5/8	.9306	11.17
3/4	1.117	13.40
7/8	1.303	15.63
1	1.489	17.87
1 1/8	1.675	20.10
1 1/4	1.861	22.33
1 1/2	2.233	26.80
1 3/4	2.606	31.27
2	2.978	35.73
2 1/4	3.350	40.20
2 1/2	3.722	44.67
2 3/4	4.094	49.13
3	4.467	53.60
4	5.956	71.47
4 1/2	6.700	80.40
5	7.445	89.33
6	8.933	107.2
1/2 x		
9/16	.9572	11.49
5/8	1.064	12.76
3/4	1.276	15.31
7/8	1.489	17.87
1	1.702	20.42
1 1/8	1.914	22.97
1 1/4	2.127	25.52
1 3/8	2.340	28.08
1 1/2	2.552	30.63
1 5/8	2.765	33.18
1 3/4	2.978	35.73
2	3.403	40.84
2 1/4	3.829	45.94
2 1/2	4.254	51.05
2 3/4	4.679	56.15
3	5.105	61.26
3 1/4	5.530	66.36
3 1/2	5.956	71.47
3 3/4	6.381	76.57
4	6.806	81.68
4 1/4	7.232	86.78
4 1/2	7.657	91.89
4 3/4	8.083	96.99
5	8.508	102.1
5 1/4	8.933	107.2
5 1/2	9.359	112.3
5 3/4	9.784	117.4
6	10.21	122.5
6 1/2	11.06	132.7
7	11.91	142.9
8	13.61	163.4
9	15.31	183.8
10	17.02	204.2
11	18.72	224.6
12	20.42	245.0
14	23.82	285.8
14 5/8	24.89	298.7
9/16 x		
5/8	1.196	14.35
3/4	1.436	17.23
7/8	1.675	20.10
1	1.914	22.97
1 1/4	2.393	28.72
1 1/2	2.871	34.46
1 3/4	3.350	40.20
2	3.829	45.95
2 1/2	4.786	57.43
5/8 x		
11/16	1.462	17.54
3/4	1.595	19.14
7/8	1.861	22.33
1	2.127	25.52
1 1/8	2.393	28.71
1 1/4	2.659	31.91
1 3/8	2.925	35.10
1 1/2	3.191	38.29
1 5/8	3.456	41.48
1 3/4	3.722	44.67
2	4.254	51.05
2 1/4	4.786	57.43
2 1/2	5.318	63.81
2 3/4	5.849	70.19
3	6.381	76.57
3 1/4	6.913	82.95
3 1/2	7.445	89.33
4	8.508	102.1
4 1/4	9.040	108.5
4 1/2	9.572	114.9
4 3/4	10.10	121.2
5	10.64	127.6
5 1/2	11.70	140.4
6	12.76	153.1
6 1/2	13.83	166.0
7	14.89	178.7
8	17.02	204.2
9	19.14	229.7
10	21.27	255.2
11	23.40	280.8
12	25.52	306.3
14	29.78	357.4
14 5/8	31.11	373.3
11/16 x		
3/4	1.755	21.06
1	2.340	28.08
3/4 x		
7/8	2.233	26.80
1	2.552	30.63
1 1/8	2.871	34.46
1 1/4	3.191	38.29
1 3/8	3.510	42.11
1 1/2	3.829	45.94
1 5/8	4.148	49.77
1 3/4	4.467	53.60
2	5.105	61.26
2 1/4	5.743	68.91
2 1/2	6.381	76.57
3/4 x		
2 3/4	7.019	84.23
3	7.657	91.89
3 1/4	8.295	99.54
3 1/2	8.933	107.2
3 3/4	9.572	114.9
4	10.21	122.5
4 1/4	10.85	130.2
4 1/2	11.49	137.8
4 3/4	12.12	145.4
5	12.76	153.1
5 1/2	14.04	168.5
6	15.31	183.8
6 1/2	16.59	199.1
7	17.87	214.4
8	20.42	245.0
9	22.97	275.7
10	25.52	306.3
11	28.08	337.0
12	30.63	367.5
14	35.73	428.8
14 5/8	37.33	448.0
7/8 x		
1	2.978	35.73
1 1/8	3.350	40.20
1 1/4	3.722	44.67
1 3/8	4.094	49.13
1 1/2	4.467	53.60
1 3/4	5.211	62.53
2	5.956	71.47
2 1/4	6.700	80.40
2 1/2	7.445	89.33
2 3/4	8.189	98.27
3	8.933	107.2
3 1/2	10.42	125.1
4	11.91	142.9
4 1/2	13.40	160.8
5	14.89	178.7
5 1/2	16.38	196.6
6	17.87	214.4
8	23.82	285.9
10	29.78	357.3
11	32.76	393.1
12	35.73	428.8
1 x		
1 1/8	3.829	45.94
1 1/4	4.254	51.05
1 3/8	4.679	56.15
1 1/2	5.105	61.26
1 5/8	5.530	66.36
1 3/4	5.956	71.47
2	6.806	81.68
2 1/4	7.657	91.89
2 1/2	8.508	102.1
2 3/4	9.359	112.3
3	10.21	122.5
3 1/4	11.06	132.7
3 1/2	11.91	142.9
3 3/4	12.76	153.1

1018 COLD DRAWN FLATS (Continued)

Stock Lengths 10' and 12'

Size In Inches	Est. Wt., Lbs. Per Foot	Est. Wt., Lbs. 12-Ft. Bar
1 x		
4	13.61	163.4
4 1/4	14.46	173.5
4 1/2	15.31	183.8
4 3/4	16.17	194.0
5	17.02	204.2
5 1/2	18.72	224.6
6	20.42	245.0
6 1/2	22.12	265.4
7	23.82	285.9
8	27.23	326.7
9	30.63	367.5
10	34.03	408.4
11	37.44	449.3
12	40.84	490.1
14	47.64	571.7
14 5/8	49.77	597.3
1 1/8 x		
1 1/4	4.786	57.43
1 3/8	5.264	63.17
1 1/2	5.743	68.91
1 5/8	6.221	74.65
1 3/4	6.700	80.40
2	7.657	91.89
2 1/4	8.614	103.4
2 1/2	9.572	114.9
3	11.49	137.8
4	15.31	183.8
5	19.14	229.7
6	22.97	275.7
1 1/4 x		
1 3/8	5.849	70.19
1 1/2	6.381	76.57
1 5/8	6.913	82.96
1 3/4	7.445	89.33
1 7/8	7.976	95.71
2	8.508	102.1
2 1/4	9.572	114.9
2 1/2	10.64	127.6
2 3/4	11.70	140.4
3	12.76	153.1
3 1/4	13.83	166.0
3 1/2	14.89	178.7
3 3/4	15.95	191.4
4	17.02	204.2
4 1/2	19.14	229.7
5	21.27	255.2
5 1/2	23.40	280.8
1 1/4 x		
6	25.52	306.3
7	29.78	357.3
8	34.03	408.4
9	38.29	459.4
10	42.54	510.5
11	46.79	561.5
12	51.05	612.6
14	59.56	714.6
14 5/8	62.21	746.5
1 3/8 x		
1 1/2	7.019	84.23
2	9.359	112.3
3	14.04	168.5
1 1/2 x		
1 5/8	8.295	99.54
1 3/4	8.933	107.2
2	10.21	122.5
2 1/4	11.49	137.9
2 1/2	12.76	153.1
2 3/4	14.04	168.5
3	15.31	183.8
3 1/4	16.59	199.1
3 1/2	17.87	214.4
4	200.42	245.0
4 1/2	22.97	275.7
5	25.52	306.3
5 1/2	28.08	336.9
6	30.63	367.5
7	35.73	428.8
8	40.84	490.1
9	45.94	551.3
10	51.05	612.6
11	56.15	673.8
12	61.26	735.1
14	71.47	857.6
1 5/8 x		
2	11.06	132.7
3	16.59	199.1
1 3/4 x		
2	11.91	142.9
2 1/4	13.40	160.8
2 1/2	14.89	178.7
2 3/4	16.38	196.5
3	17.87	214.4
3 1/2	20.84	250.1
4	23.82	285.9
4 1/2	26.80	321.6
5	29.78	357.3
1 3/4 x		
5 1/2	32.76	393.1
6	35.73	428.8
8	47.64	571.7
10	59.56	714.7
11	65.51	786.1
12	71.47	857.6
2 x		
2 1/4	15.31	183.8
2 1/2	17.02	204.2
2 3/4	18.72	224.6
3	20.42	245.0
3 1/4	22.12	265.4
3 1/2	23.82	285.9
3 3/4	25.52	306.2
4	27.23	326.7
4 1/2	30.63	367.5
5	34.03	408.4
5 1/2	37.44	449.2
6	40.84	490.1
7	47.64	571.7
8	54.45	653.4
9	61.26	735.1
10	68.06	816.8
11	74.87	898.4
12	81.68	980.1
2 1/4 x		
2 1/2	19.14	229.7
2 3/4	21.06	252.7
3	22.97	275.7
3 1/2	26.80	321.6
4	30.63	367.5
4 1/2	34.46	413.5
5	38.29	459.4
5 1/2	42.11	505.4
6	45.94	551.3
8	61.26	735.1
10	76.57	918.9
2 1/2 x		
2 3/4	23.40	280.8
3	25.52	306.3
3 1/2	29.78	357.3
4	34.03	408.4
4 1/2	38.29	459.4
5	42.54	510.5
5 1/2	46.79	561.5
6	51.05	612.6
7	59.56	714.7
2 1/2 x		
8	68.06	816.8
9	76.57	918.9
10	85.08	1021
11	93.59	1123
12	102.1	1225
3 x		
3 1/2	35.73	428.8
4	40.84	490.1
4 1/2	45.94	551.3
5	51.05	612.6
6	61.26	735.1
7	71.47	857.6
8	81.68	980.1
10	102.1	1225
12	122.5	1470
3 1/2 x		
4	47.64	571.7
4 1/2	53.60	643.2
5	59.56	714.7
6	71.47	857.6
7	83.38	1001
8	95.29	1143
9	107.2	1286
10	119.1	1429
12	142.9	1715
4 x		
4 1/2	61.26	735.1
5	68.06	816.8
6	81.68	980.1
6 1/2	88.48	1062
7	95.29	1143
8	108.9	1307
10	136.1	1634
12	163.4	1960
4 1/2 x		
5	76.57	918.9
5 1/2	84.23	1011
6	91.89	1103
5 x		
6	102.1	1225
7	119.1	1429
8	136.1	1633
10	170.2	2042
6 x		
8	163.4	1961
10	204.2	2450
12	245.0	2940

HOT ROLLED SHEETS and PICKLED & OILED SHEETS

Gauge	Width and Length	Est. Wt. Lbs. Per Sheet
18 Ga.–(.0478")		
2.0 Lb. Sq. Ft.		
	24 x 96	32.00
	120	40.00
	30 x 96	40.00
	120	50.00
	144	60.00
	36 x 96	48.00
	120	60.00
	144	72.00
	42 x 96	56.00
	120	70.00
	48 x 96	64.00
	120	80.00
	144	96.00
16 Ga.–(.0598")		
2.5 Lb. Sq. Ft.		
	24 x 96	40.00
	108	45.00
	120	50.00
	132	55.00
	144	60.00
	30 x 96	50.00
	120	62.50
	144	75.00
	36 x 96	60.00
	120	75.00
	144	90.00
	42 x 96	70.00
	120	87.50
	144	105.00
	48 x 96	80.00
	120	100.00
	144	120.00
	240	200.00
	54 x120	112.50
	60 x 96	100.00
	120	125.00
	144	150.00
14 Ga.–(.0747")		
3.125 Lb. Sq. Ft.		
	24 x 96	50.00
	120	62.50
	144	75.00
	30 x 96	62.50
	120	78.13
	144	93.75
	36 x 96	75.00
	120	93.75
	144	112.50
	42 x 96	87.50
	120	109.38
	144	131.25
	48 x 96	100.00
	120	125.00
	144	150.00

Gauge	Width and Length	Est. Wt. Lbs. Per Sheet
14 Ga.–(.Cont.)		
	48 x240	250.00
	54 x 96	112.50
	120	140.63
	60 x 96	125.00
	120	156.25
	144	187.50
	240	312.50
	72 x120	187.50
	144	225.00
	240	375.00
13 Ga.–(.0897")		
3.75 Lb. Sq. Ft.		
	36 x 96	90.00
	120	112.50
	48 x 96	120.00
	120	150.00
12 Ga.–(.1046")		
4.375 Lb. Sq. Ft.		
	24 x 96	70.00
	120	87.50
	144	105.00
	30 x 96	87.50
	120	109.38
	144	131.25
	36 x 96	105.00
	120	131.25
	144	157.50
	42 x 96	122.50
	120	153.13
	48 x 96	140.00
	120	175.00
	144	210.00
	240	350.00
	54 x 96	157.50
	120	196.88
	60 x 96	175.00
	120	218.75
	144	262.50
	192	350.00
	240	437.50
	72 x 96	210.00
	120	262.50
	144	315.00
	192	420.00
	240	525.00
	84 x120	306.25
	144	367.50
11 Ga.–(.1196")		
5.0 Lb. Sq. Ft.		
	24 x 96	80.00
	120	100.00
	144	120.00
	36 x 96	120.00
	120	150.00
	144	180.00
	48 x 96	160.00

Gauge	Width and Length	Est. Wt. Lbs. Per Sheet
11 Ga.–(.Cont.)		
	48 x120	200.00
	144	240.00
	240	400.00
	60 x 96	200.00
	120	250.00
	144	300.00
	240	500.00
	72 x 96	240.00
	120	300.00
	144	360.00
	240	600.00
10 Ga.–(.1345")		
5.625 Lb. Sq. Ft.		
	24 x 96	90.00
	120	112.50
	144	135.00
	30 x 96	112.50
	120	140.63
	144	168.75
	36 x 96	135.00
	120	168.75
	144	202.50
	240	337.50
	42 x 96	157.50
	120	196.88
	144	236.25
	48 x 96	180.00
	120	225.00
	144	270.00
	240	450.00
	60 x 96	225.00
	120	281.25
	144	337.50
	240	562.50
	72 x 96	270.00
	120	337.50
	144	405.00
	240	675.00
7 Ga.–(.1793")		
7.5 Lb. Sq. Ft.		
	24 x 96	120.00
	120	150.00
	144	180.00
	36 x 96	180.00
	120	225.00
	144	270.00
	48 x 96	240.00
	120	300.00
	144	360.00
	240	600.00
	60 x 96	300.00
	120	375.00
	144	450.00
	240	750.00
	72 x120	450.00
	144	540.00
	240	900.00

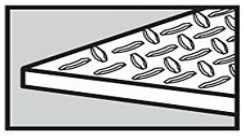
STEEL PLATES WEIGHT CHART

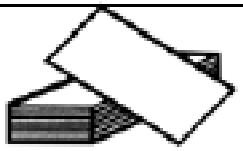
Thickness - ins.		Theoretical Weight lbs./sq. ft.	Thickness - ins.		Theoretical Weight lbs./sq. ft.
fractions	decimal		fractions	decimals	
3/16	.1875	7.66	3 5/8	3.625	148.04
7/32	.21875	8.93	3 3/4	3.75	153.14
1/4	.25	10.21	3 7/8	3.875	158.25
9/32	.28125	11.49			
5/16	.3125	12.76	4	4.	163.35
11/32	.34375	14.04	4 1/8	4.125	168.46
3/8	.375	15.31	4 1/4	4.25	173.56
13/32	.40625	16.59	4 3/8	4.375	178.67
7/16	.4375	17.87	4 1/2	4.5	183.77
15/32	.46875	19.14	4 5/8	4.625	188.88
1/2	.5	20.42	4 3/4	4.75	193.98
9/16	.5625	22.97	4 7/8	4.875	199.09
5/8	.625	25.52			
11/16	.6875	28.08	5	5.	204.19
3/4	.75	30.63	5 1/8	5.125	209.30
13/16	.8125	33.18	5 1/4	5.25	214.40
7/8	.875	35.73	5 3/8	5.375	219.51
15/16	.9375	38.29	5 1/2	5.5	224.61
			5 5/8	5.625	229.72
1	1.	40.84	5 3/4	5.75	234.82
1 1/16	1.0625	43.39	5 7/8	5.875	239.93
1 1/8	1.125	45.94			
1 3/16	1.1875	48.50	6	6.	245.03
1 1/4	1.25	51.05	6 1/8	6.125	250.14
1 5/16	1.3125	53.60	6 1/4	6.25	255.24
1 3/8	1.375	56.15	6 3/8	6.375	260.34
1 7/16	1.4375	58.71	6 1/2	6.5	265.45
1 1/2	1.5	61.26	6 5/8	6.625	270.55
1 5/8	1.625	66.36	6 3/4	6.75	275.66
1 3/4	1.75	71.47	6 7/8	6.875	280.76
1 7/8	1.875	76.57			
			7	7.	285.87
2	2.	81.68	7 1/8	7.125	290.97
2 1/8	2.125	86.78	7 1/4	7.25	296.08
2 1/4	2.25	91.89	7 3/8	7.375	301.18
2 3/8	2.375	96.99	7 1/2	7.5	306.29
2 1/2	2.5	102.10	7 5/8	7.625	311.39
2 5/8	2.625	107.20	7 3/4	7.75	316.50
2 3/4	2.75	112.31	7 7/8	7.875	321.60
2 7/8	2.875	117.41			
			8	8.	326.71
3	3.	122.52	8 1/2	8.5	347.13
3 1/8	3.125	127.62			
3 1/4	3.25	132.72	9	9.	367.55
3 3/8	3.375	137.83			
3 1/2	3.5	142.93	10	10.	408.38

FLOOR PLATES
STOCK SIZES

16 Ga. To 1/8" — As indicated below.
3/16" to 3/4" — Thickness and Widths as indicated below. Lengths up to 24'.
Thickness refers to body of plate, not including raised portion.

Stock Size	Per Sq.In.	Estimated Weight, Lbs. Per Sq.Ft.	Per Lin.Ft.	Per Plate
16 Ga.				
30x 96	.0208	3.00	7.50	60.00
36x 96	"	"	9.00	72.00
120	"	"	"	90.00
48x 120	"	"	12.00	120.0
144	"	"	"	144.0
14 Ga.				
30x 120	.0260	3.75	9.38	93.75
168	"	"	"	131.3
36x 96	"	"	11.25	90.00
120	"	"	"	112.5
144	"	"	"	135.0
48x 96	"	"	15.00	120.0
120	"	"	"	150.0
144	"	"	"	180.0
12 Ga.				
30x 120	.0365	5.25	13.13	131.3
180	"	"	"	196.9
36x 96	"	"	15.75	126.0
120	"	"	"	157.5
144	"	"	"	189.0
180	"	"	"	236.3
48x 96	"	"	21.00	168.0
120	"	"	"	210.0
144	"	"	"	252.0
240	"	"	"	420.0
60x 96	"	"	26.25	210.0
120	"	"	"	262.5
144	"	"	"	315.0
240	"	"	"	525.0
1/8				
24x 168	.0427	6.15	12.30	172.2
30x 96	"	"	15.38	123.0
120	"	"	"	153.8
144	"	"	"	184.6
192	"	"	"	246.1
36x 96	"	"	18.45	147.6
120	"	"	"	184.5
144	"	"	"	221.4
192	"	"	"	295.2
42x 120	"	"	21.53	215.3
48x 96	"	"	24.60	196.8
120	"	"	"	246.0
144	"	"	"	295.2
168	"	"	"	344.4
192	"	"	"	393.6
240	"	"	"	492.0
288	"	"	"	590.4
60x 96	"	"	30.75	246.0
120	"	"	"	307.5
144	"	"	"	369.0
240	"	"	"	615.0
288	"	"	"	738.0
72x 240	"	"	36.90	738.0
288	"	"	"	885.6

Thickness and Width	Per Sq.In.	Estimated Weight, Lbs. Per Sq.Ft.	Per Lin.Ft.
3/16 x		8.71	17.42
		"	21.78
		"	26.13
		"	30.49
48		"	34.84
60	"	"	43.55
72	"	"	52.26
84	"	"	60.97
96	"	"	69.68
1/4 x 24	.0782	11.26	22.52
30	"	"	28.15
36	"	"	33.78
42	"	"	39.41
48	"	"	45.04
60	"	"	56.30
72	"	"	67.56
84	"	"	78.82
96	"	"	90.08
5/16 x 24	.0959	13.81	27.62
30	"	"	34.53
36	"	"	41.43
48	"	"	55.24
60	"	"	69.05
72	"	"	82.86
84	"	"	96.67
96	"	"	110.5
3/8 x 24	.1137	16.37	32.74
30	"	"	40.93
36	"	"	49.11
42	"	"	57.30
48	"	"	65.48
60	"	"	81.85
72	"	"	98.22
84	"	"	114.6
96	"	"	131.0
1/2 x 24	.1491	21.47	42.94
30	"	"	53.68
36	"	"	64.41
48	"	"	85.88
60	"	"	107.4
72	"	"	128.8
84	"	"	150.3
96	"	"	171.8
5/8 x 60	.1845	26.58	132.9
72	"	"	159.5
3/4 x 60	.2200	31.68	158.4
96	"	"	253.4



COLD ROLLED SHEETS

Ga.	Width and Length	Est. Wt. Lbs. Per Sheet
28 Ga.–(.0149")		
.625 Lb. Sq. Ft.		
	36 x 96	15.00
	120	18.75
26 Ga.–(.0179")		
.75 Lb. Sq. Ft.		
	36 x 96	18.00
	120	22.50
	42 x 96	21.00
	120	26.25
	48 x 96	24.00
	120	30.00
	52 x120	32.50
24 Ga.–(.0239")		
1.0 Lb. Sq. Ft.		
	36 x 96	24.00
	120	30.00
	48 x 96	32.00
	120	40.00
22 Ga.–(.0299")		
1.25 Lb. Sq. Ft.		
	30 x120	31.25
	36 x 96	30.00
	120	37.50
	48 x 96	40.00
	120	50.00
	144	60.00
20 Ga.–(.0359")		
1.5 Lb. Sq. Ft.		
	30 x 96	30.00
	120	37.50
	36 x 96	36.00
	120	45.00
	144	54.00
	156	58.50
	42 x120	52.50
	144	63.00
	48 x 96	48.00
	120	60.00
	144	72.00
	60 x120	75.00
	144	90.00
18 Ga.–(.0478")		
2.0 Lb. Sq. Ft.		
	36 x 96	48.00
	120	60.00
	144	72.00
	42 x120	70.00
	144	84.00
	48 x 96	64.00
	120	80.00
	144	96.00
	60 x120	100.00
	144	120.00
16 Ga.–(.0598")		
2.5 Lb. Sq. Ft.		
	30 x 96	50.00
	36 x 96	60.00
	120	75.00
	144	90.00
	42 x120	87.50
	144	105.00
	48 x 96	80.00
	120	100.00
	144	120.00
	60 x 96	100.00
	120	125.00
	144	150.00
	72 x144	180.00
14 Ga.–(.0747")		
3.125 Lb. Sq. Ft.		
	30 x120	78.13
	36 x 96	75.00
	120	93.75
	42 x120	109.38
	48 x 96	100.00
	120	125.00
	144	150.00
	192	200.00
	54 x120	140.63
	60 x120	156.25
	144	187.50
	72 x120	187.50
	144	225.00
13 Ga.–(.0897")		
3.75 Lb. Sq. Ft.		
	36 x 96	90.00
	120	112.50
	48 x 96	120.00
	120	150.00
	60 x 96	150.00
12 Ga.–(.1046")		
4.375 Lb. Sq. Ft.		
	36 x 96	105.00
	120	131.25
	48 x 96	140.00
	120	175.00
	144	210.00
	60 x120	218.75
	144	262.50
	72 x120	262.50
	144	315.00
11 Ga.–(.1196")		
5.0 Lb. Sq. Ft.		
	36 x 96	120.00
	120	150.00
	48 x 96	160.00
	120	200.00
	144	240.00
	60 x120	250.00
	144	300.00
	72 x120	300.00
10 Ga.–(.1345")		
5.625 Lb. Sq. Ft.		
	36 x120	168.75
	48 x 96	180.00
	120	225.00

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or Email your Steel inquiries to:
steelsales@pacemakersteel.com

FLAT GALVANIZED SHEETS

G90 & G60

& GALVANNEAL

30 Ga.–(.016")

.656 Lb. Sq. Ft.

Width and Length	Est. Wt. Lbs. Per Sheet
30 x 96	13.12
120	16.41
36 x 96	15.75
120	19.69

28 Ga.–(.019")

.781 Lb. Sq. Ft.

Width and Length	Est. Wt. Lbs. Per Sheet
24 x 96	12.50
30 x 96	15.62
120	19.53
36 x 96	18.75
120	23.40
144	28.12
48 x120	31.24

26 Ga.–(.022")

.906 Lb. Sq. Ft.

Width and Length	Est. Wt. Lbs. Per Sheet
24 x 96	14.50
30 x 96	18.12
120	22.66
144	27.19
36 x 96	21.75
120	27.19
144	32.63
48 x 96	29.00
120	36.24
144	43.49

24 Ga.–(.028")

1.156 Lb. Sq. Ft.

Width and Length	Est. Wt. Lbs. Per Sheet
24 x 96	18.50
30 x 96	23.12
120	28.91
36 x 96	27.75
120	34.68
48 x 96	36.99
120	46.24
144	55.49

22 Ga.–(.034")

1.406 Lb. Sq. Ft.

Width and Length	Est. Wt. Lbs. Per Sheet
30 x 96	28.12
120	35.16
36 x 96	33.75
120	42.19
144	50.62
48 x 96	44.99
120	56.24
144	67.49

20 Ga.–(.040")

1.656 Lb. Sq. Ft.

Width and Length	Est. Wt. Lbs. Per Sheet
30 x 96	33.12
120	41.41
144	49.68
36 x 96	39.75
120	49.68
144	59.62
48 x 96	52.99
120	66.24
144	79.48
60 x120	82.80

18 Ga.–(.052")

2.156 Lb. Sq. Ft.

Width and Length	Est. Wt. Lbs. Per Sheet
30 x 96	43.12
120	53.91
144	64.69
36 x 96	51.75
120	64.69
144	77.62
48 x 96	68.99
120	86.24
144	103.48
60 x 120	107.80
144	129.36

16 Ga.–(.064")

2.656 Lb. Sq. Ft.

Width and Length	Est. Wt. Lbs. Per Sheet
30 x 96	53.12
120	66.41
144	79.69
36 x 96	63.75
120	79.69
144	95.63
48 x 96	84.99
120	106.24
144	127.49
60 x120	132.80
144	159.36

14 Ga.–(.079")

3.281 Lb. Sq. Ft.

Width and Length	Est. Wt. Lbs. Per Sheet
36 x 96	78.75
120	98.44
144	118.12
48 x 96	104.99
120	131.24
144	157.49
60 x120	164.05
144	196.86

12 Ga.–(.108")

4.531 Lb. Sq. Ft.

Width and Length	Est. Wt. Lbs. Per Sheet
36 x 96	108.75
120	135.94
48 x 96	144.99
120	181.24
144	217.49
60 x120	226.55

11 Ga.–(.123")

5.156 Lb. Sq. Ft.

Width and Length	Est. Wt. Lbs. Per Sheet
48 x 96	164.99
120	206.24
144	247.49

10 Ga.–(.138")

5.781 Lb. Sq. Ft.

Width and Length	Est. Wt. Lbs. Per Sheet
36 x 96	138.74
120	173.40
48 x 96	185.00
120	231.24
144	277.50
60 x144	346.86

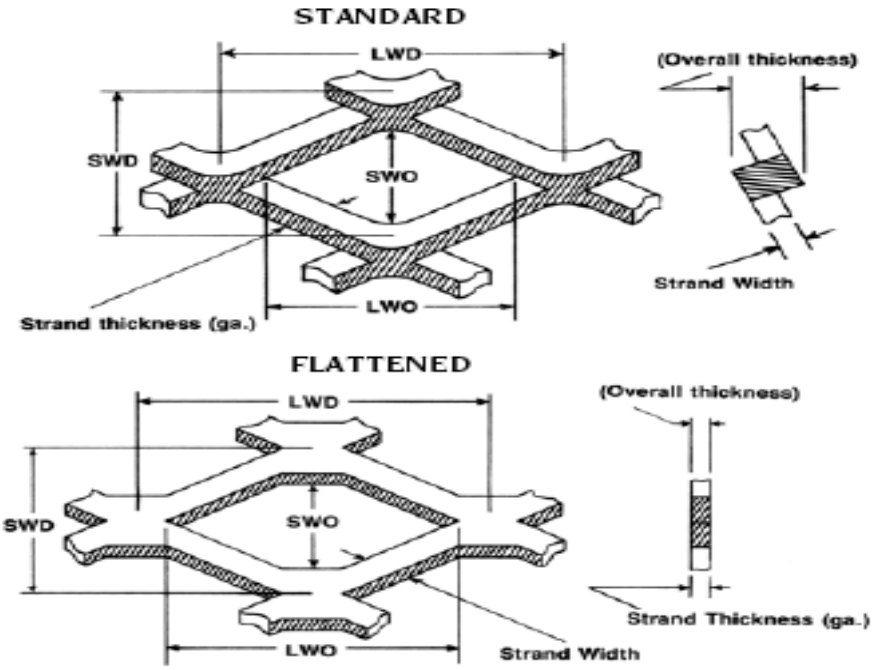
EXPANDED METAL

Expanded Metal is sheet metal that has been slit and expanded up to ten times its original width. The formation of the diamond-shaped pattern adds to the strength and rigidity of the sheet.

Expanded Metal is available in the "standard" pattern, where the strands and bonds are set at a sharp angle to the plane of the sheet. It is also available in the "flattened" pattern, where the material has been cold-rolled to bring the strands and bonds into the same plane. Flattened Expanded Metal is especially suited to welding because of its flat surface.

Expanded Metal offers the advantages of savings in weight and metal, free passage of light and air, and a decorative or ornamental effect. Structural applications include door panels, open partitions, window guards, enclosures, etc. Decorative applications include grilles, screens, panels, backgrounds, etc.

The width of the sheet is measured in the direction of the short dimension of the diamond. The length of the sheet is measured in the direction of the long dimension of the diamond. For additional information on applications, properties, and fabricating procedures, ask for our special pamphlet on Expanded Metal.



LEGEND

SWD – "Short way of diamond."

LWD – "Long way of diamond."

SWO – "Short way of opening."

LWO – "Long way of opening."

Strand Thickness – Equal to the thickness of the sheet of metal used.

Strand Width – Amount of metal of a given thickness in one strand.

STANDARD EXPANDED METAL

*Style Designation	Width & Length (Inches)	Thick. of Strand (Inches)	Est. Wt., Lbs. Per Sq. Ft.	Est. Wt., Lbs. Per Sheet
1/4" – #20	48 x 96	.036	.86	27.52
1/4" – #18	48 x 96	.048	1.14	36.48
1/2" – #20	36 x 96	.036	.43	10.32
	48 x 96	"	"	13.76
1/2" – #18	48 x 96	.048	.70	22.40
	120	"	"	28.00
	72 x 96	"	"	33.60
	120	"	"	42.00
1/2" – #16	48 x 96	.060	.86	27.52
	120	"	"	34.40
	72 x 96	"	"	41.28
	120	"	"	51.60
1/2" – #13	48 x 96	.092	1.47	47.04
	120	"	"	58.80
	72 x 96	"	"	70.56
3/4" – #16	48 x 96	.060	.54	17.28
	120	"	"	21.60
	60 x120	"	"	27.00
	72 x 96	"	"	25.92
	120	"	"	32.40
	144	"	"	38.88
3/4" – #13	48 x 96	.092	.80	25.60
	120	"	"	32.00
	72 x 96	"	"	38.40
	120	"	"	48.00
	96 x120	"	"	64.00
3/4" – #10	48 x 96	.092	1.20	38.40
	120	"	"	48.00
	72 x 96	"	"	57.60
	120	"	"	72.00
3/4" – #9	36 x 96	.134	1.80	43.20
	120	"	"	54.00
	48 x 96	"	"	57.60
	120	"	"	72.00
	144	"	"	86.40
	60 x 96	"	"	72.00
	120	"	"	90.00
	72 x 96	"	"	86.40
	120	"	"	108.00
	144	"	"	129.60
1" – #16	48 x 96	.060	.44	14.08
1 1/2" – #18	48 x 96	.048	.20	6.04
1 1/2" – #16	48 x 96	.060	.40	12.80
1 1/2" – #13	48 x 96	.092	.60	19.20
	120	"	"	24.00
	72 x 96	"	"	28.80
	120	"	"	36.00
	96 x120	"	"	48.00
1 1/2" – #10	48 x 96	.092	.79	25.28
	120	"	"	31.60
	60 x120	"	"	39.50
	72 x 96	"	"	37.92
	120	"	"	47.40
	144	"	"	56.68
1 1/2" – #9	36 x 96	.134	1.20	38.80
	48 x 96	"	"	38.40
	120	"	"	48.00
	144	"	"	57.60
	60 x120	"	"	60.00
	72 x 96	"	"	57.60
	120	"	"	72.00
	144	"	"	86.40
1 1/2" – #6	36 x144	.198	2.50	90.00
	48 x 96	"	"	80.00
	72 x144	"	"	180.00
2" – #10	36 x 96	.092	.68	16.32
	120	"	"	20.40
	72 x 96	"	"	32.64
	120	"	"	40.80
	144	"	"	48.96
2" – #9	36 x 96	.134	.90	21.60
	120	"	"	27.00
	144	"	"	32.40
	48 x 96	"	"	28.80
	120	"	"	36.00
	144	"	"	43.20
	72 x 96	"	"	43.20
	120	"	"	54.00
	144	"	"	64.80

FLATTENED EXPANDED METAL

*Style Designation	Width & Length (Inches)	Thick. of Strand (Inches)	Est. Wt., Lbs. Per Sq. Ft.	Est. Wt., Lbs. Per Sheet
1/4" – #20	36 x 96	.030	.83	19.92
	48 x 96	"	"	26.56
1/4" – #18	48 x 96	.040	1.11	35.52
1/2" – #20	36 x 96	.029	.40	9.06
	48 x 96	"	"	12.80
1/2" – #18	36 x 96	.039	.66	15.84
	120	"	"	19.80
	48 x 96	"	"	21.12
	120	"	"	26.40
1/2" – #16	36 x 96	.050	.82	19.68
	120	"	"	24.60
	144	"	"	29.52
	48 x 96	"	"	26.24
	120	"	"	32.80
	144	"	"	39.36
	60 x 96	"	"	41.00
1/2" – #13	36 x 96	.070	1.40	33.60
	120	"	"	42.00
	144	"	"	50.40
	48 x 96	"	"	44.80
	120	"	"	56.00
	144	"	"	67.20
3/4" – #16	36 x 96	.048	.51	12.24
	120	"	"	15.30
	144	"	"	18.36
	48 x 96	"	"	16.32
	120	"	"	20.40
	144	"	"	24.48
3/4" – #14	36 x 96	.061	.63	15.12
	48 x 96	"	"	20.16
3/4" – #13	36 x 96	.070	.75	18.00
	120	"	"	22.50
	144	"	"	27.00
	48 x 96	"	"	24.00
	120	"	"	30.00
	144	"	"	36.00
3/4" – # 9	36 x 96	.120	1.71	41.04
	120	"	"	51.30
	144	"	"	61.56
	48 x 96	"	"	54.72
	120	"	"	68.40
	144	"	"	82.08
	60 x 96	"	"	68.40
1" – #16	36 x 96	.050	.41	9.84
	48 x 96	"	"	13.12
1 1/2" – #16	36 x 96	.048	.38	9.12
	120	"	"	11.40
	144	"	"	13.68
	48 x 96	"	"	12.16
	120	"	"	15.20
	144	"	"	18.24
1 1/2" – #14	36 x 96	.060	.46	11.04
	48 x 96	"	"	14.72
1 1/2" – #13	36 x 96	.070	.57	13.68
	120	"	"	17.10
	144	"	"	20.52
	48 x 96	"	"	18.24
	120	"	"	22.80
	144	"	"	27.36
	60 x120	"	"	28.50
	72 x120	"	"	34.20
1 1/2" – #9	36 x 96	.110	1.14	27.36
	120	"	"	34.20
	144	"	"	41.04
	48 x 96	"	"	36.48
	120	"	"	45.60
	144	"	"	54.72

EXPANDED METAL GRATINGS

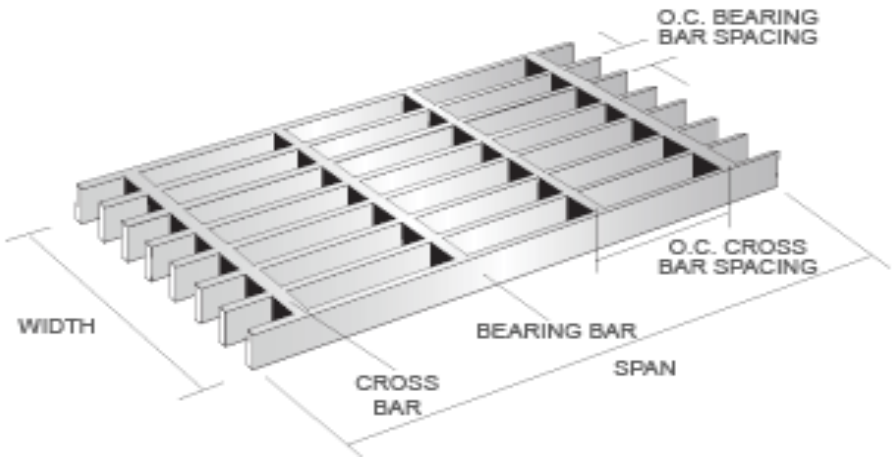
Style Designation	Size in Inches	Size of Mesh* in Inches Width	Length	Wt. Per Square Foot
Treadway (Walkway)	48 x 96	1.412	4.00	4.27

Wire Reinforcing Mesh
Sheet & Roll

6 x 6 with 6 ga wire
Sheets 60 x 120 (sold in lots of 100)
Rolls 5’ x 150’

6 x 6 with 10 ga wire
Sheets 60 x 120 (sold in lots of 100)
Rolls 5’ x 150’

Bar Grating



19 w 4 Bar Grating
1” high 3/16” bearing bar 24” wide 24’ long
1” high 3/16” bearing bar 36” wide 24’ long
1-1/4” high 3/16” bearing bar 24” wide 24’ long
1-1/4” high 3/16” bearing bar 36” wide 24’ long
Additional sizes and styles available via special order

3003 SHEET

Available in following Tempers

3003-H14 ½ Hard

Thick-ness In Inches	Width and Length	Est.Wt. Lbs. per Sheet
.016 (.242 lb. per sq. ft.)		
	24 x 72	2.90
	36 x 96	5.81
.020 (.299 lb. per sq. ft.)		
	36 x 96	7.18
	120	8.97
	48 x 96	9.57
.025 (.371 lb. per sq. ft.)		
	36 x 96	8.90
	120	11.1
	144	13.4
	48 x 96	11.9
	120	14.8
	144	17.8
.032 (.474 lb. per sq. ft.)		
	36 x 96	11.4
	120	14.2
	48 x 96	15.2
	120	19.0
	144	22.8
.040 (.595 lb. per sq. ft.)		
	30 x120	14.9
	36 x 96	14.3
	120	17.9
	48 x 96	19.0
	120	23.8
	144	28.6
	60 x144	35.7
.050 (.738 lb. per sq. ft.)		
	36 x 96	17.7
	120	22.1
	48 x 96	23.6
	120	29.5
	144	35.4
	60 x144	44.3
.063 (.923 lb. per sq. ft.)		
	36 x 96	22.2
	120	27.7
	48 x 96	29.5
	120	36.9
	144	44.3
	60 x144	55.4
.080 (1.17 lb. per sq. ft.)		
	36 x 96	28.1
	48 x 96	37.4
	120	46.8
	144	56.2
	60 x144	70.2
.090 (1.32 lb. per sq. ft.)		
	36 x 96	31.7
	48 x144	63.4
	60 x120	66.0
	144	79.2
.100 (1.46 lb. per sq. ft.)		
	36 x 96	35.0
	48 x144	70.1
.125 (1.82 lb. per sq. ft.)		
	36 x 96	43.7
	120	54.6
	48 x 96	58.2
	120	72.8
	144	87.4
	60 x144	109
.160 (2.35 lb. per sq. ft.)		
	48 x144	113
.190 (2.77 lb. per sq. ft.)		
	36 x 96	66.5
	48 x120	111
	144	133
	60 x144	166

We specialize in those **"Hard-to-Find"** items.
Let your sales representative know what your needs are and when you need the material on your docks. They will do their best to find the material, get it to you on time and at a competitive price.
We put the "Customer" and "Service" first!

5052 SHEET and PLATE

Available in following Tempers

5052-H32 1/4 Hard

Thick-ness In Inches	Width and Length	Est.Wt. Lbs. per Sheet
	SHEET	
.020 (.300 lb. per sq. ft.)		
	36 x 96	7.20
.025 (.370 lb. per sq. ft.)		
	36 x 96	8.83
	144	13.3
.032 (.471 lb. per sq. ft.)		
	36 x 96	11.3
	48 x 96	15.1
	144	22.6
.040 (.587 lb. per sq. ft.)		
	36 x 96	14.1
	48 x 96	18.8
	144	28.2
.050 (.730 lb. per sq. ft.)		
	36 x 96	17.5
	48 x 96	23.4
	120	29.2
	144	35.0
.063 (.911 lb. per sq. ft.)		
	36 x 96	21.9
	120	27.3
	48 x 96	29.2
	120	36.4
	144	43.7

Thick-ness In Inches	Width and Length	Est.Wt. Lbs. per Sheet
	SHEET	
.080 (1.16 lb. per sq. ft.)		
	36 x 96	27.8
	48 x 96	37.1
	144	55.7
	60 x 144	69.6
.090 (1.30 lb. per sq. ft.)		
	36 x 96	31.2
	120	39.0
	48 x 96	41.6
	144	62.4
	60 x 144	78.0
.100 (1.45 lb. per sq. ft.)		
	48 x 120	58.0
	144	69.6
.125 (1.79 lb. per sq. ft.)		
	36 x 96	43.0
	48 x 96	57.3
	120	71.6
	144	85.9
.160 (2.30 lb. per sq. ft.)		
	48 x 144	110
.190 (2.72 lb. per sq. ft.)		
	36 x 96	65.3
	120	81.6
	48 x 144	131
	PLATE	
.250 (3.49 lb. per sq. ft.)		
	48 x 144	168

6061 ALUMINUM

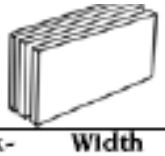
6061 SHEET

6061-T6 Heat Treated & Aged

Thick-ness In Inches	Width and Length	Est.Wt. Lbs. per Sheet
.020 (.303 lb. per sq. ft.)		
	36x144	10.9
	48x144	14.5
.025 (.375 lb. per sq. ft.)		
	36x144	13.5
	48x144	18.0
.032 (.476 lb. per sq. ft.)		
	36x96	11.4
	48x144	22.8
.040 (.593 lb. per sq. ft.)		
	36x96	14.2
	48x144	28.5
.050 (.737 lb. per sq. ft.)		
	36x96	17.7
	48x144	35.4
	60x144	44.2

Thick-ness In Inches	Width and Length	Est.Wt. Lbs. per Sheet
.063 (.921 lb. per sq. ft.)		
	36x96	22.1
	48x144	44.2
	60x144	55.3
.071 (1.04 lb. per sq. ft.)		
	48x144	49.9
.080 (1.17 lb. per sq. ft.)		
	48x144	56.2
	60x144	70.2
	72x144	84.2
.090 (1.31 lb. per sq. ft.)		
	48x144	62.9
	60x144	78.6
.100 (1.46 lb. per sq. ft.)		
	48x144	70.1

Thick-ness In Inches	Width and Length	Est.Wt. Lbs. per Sheet
.125 (1.81 lb. per sq. ft.)		
	36x96	43.4
	144	65.2
	48x144	86.9
	60x144	109
.160 (2.33 lb. per sq. ft.)		
	36x96	55.9
	48x144	112
	60x144	140
.190 (2.75 lb. per sq. ft.)		
	36x96	66.0
	48x144	132
	60x144	165
	180	206
	72x144	198



6061-T651 PLATE

Thickness In Inches	Width and Length	Est.Wt. Lbs. per Sheet
.250 (3.53 lb. per sq. ft.)		
	36x96	84.7
	48x144	169
	60x144	212
	72x144	254
.313 (4.42 lb. per sq. ft.)		
	48x144	212
.375 (5.29 lb. per sq. ft.)		
	36x96	127
	48x144	254
	60x144	317
.500 (7.06 lb. per sq. ft.)		
	36x96	169
	48x144	339
	60x144	424
.625 (8.82 lb. per sq. ft.)		
	36x96	212
	48x144	423
	60x144	529
.750 (10.6 lb. per sq. ft.)		
	48x144	509
	60x144	636
.875 (12.3 lb. per sq. ft.)		
	48x144	590
1.000 (14.1 lb. per sq. ft.)		
	48x144	677
	60x144	846
1.250 (17.6 lb. per sq. ft.)		
	48x144	845
	60x144	1056
1.500 (21.2 lb. per sq. ft.)		
	48x144	1018
	60x144	1272
1.750 (24.7 lb. per sq. ft.)		
	48x144	1186
2.000 (28.2 lb. per sq. ft.)		
	48x144	1354
	60x144	1692
2.250 (31.8 lb. per sq. ft.)		
	48x144	1526
	60x144	1908
2.500 (35.3 lb. per sq. ft.)		
	48x144	1694
	60x144	2118
2.750 (38.8 lb. per sq. ft.)		
	48x144	1862
3.000 (42.3 lb. per sq. ft.)		
	48x144	2030
	60x144	2538
3.500 (49.4 lb. per sq. ft.)		
	48x144	2371
4.000 (56.4 lb. per sq. ft.)		
	48x144	2707
4.500 (63.6 lb. per sq. ft.)		
	48x144	3053
5.000 (70.6 lb. per sq. ft.)		
	48x144	3389
6.000 (84.7 lb. per sq. ft.)		
	48x144	4066
7.000 (98.7 lb. per sq. ft.)		
	48x144	4738
8.000 (112.8 lb. per sq. ft.)		
	48x144	5414
9.000 (126.9 lb. per sq. ft.)		
	48x144	6091

6061-T6 TREAD PLATE

Diamond Pattern

Thickness In Inches	Width and Length	Estimated Wt., Lbs. Per Sq. Ft.	Estimated Wt., Lbs. Per Plate
.100	48x192	1.55	99
.125	48x192	1.90	122
	60x192	1.90	152
.188	48x192	2.79	179
	60x192	2.79	223
.250	48x192	3.67	235
	60x192	3.67	294
.375	48x192	5.43	348
	60x192	5.43	434

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ALUMINUM TREAD PLATE

Bright Finish

3003-H22/24

Raised Diamond Pattern One Side

THK		Width		Length	Est. lbs. per sq. ft.	Est. lbs. per plate
.063	x	48	x	96	0.84	31.0
		48	x	120	0.84	36.3
.080	x	48	x	144	1.15	55.3
.100	x	48	x	96	1.57	46.1
		48	x	144	1.57	69.1
		48	x	192	1.57	92.2
		60	x	96	1.57	57.6
		60	x	144	1.57	86.4
		60	x	192	1.57	125.6
.125	x	48	x	96	1.92	57.6
		48	x	120	1.92	76.8
		48	x	144	1.92	92.2
		48	x	192	1.92	115.2
		60	x	96	1.92	72.0
		60	x	120	1.92	96.0
		60	x	144	1.92	108.0
		60	x	192	1.92	144.0
.190	x	48	x	96	2.82	90.2
		48	x	120	2.82	112.8
		48	x	144	2.82	135.4
		48	x	192	2.82	173.2
		60	x	96	2.82	109.4
		60	x	120	2.82	136.8
		60	x	144	2.82	164.2
		60	x	192	2.82	225.6
.250	x	48	x	96	3.60	115.2
		48	x	120	3.60	144.0
		48	x	144	3.60	172.8
		48	x	192	3.60	230.4
		60	x	96	3.60	144.0
		60	x	120	3.60	180.0
		60	x	144	3.60	216.0
		60	x	192	3.60	288.0

ALUMINUM TOOLING PLATE

Thickness In Inches	Width and Length	Est.Wt. Lbs. per Sheet
.250 (3.636 lb. per sq. ft.)		
	48x96	116
	144	175
	60x144	218
.313 (4.545 lb. per sq. ft.)		
	48x96	145
	144	218
.375 (5.454 lb. per sq. ft.)		
	48x96	175
	144	262
	60x144	327
.500 (7.272 lb. per sq. ft.)		
	48x96	233
	144	349
	60x144	436
.625 (9.090lb. per sq. ft.)		
	48x96	291
	144	436
	60x144	545
.750 (10.91 lb. per sq. ft.)		
	48x96	349
	144	524
	60x144	655
.875 (12.70 lb. per sq. ft.)		
	48x144	610
1.000 (14.54 lb. per sq. ft.)		
	48x96	465
	144	698
	60x144	872
1.250 (18.18 lb. per sq. ft.)		
	48x96	582
	144	873
	60x144	1091
1.500 (21.82 lb. per sq. ft.)		
	48x96	698
	144	1047
	60x144	1309
1.750 (25.45 lb. per sq. ft.)		
	48x96	814
	144	1222
	60x144	1527
2.000 (29.09 lb. per sq. ft.)		
	48x144	1396
2.500 (36.36 lb. per sq. ft.)		
	48x96	1164
	144	1745
3.000 (43.63 lb. per sq. ft.)		
	48x96	1396
	144	2094
3.500 (50.90 lb. per sq. ft.)		
	48x144	2443
4.000 (58.18 lb. per sq. ft.)		
	48x144	2792
4.500 (65.46 lb. per sq. ft.)		
	48x144	3142
5.000 (72.72 lb. per sq. ft.)		
	48x144	3491
5.500 (80.00 lb. per sq. ft.)		
	48x144	3840
	60x144	4800
6.000 (87.27 lb. per sq. ft.)		
	48x144	4189
	60x144	5236

Tool steel, Drill rod, Ground flat, and Alloy bar. DOM tube, A106 Grade B schedule 80 pipe. 36” weld ells, weld 45’s or tee’s. These are just some of the items we source every day.

6061-T6 and 6061-T651 ROUNDS

Lengths 12' Approx.

Size In Inches	Est. Wt., Lbs. Per Foot	Est. Wt., Lbs. 12-Ft. Lgth
1/8	.014	174
3/16	.033	.391
1/4	.058	.694
5/16	.090	1.08
3/8	.131	1.56
7/16	.177	2.12
1/2	.231	2.77
9/16	.293	3.51
5/8	.361	4.34
11/16	.437	5.25
3/4	.520	6.24
13/16	.611	7.32
7/8	.708	8.50
15/16	.813	9.76
1	.925	11.1
1 1/16	1.05	12.6
1 1/8	1.17	14.0
1 3/16	1.31	15.6
1 1/4	1.45	17.4
5/16	1.59	19.1
3/8	1.75	21.0
7/16	1.91	22.9
1/2	2.08	25.0
9/16	2.26	27.1
5/8	2.44	29.3
11/16	2.63	31.6
3/4	2.83	34.0
13/16	3.04	35.6
7/8	3.25	39.1
15/16	3.48	41.7
2	3.70	44.4
2 1/8	4.18	50.1
2 1/4	4.68	56.2
2 3/8	5.22	62.6
2 7/16	5.50	66.0
2 1/2	5.78	69.4
2 5/8	6.37	76.5
2 3/4	7.00	84.0
2 7/8	7.65	91.8
3	8.32	99.8
3 1/8	9.03	108
3 1/4	9.79	117
3 3/8	10.5	126
3 1/2	11.3	136
3 5/8	12.1	145
3 3/4	13.1	156
4	14.8	178
4 1/8	15.7	188
4 1/4	16.7	201
4 1/2	18.7	225
4 5/8	19.8	238
4 3/4	20.8	251
5	23.1	277
5 1/8	24.3	292
5 1/4	25.5	306
5 1/2	28.0	336
5 5/8	29.2	350
5 3/4	30.6	367
6	33.3	399
6 1/8	34.7	416
6 1/4	36.1	434
6 1/2	39.1	469
6 3/4	42.1	506
7	45.3	544
7 1/4	48.7	584
7 1/2	52.0	624
7 3/4	55.6	667
8	59.2	710
8 1/2	66.8	802
9	75.0	900
9 1/2	83.4	1001
10	92.5	1110
11	112	1344
12	113	1596

6061 ALUMINUM (Continued)

6061-T6 and 2024-T651 HEXAGONS

Lengths 12' Approx.

Size In Inches	Est. Wt., Lbs. Per Foot	Est. Wt., Lbs. 12-Ft. Lgth
3/8	.144	1.73
1/2	.255	3.06
5/8	.398	4.78
3/4	.574	6.88
7/8	.781	9.37
1	1.020	12.3
1 1/8	1.310	15.7
1 1/4	1.590	19.1
1 3/8	1.930	23.1
1 1/2	2.290	27.6
1 11/16	2.900	34.8
1 3/4	3.120	37.5
2	4.070	48.8
2 1/4	5.170	62.0
2 7/16	6.060	72.7
2 1/2	6.380	76.5

6061-T651 SQUARES

Lengths 12' Approx.

Size In Inches	Est. Wt., Lbs. Per Foot	Est. Wt., Lbs. 12-Ft. Lgth
1/4	.074	.888
3/8	.166	1.99
1/2	.295	3.53
9/16	.373	4.48
5/8	.459	5.52
3/4	.662	7.95
7/8	.901	10.8
1	1.180	14.1
1 1/8	1.490	17.9
1 1/4	1.840	22.1
1 3/8	2.230	26.8
1 1/2	2.650	31.8
1 3/4	3.610	43.3

Size In Inches	Est. Wt., Lbs. Per Foot	Est. Wt., Lbs. 12-Ft. Lgth
2	4.710	56.5
2 1/4	5.950	71.4
2 1/2	7.360	88.3
2 3/4	8.900	107
3	10.60	128
3 1/4	11.50	138
3 1/2	14.40	172
3 3/4	16.60	199
4	19.00	228
5	29.50	354

6063-T52 ANGLES

Lengths 16' Approx.

Size In Inches	Estimated Wt., Lbs. Per Foot	Estimated Wt., Lbs. 16-Ft. Length
1/2 x 1/2 x 1/16	.070	1.12
1/8	.131	2.10
5/8 x 5/8 x 1/8	.168	2.69
3/4 x 3/8 x 3/32	.116	1.86
3/4 x 3/4 x 1/16	.107	1.71
1/8	.206	3.30
1 x 1/2 x 3/32	.158	2.53
1/8	.206	3.30
1 x 3/4 x 1/8	.244	3.90
1 x 1 x 1/16	.145	2.32
1/8	.281	4.50
3/16	.409	6.54
1 1/4 x 1/2 x 1/8	.244	3.90
1 1/4 x 1 x 1/8	.319	5.10
1 1/4 x 1 1/4 x 1/8	.356	5.70
3/16	.522	8.35
1 1/2 x 3/4 x 1/8	.319	5.10
1 1/2 x 1 x 1/8	.356	5.70

Size In Inches	Estimated Wt., Lbs. Per Foot	Estimated Wt., Lbs. 16-Ft. Length
1 1/2 x 1 1/2 x 1/8	.431	6.90
3/16	.632	10.1
1 3/4 x 1 3/4 x 1/8	.506	8.10
2 x 1 x 1/8	.431	6.90
2 x 1 1/2 x 1/8	.506	8.10
2 x 2 x 1/8	.581	9.30
3/16	.860	13.8
1/4	1.13	18.1
2 1/2 x 1 1/2 x 1/8	.506	8.10
2 1/2 x 2 x 1/8	.656	10.5
2 1/2 x 2 1/2 x 1/8	.731	11.7
3 x 2 x 1/8	.731	11.7
3 x 3 x 1/8	.881	14.1
3/16	1.31	20.9
3 1/2 x 1 1/4 x 1/8	.694	11.1
3 1/2 x 3 1/2 x 1/8	1.03	16.5
4 x 2 x 1/8	.881	14.1
4 x 3 x 1/8	1.03	16.5
4 x 4 x 1/8	1.18	18.9

6061-T6 and 6061-T6511 RECTANGLES
Lengths 12' Approx.

Size In Inches	Est. Wt., Lbs. Per Foot	Est. Wt., Lbs. 12-Ft. Lgth
1/8 x		
1/2	.074	.888
5/8	.092	1.10
3/4	.110	1.32
1	.147	1.77
1 1/4	.184	2.21
1 1/2	.221	2.65
1 3/4	.258	3.10
2	.295	3.53
2 1/2	.368	4.42
3/16 x		
1/2	.110	1.32
3/4	.166	1.99
1	.221	2.65
1 1/4	.276	3.31
1 1/2	.331	3.97
1 3/4	.387	4.64
2	.442	5.30
2 1/2	.552	6.62
3	.663	7.95
3 1/2	.773	9.28
4	.883	10.6
1/4 x		
1/2	.147	1.77
3/4	.221	2.65
1	.295	3.53
1 1/4	.368	4.42
1 1/2	.442	5.30
1 3/4	.516	6.18
2	.589	7.07
2 1/4	.662	7.94
2 1/2	.736	8.83
2 3/4	.809	9.70
3	.883	10.6
3 1/4	.957	11.7
3 1/2	1.03	12.3
4	1.18	14.1
4 1/2	1.32	15.9
5	1.47	17.6
6	1.76	21.1
8	2.35	28.2
10	2.94	35.3
12	3.53	42.4
14	4.12	49.4
5/16 x		
1/2	.184	2.21
3/4	.276	3.31
1	.368	4.42
1 1/4	.460	5.52
1 1/2	.552	6.62
2	.736	8.83
3	1.10	13.2
3/8 x		
1/2	.221	2.65
3/4	.331	3.97
1	.442	5.30
1 1/4	.552	6.62
1 1/2	.662	7.95
1 3/4	.771	9.25
2	.883	10.6
2 1/2	1.10	13.2
3	1.32	15.9
3 1/2	1.54	18.5
4	1.77	21.2
4 1/2	1.99	23.9
5	2.20	26.4
6	2.65	31.8
7	3.10	37.2
8	3.53	42.4
10	4.42	53.0
12	5.30	63.6
14	6.18	74.2
1/2 x		
3/4	.442	5.30
1	.589	7.07
1 1/4	.736	8.83
1 1/2	.883	10.6
1 3/4	1.03	12.4
2	1.18	14.1
2 1/4	1.33	16.0
2 1/2	1.47	17.7
2 3/4	1.62	19.4
3	1.77	21.2
3 1/2	2.06	24.7
4	2.35	28.2
5	2.95	35.3
6	3.53	42.4
8	4.71	56.5
10	5.89	70.7
12	7.07	84.8
14	8.25	99.0
5/8 x		
1	.736	8.83
1 1/4	.921	11.0
1 1/2	1.10	13.2
1 3/4	1.29	15.5
2	1.47	17.7
2 1/2	1.84	22.1
3	2.20	26.4
4	3.00	36.0
5	3.75	45.0
6	4.41	52.9
3/4 x		
1	.883	10.6
1 1/4	1.10	13.2
1 1/2	1.32	15.9
1 3/4	1.57	18.9
2	1.77	21.2
2 1/4	2.02	24.2
2 1/2	2.21	26.5
2 3/4	2.43	29.2
3	2.65	31.8
3 1/2	3.09	37.2
4	3.53	42.4
5	4.41	52.9
6	5.30	63.6
8	7.07	84.8
10	8.83	106
12	10.6	128
14	12.4	149
7/8 x		
1	1.03	12.4
1 1/2	1.55	18.6
2	2.06	24.7
1 x		
1 1/4	1.47	17.7
1 1/2	1.77	21.2
1 3/4	2.06	24.7
2	2.35	28.2
2 1/4	2.65	31.8
2 1/2	2.95	35.3
2 3/4	3.24	38.9
3	3.53	42.4
3 1/2	4.12	49.4
4	4.71	56.5
5	5.87	70.5
6	7.07	84.8
8	9.43	113
10	11.8	141
12	14.1	169
14	16.5	198
1 1/4 x		
1 1/2	2.21	26.5
2	2.95	35.3
2 1/2	3.68	44.2
3	4.42	53.0
4	5.89	70.7
6	8.83	106
8	11.8	141
10	14.7	176
12	17.7	212
14	20.6	247
1 1/2 x		
2	3.53	42.4
2 1/2	4.42	53.0
3	5.30	63.6
3 1/2	6.18	74.2
4	7.07	84.8
5	8.83	106
6	10.6	128
6 1/2	11.5	138
8	14.1	169
8 1/2	15.0	180
10	17.6	212
12	21.2	254
14	24.7	297
1 3/4 x		
2	4.12	49.4
3 3/4	7.73	92.6
4 1/2	9.28	111
5 1/2	11.3	136
2 x		
2 1/2	5.89	70.7
3	7.07	84.8
3 1/2	8.24	98.9
4	9.43	113
5	11.8	142
6	14.1	169
6 1/2	15.3	184
8	18.9	226
8 1/2	20.0	240
10	23.6	283
12	28.3	339
14	33.0	396
2 1/2 x		
3	8.83	106
3 1/2	10.3	124
4	11.8	141
5	14.7	177
3 x		
4	14.1	169
5	17.6	212
6	21.2	254
4 x		
5	23.6	283

6061-T6 CHANNELS
Lengths 25' Approx.

Size In Inches	Estimated Wt., Lbs. Per Foot	25-Ft. Length
3 x		
.170	1.42	35.5
.258	1.73	43.3
.356	2.08	52.0
4 x		
.180	1.85	46.3
.247	2.16	54.0
.320	2.50	62.5
5 x		
.190	2.31	57.8
.325	3.11	77.8
.472	3.97	99.3
6 x		
.200	2.83	70.8
.225	3.00	75.0
.314	3.63	90.8
.437	4.50	113
7 x		
.230	3.54	88.5
.314	4.23	106
8 x		
.190	4.15	104
.250	4.25	106
.303	4.75	119
.487	6.48	162
10 x		
.240	5.28	132
.526	8.64	216
12 x		
.300	7.41	185
.387	8.64	216

6061-T6 TEES
Lengths 25' Approx.

Size In Inches	Estimated Wt., Lbs. Per Foot	25-Ft. Length
2 x 2 x ¼	1.26	31.5
3 x 3 x ⅜	2.72	68.0

6061-T6 I BEAMS
Lengths 25' Approx.

Size In Inches	Estimated Wt., Lbs. Per Foot	25-Ft. Length
3 x .170	1.96	49.0
.349	2.59	64.8
4 x .190	2.64	66.0
.326	3.28	82.0
5 x .210	3.43	85.8
.494	5.10	128
6 x .230	4.30	108
.343	5.10	128
8 x .350	6.18	155

6061-T6 WIDE FLANGE
6061-T6 H BEAMS
Lengths 25' Approx.

Size In Inches	Estimated Wt., Lbs. Per Foot	25-Ft. Length
WIDE FLANGE		
6 x 4 x .230	4.16	104
6 x 6 x .240	5.40	135
8 x 5¼ x .230	5.90	148
8x 6½ x .245	8.32	208
8 x 8 x .288	10.7	268
H BEAMS		
4 x .313	4.76	119
5 x .313	6.49	162
6 x .250	7.85	196
8 x .313	11.2	280

6063 ALUMINUM
EXTRUDED SEAMLESS MECHANICAL TUBING

ASTM B 221

6063 is a hardenable alloy that is designed for extrusions. The as-extruded finish is bright, similar to 1100, relatively free from die lines and pick-up, and is satisfactory for many applications without further work.

It has excellent corrosion resistance to industrial and marine environments. For further protection, a variety of coatings may be applied successfully.

This alloy is readily weldable by all methods commonly used for aluminum, especially by the inert-gas shielded-arc fusion process, and is easily machined particularly in the hardened tempers.

APPLICATIONS — It is used where good surface appearance is required as well as good strength and corrosion resistance. Such uses include architectural applications an irrigation systems.

MECHANICAL PROPERTIES — The following mechanical properties apply:

Temper	Tensile Strength (psi)	Yield Strength (psi)	Elongation 2" Min.
T5	27,000 average	21,000 average	12% average

TOLERANCES — Refer to Page 94-96 of this section.

SQUARE ALUMINUM TUBING — EXTRUDED

Outside Dimension (Inches)	Wall Thickness (Inches)	Weight Per Foot	Alloy
1/2 x 1/2	.058	.116	6061-T6
3/4 x 3/4	.028	.093	2024-T3
	.049	.161	6061-T6
	.062	.200	6061-T6
	.125	.373	6061-T6
	.125	.373	6063-T5
7/8 x 7/8	.049	.184	6061-T6
	.058	.198	6061-T6
	.062	.236	6063-T5
	.094	.354	6061-T6
1 x 1	.047	.231	6061-T6
	.060	.264	6063-T5
	.065	.288	2024-T3
	.094	.370	6061-T6
	.125	.552	6063-T5
1 1/8" x 1 1/8"	.049	.259	2024-T3
1 1/4" x 1 1/4"	.065	.356	6061-T6
	.125	.671	2024-T3
	.125	.671	6036-T5
1 1/2" x 1 1/2"	.058	.392	2024-T3
	.065	.536	6061-T6
	.125	.821	6063-T5
	.140	.843	6061-T6
1 3/4" x 1 3/4"	.125	.970	6063-T5
	.156	1.165	6061-T6
2 x 2	.062	.541	6061-T6
	.125	1.120	6061-T6
	.125	1.120	6063-T5
	.188	1.638	6061-T6
2 1/2" x 2 1/2"	.094	1.019	6061-T6
	.250	2.507	6061-T6
3 x 3	.062	.817	6061-T6
	.140	1.877	2024-T3
4 x 4	.125	2.326	6063-T5

RECTANGULAR ALUMINUM TUBING -- EXTRUDED

Outside Dimension (Inches)	Wall Thickness (Inches)	Weight Per Foot	Alloy
3/4 X 3/8	.047	.116	6061-T6
1 X 1/2	.035	.119	6061-T6
	.125	.373	6063-T5
1 1/2" X 3/4	.125	.598	6063-T5
1 1/2" X 1	.078	.451	6063-T5
	.125	.671	6061-T6
	.125	.671	6063-T5
2 x 1	.064	.436	6061-T6
	.083	.528	6061-T6
	.125	.821	6063-T5
2 x 1 1/2	.125	.970	6063-T5
2 x 1 1/4	.125	.970	6063-T5
3 x 1	.083	.775	6061-T6
3 x 1 1/4	.125	1.200	6061-T6
3 x 1 3/4	.125	1.345	6063-T5
3 x 2	.125	1.402	6063-T5
3 1/2 x 1 3/4	.125	1.494	6063-T5
4 x 1 1/2	.065	.837	2024-T3
4 x 1 3/4	.125	1.643	6063-T5
4 1/2 x 1 3/4	.125	1.793	6063-T5
5 x 1 1/4	.125	1.780	6061-T6
5 x 1 3/4	.125	1.942	6063-T5
5 x 2	.125	2.017	6063-T5

TOLERANCES FOR SQUARE AND RECTANGULAR ALUMINUM TUBING — EXTRUDED

WIDTH and DEPTH TOLERANCES[2]

INCHES — Plus and Minus

Specified Width or Depth[1] (Inches)	Allowable Deviation of Width or Depth at Corners from Specified Width or Depth	Allowable Deviation of Width or Depth Not at Corners from Specified Width or Depth[4]	
	Square and Rectangular	Square	Rectangular
0.500-0.749	.012	.020	The tolerance for the width is the value shown in Square column for a dimension equal to the depth, and conversely, but in no case is the tolerance less than at the corners.[7]
0.750-.0999	.014	.020	
1.000-1.999	.018	.025	
2.000-3.999	.025	.035	
4.000-4.999	.035	.045	
5.000-5.999	.045	.055	

WALL THICKNESS TOLERANCES[1,3]

Inches — Plus and Minus

CIRCUMSCRIBING CIRCLE DIAMETER[5] -- Inches

Specified Width or Depth[1] (Inches)	Allowable Deviation of Mean[3] Wall Thickness from Specified Wall Thickness		Allowable Deviation of Wall Thickness of any point from Mean Wall Thickness[3] (Eccentricity)	
	Under 5,000	5,000 & over	Under 5,000	5,000 & Over
Under 0.047	.005	.008	.005	Plus and Minus 10% of Mean Wall Thickness Max. +/- 0.060 Min. +/- 0.010
0.047-0.061	.006	.009	.007	
0.062-0.124	.007	.010	.010	
0.125-0.249	.008	.015	.015	
0.250-0.374	.011	.020	.025	
0.375-0.499	.014	.030	.030	
0.500-0.749	.025	.040	.040	
0.750-0.999	.035	.050	.050	
1.000-1.499	.045	.060	.060	
1.500-2.000	---	.070	---	

ALUMINUM TEMPER DESIGNATIONS

BASIC TEMPER DESIGNATIONS

F —— As Fabricated.
O —— Annealed.
H —— Strain Hardened.
W —— Solution Heat Treated.
T —— Thermally Treated —— to produce a stable temper other than those listed.

SUBDIVISIONS OF H TEMPER

H1 —— Strain hardened only.
H2 —— Strain hardened, then partially annealed.
H3 —— Strain hardened, then stabilized.

The degree of strain hardening is indicated by a second digit following one of the above designations:

2 —— 1/4 hard (tensile strength midway between 0 and 4).
4 —— 1/2 hard (tensile strength midway between 0 and 8).
6 —— 3/4 hard (tensile strength midway between 4 and 8).
8 —— full hard (tensile strength achieved by 75% cold reduction after anneal).
9 —— extra hard (minimum tensile 2.0 ksi higher than 8).

SUBDIVISIONS OF T TEMPER

— T1 Cooled from an elevated temperature shaping process and naturally aged.
— T2 Annealed.
— T3 Solution heat treated and cold worked.
— T4 Solution heat treated and naturally aged.
— T5 Cooled from an elevated temperature shaping process and artificially aged.
— T6 Solution heat treated and artificially aged.
— T7 Solution heat treated and stabilized.
— T8 Solution heat treated, cold worked, and artificially aged.
— T9 Solution heat treated, artificially aged, and cold worked.
— T10 Cooled from an elevated temperature shaping process, artificially aged and cold worked.

Additional digits are used to designate stress relieving:

— T51 Stress relieving by stretching.
— T52 Stress relieving by compressing.

T510 designates products that receive no further straightening after stretching, and T511 designates products that receive minor straightening in order to comply with standard tolerances.

RELATIVE CORROSION RESISTANCE OF ALUMINUM ALLOYS

Alloy	Non-Industrial Atmosphere	Industrial Atmosphere	Marine Atmosphere or Sea Water Service
1100	A	B	B
2011	B	C	D
2017	A	A	B
2024	B	C	D
Alclad 2024	A	A	B
3003	A	B	B
5005	A	A	A
5052	A	A	A
5083	A	A	A
5086	A	A	A
6061-T6	A	B	B
6063-T5	A	B	B
7075-T6	B	C	D
Alclad 7075-T6	A	B	C

A = Best relative resistance.

B = Good relative resistance.

C = Fair relative resistance.

D = Not usually recommended without additional surface treatment.

TYPES 304 AND 304L

Sheets, Plates, Bars, Angles

UNS S30400, 30403

Type 304 is the basic "18 — 8" chromium-nickel stainless steel. It combines excellent mechanical properties with remarkable resistance to many corrosive agents encountered in domestic and industrial use. It is non-magnetic in the annealed condition and not hardenable by heat treatment. Both hardness and tensile strength can be increased by cold working. This is an electric-furnace product manufactured to meet the exacting standards of the aircraft industry.

The analysis of Type 304 is similar to that of Type 304L except that Type 304L is modified by lowered carbon content. This provides good resistance to corrosion in welded construction where subsequent heat treatment is not practicable. Bars and Plates are available not only in the regular Type 304 analysis, but also in an extra low carbon analysis Type 304L. The advantage of this analysis is that it precludes any harmful precipitation in the 800° — 1500°F range, such as might otherwise occur in welding heavier sections.

ANALYSIS

	C Max.	Mn Max.	P Max.	S Max.	Si Max.	Cr	Ni	Cu Max.	Mo Max.
304	.08	2.00	.040	.030	1.00	18.00/20.00	8.00/10.50	.75	.75
304L	.03	2.00	.040	.030	1.00	18.00/20.00	8.00/12.00	.75	.75

SPECIFICATIONS — The following specifications are generally applicable:
Sheets & Plates: AMS 5513, ASTM A 167, ASTM A 240
Bars: AMS 5639, ASTM A 276, ASTM A 479

APPLICATIONS — Used where corrosion resistance and good mechanical properties are primary requirements. These grades are widely accepted in such industries as dairy, beverage, and other food products where the highest degree of sanitation and cleanliness is of prime importance. Parts for handling acetic, nitric, and citric acids, organic and inorganic chemicals, dyestuffs, crude and refined oils, etc., are fabricated from this material. Because of its lack of magnetism it is highly desirable for instruments. It is also widely used for architectural trim. Type 304 sheets are used in aircraft applications where corrosion resistance is required, but where gas or arc welding and elevated temperatures are not involved. Type 304L, as noted above, finds particular use in applications requiring welding.

CORROSION RESISTANCE — Types 304 and 304L show good resistance to corrosion. They are highly resistant to strong oxidizing acids, such as nitric acid, and resist attack by a wide variety of organic and inorganic chemicals. Maximum corrosion resistance is obtained in the annealed condition. Intergranular corrosion may occur when material is heated within or cooled through the range of 800° to 1500°F.

RESISTANCE TO SCALING — Excellent scale resistance at temperatures up to 1600°F in continuous service. Chromium-nickel grades have a high coefficient of expansion, which should be considered in designing.

MECHANICAL PROPERTIES — Applicable specifications require the following properties of sheets in the annealed condition:

	Tensile Strength (psi)	Min. Elongation in 2"		
		.015" Thick and Under	.016" Thick to .030"	.031" Thick and Over
Type 304	100,000 Max.	40%	40%	40%

In practice, annealed sheets and plates will average as follows:

Tensile Strength (psi)	Yield Strength (psi)	Elongation in 2"	Rockwell "B" Hardness
90,000	40,000	50%	85

MACHINABILITY — Types 304 and 304L have a machinability rating of approximately 45% with 1212 rated as 100%. Surface cutting speed on automatic screw machines is approximately 75 feet per minute.

TYPES 304 AND 304L STAINLESS (Continued)

WELDABILITY — Easily welded by all the commercial processes except forging or hammer welding. The resulting weld had good toughness and ductility. Annealing is recommended after welding to maintain maximum corrosion resistance.

FORMING — These grades have very good drawing and stamping properties.

FORGING — Forge between 2100° and 2350°F. Do not forge below 1700°F.

ANNEALING — Annealing range is between 1850° and 2050°F. Cool rapidly. Water should be used for heavier sections; air for lighter sections. The stress relieving range is between 400° and 750°F.

TYPES 304 & 304L STAINLESS SHEETS

Annealed (Physical Condition A)
No. 2B Finish — Bright Cold Rolled
No.2D Finish — Dull Cold Rolled
No. 3 Finish — Polished One Side
No. 4 Finish — Polished One Side

Thickness	Width & Length Inches	Est. Wt. Lbs. per Sheet
.016" (28 Ga.)		
.672 Lb. Sq. Ft.		
	36 x120	20.2
.0161" (27 Ga.)		
.676 Lb. Sq. Ft.		
	36 x120	20.3
.018" (26 Ga.)		
.756 Lb. Sq. Ft.		
	36 x 96	18.1
	120	22.7
.020" (25 Ga.)		
.840 Lb. Sq. Ft.		
	36 x 120	25.2
.024" (24 Ga.)		
1.008 Lb. Sq. Ft.		
	36 x 96	24.2
	120	30.2
	48 x 96	32.3
	120	40.3
.030" (22 Ga.)		
1.260 Lb. Sq. Ft.		
	36 x96	30.2
	120	37.8
	48 x96	40.3
	120	50.4
.0351" (20 Ga.)		
1.474 Lb. Sq. Ft.		
	36 x96	35.4
	120	44.2
	48 x96	47.2
	120	59.0
.040" (20 Ga.)		
1.680 Lb. Sq. Ft.		
	36 x120	50.4
.048" (18 Ga.)		
2.016 Lb. Sq. Ft.		
	36 x96	48.4
	120	60.5
	48 x96	64.5
	120	80.6
	144	96.8
.060" (16 Ga.)		
2.520 Lb. Sq. Ft.		
	36 x96	60.5
	120	75.6
	144	90.7
	48 x96	80.6
	120	100.8
	144	121.2
	60 x120	126.0
.075" (14 Ga.)		
3.150 Lb. Sq. Ft.		
	36 x96	75.6
	120	94.5
	48 x96	100.8
	120	126.0
	144	151.2
.090" (13 Ga.)		
3.780 Lb. Sq. Ft.		
	36 x96	90.7
	120	113.4
	48 x96	121.0
	120	151.2
.105" (12 Ga.)		
4.410 Lb. Sq. Ft.		
	36 x 96	105.8
	120	132.3
	48 x 96	141.1
	120	176.4
	144	211.7
	60 x144	264.6
.120" (11 Ga.)		
5.040 Lb. Sq. Ft.		
	36 x 96	121.0
	120	151.2
	48 x 96	161.2
	120	201.6
	144	241.9
	60 x120	252.0
.135" (10 Ga.)		
5.670 Lb. Sq. Ft.		
	36 x 96	136.1
	120	170.1
	48 x 96	181.4
	120	226.8
	144	272.2
	60 x120	283.5

TYPES 304 & 304L ANGLES

Hot Rolled, Annealed and Pickled
Stock Lengths 20" to 22"

Size in Inches	Est. Wt., Lbs. Per Foot	Est. Wt., Lbs. 20-Ft. Length
3/4 x 3/4 x 1/8	.59	11.8
1 x 1 x 1/8	.80	16.0
3/16	1.16	23.2
1/4	1.49	29.8
1 1/4 x 1 1/4 x 1/8	1.01	20.2
3/16	1.48	29.6
1/4	1.92	38.4
1 1/2 x 1 1/2 x 1/8	1.23	24.6
3/16	1.80	36.0
1/4	2.34	46.8
2 x 2 x 1/8	1.65	33.0
3/16	2.44	48.8
1/4	3.19	63.8
3/8	4.70	94.0
2 1/2 x 2 1/2 x 3/16	3.07	61.4
1/4	4.10	82.0
3/8	5.90	118.0
3 x 3 x 1/4	4.90	98.0
3/8	7.20	144.0
4 x 4 x 1/4	6.60	132.0
3/8	9.80	196.0
1/2	12.80	256.0

TYPES 304 & 304L ROUNDS

Conditioned A — Annealed
Stock Lengths 10' to 12' and 20' to 22'

Size In Inches	Est. Wt., Lbs. Per Foot	Est. Wt., Lbs. 12-Ft. Bar
Ann. & C.D.		
1/8	.0418	.5012
5/32	.0653	.7831
3/16	.0940	1.128
7/32	.1279	1.535
1/4	.1671	2.005
5/16	.2610	3.132
11/32	.3158	3.790
3/8	.3759	4.510
7/16	.5116	6.139
1/2	.6682	8.019
9/16	.8457	10.15
5/8	1.044	12.53
11/16	1.263	15.16
3/4	1.504	18.04
Ann. & C.F.		
5/8	1.044	12.53
3/4	1.504	18.04
13/16	1.765	21.17
7/8	2.046	24.56
15/16	2.349	28.19
1	2.673	32.07
1/16	3.017	36.21
1/8	3.383	40.59
3/16	3.769	45.23
1/4	4.176	50.12
5/16	4.604	55.25
3/8	5.053	60.64
7/16	5.523	66.28
1/2	6.014	72.17
9/16	6.526	78.31
5/8	7.058	84.70
11/16	7.612	91.34
3/4	8.186	98.23
7/8	9.397	112.8
15/16	10.03	120.4
2	10.69	128.3
Hot Rolled, Ann., Rough Turned		
2 1/8	12.07	144.8
3/16	12.79	153.5
1/4	13.53	162.4
5/16	14.29	171.5
3/8	15.08	180.9
1/2	16.71	200.5
5/8	18.42	221.0
3/4	20.21	242.6
7/8	22.09	265.1
3	24.06	288.7
1/8	26.10	313.2
1/4	28.23	338.8
3/8	30.45	365.3
1/2	32.74	392.9
5/8	35.12	421.5
3/4	37.59	451.0
7/8	40.14	481.6
4	42.77	513.2
1/8	45.48	545.8
1/4	48.28	579.3
3/8	51.16	613.9
1/2	54.13	649.5
5/8	57.18	686.1
3/4	60.31	723.7
7/8	63.52	762.3
5	66.82	801.9
1/4	73.67	884.0
1/2	80.86	970.2
3/4	88.37	1060
6	96.22	1155
1/4	104.4	1253
1/2	112.9	1355
3/4	121.8	1461
7	131.0	1572
1/4	140.5	1686
1/2	150.4	1804
3/4	160.5	1926
8	171.1	2053
1/4	181.9	2183
1/2	193.1	2317
9	216.5	2598
1/2	241.2	2895
10	267.3	3207
11	323.4	3881
12	384.9	4619
13	451.7	5421
14	523.9	6287

TYPES 304 & 304L C.D. HEXAGONS

Cond. A — Annealed
Stock Lengths 10' to 12'

Size In Inches	Est. Wt., Lbs. Per Foot	Est. Wt., Lbs. 12-Ft. Bar
1/4	.1842	2.210
5/16	.2878	3.454
3/8	.4145	4.973
7/16	.5641	6.769
1/2	.7368	8.842
9/16	.9325	11.19
5/8	1.151	13.82
11/16	1.393	16.72
3/4	1.658	19.89
13/16	1.946	23.35
7/8	2.257	27.08
1	2.947	35.37
1/8	3.730	44.76
1 1/4	4.605	55.26
3/8	5.572	66.87
1/2	6.631	79.56
5/8	7.783	93.39
3/4	9.026	108.3
7/8	10.36	124.3
2	11.79	141.5
1/4	14.92	179.0
1/2	18.42	221.0
5/8	20.31	243.7
3/4	22.29	267.5
7/8	24.36	292.3
3	26.53	318.3

TYPES 304 & 304L SQUARES

Cond. A — Annealed
Stock Lengths 10' to 12'

Size In Inches	Est. Wt., Lbs. Per Foot	Est. Wt., Lbs. 12-Ft. Bar
Ann. & C.D.		
3/16	.1196	1.436
1/4	.2127	2.552
5/16	.3323	3.988
3/8	.4786	5.743
7/16	.6514	7.817
1/2	.8508	10.21
5/8	1.329	15.95
3/4	1.914	22.97
7/8	2.606	31.27
1	3.403	40.84
1/8	4.307	51.69
1/4	5.318	63.81
3/8	6.434	77.21
1/2	7.657	91.89
5/8	8.987	107.8
3/4	10.42	125.1
7/8	11.96	143.6
2	13.61	163.4
1/2	21.27	255.2
H.R., Ann. & Pick.		
2	13.61	163.4
1/4	17.23	206.7
1/2	21.27	255.2
3/4	25.74	308.8
3	30.63	367.5
1/4	35.95	431.4
1/2	41.69	500.3
3/4	47.86	574.3
4	54.45	653.4
1/2	68.91	827.0
5	85.08	1021
1/2	102.9	1235
6	122.5	1470

TYPES 304 AND 304L STAINLESS (Continued)

TYPES 304 & 304L FLATS

Hot Rolled, Annealed, & Pickled

Stock Lengths 10' to 12'

Size In Inches	Est. Wt., Lbs. Per Foot	12-Ft. Bar
1/8 x		
1/4	.1060	1.280
3/8	.1600	1.910
1/2	.2127	2.552
5/8	.2659	3.191
3/4	.3191	3.829
7/8	.3722	4.466
1	.4254	5.105
1 1/4	.5318	6.381
1 1/2	.6381	7.657
1 3/4	.7445	8.933
2	.8508	10.21
2 1/2	1.064	12.76
3	1.276	15.31
4	1.702	20.42
6	2.552	30.62
3/16 x		
1/4	.1600	1.910
3/8	.2390	2.870
1/2	.3191	3.829
5/8	.3990	4.590
3/4	.4786	5.743
7/8	.5563	6.676
1	.6381	7.657
1 1/4	.7976	9.572
1 1/2	.9572	11.49
1 3/4	1.117	13.40
2	1.276	15.31
2 1/4	1.436	17.23
2 1/2	1.595	19.14
2 3/4	1.755	21.06
3	1.914	22.97
4	2.552	30.63
6	3.829	45.95
1/4 x		
3/8	.3191	3.829
1/2	.4254	5.105
5/8	.5318	6.381
3/4	.6381	7.657
7/8	.7445	8.934
1	.8508	10.21
1 1/4	1.064	12.76
1 1/2	1.276	15.31
1 3/4	1.489	17.87
2	1.702	20.42
2 1/4	1.914	22.97
2 1/2	2.127	25.52
2 3/4	2.340	28.08
3	2.552	30.63
3 1/2	2.978	35.73
4	3.403	40.84
4 1/2	3.829	45.94
5	4.254	51.05
6	5.105	61.26
8	6.806	81.68

Size In Inches	Est. Wt., Lbs. Per Foot	12-Ft. Bar
5/16 x		
3/8	.3988	4.786
1/2	.5318	6.382
5/8	.6647	7.976
3/4	.7976	9.571
1	1.064	12.76
1 1/4	1.329	15.95
1 1/2	1.595	19.14
1 3/4	1.861	22.33
2	2.127	25.52
2 1/4	2.393	28.71
2 1/2	2.659	31.91
2 3/4	2.925	35.10
3	3.191	38.29
4	4.254	51.05
5	5.318	63.82
6	6.381	76.57
3/8 x		
1/2	.6381	7.657
5/8	.7976	9.571
3/4	.9572	11.49
1	1.276	15.31
1 1/4	1.595	19.14
1 3/8	1.755	21.06
1 1/2	1.914	22.97
1 3/4	2.233	26.80
2	2.552	30.63
2 1/4	2.871	34.46
2 1/2	3.191	38.29
2 3/4	3.510	42.11
3	3.829	45.94
3 1/2	4.467	53.60
4	5.105	61.26
4 1/2	5.743	68.91
5	6.381	76.57
5 1/2	7.019	84.23
6	7.657	91.89
8	10.21	122.5
1/2 x		
5/8	1.064	12.77
3/4	1.276	15.31
7/8	1.489	17.87
1	1.702	20.42
1 1/4	2.127	25.52
1 1/2	2.552	30.63
1 3/4	2.978	35.73
2	3.403	40.84
2 1/4	3.829	45.94
2 1/2	4.254	51.05
2 3/4	4.679	56.15

Size In Inches	Est. Wt., Lbs. Per Foot	12-Ft. Bar
1/2 x		
3	5.105	61.26
3 1/4	5.530	66.36
3 1/2	5.956	71.47
3 3/4	6.381	76.57
4	6.806	81.68
4 1/2	7.657	91.89
5	8.508	102.1
5 1/2	9.359	112.3
6	10.21	122.5
8	13.61	163.4
5/8 x		
3/4	1.595	19.14
1	2.127	25.52
1 1/4	2.659	31.91
1 1/2	3.191	38.29
1 3/4	3.722	44.67
2	4.254	51.05
2 1/4	4.786	57.43
2 1/2	5.318	63.81
2 3/4	5.849	70.19
3	6.381	76.57
3 1/2	7.445	89.33
4	8.508	102.1
5	10.64	127.6
6	12.76	153.1
3/4 x		
1	2.552	30.63
1 1/4	3.191	38.29
1 1/2	3.829	45.94
1 3/4	4.467	53.60
2	5.105	61.26
2 1/4	5.743	68.91
2 1/2	6.381	76.57
2 3/4	7.019	84.23
3	7.657	91.89
3 1/2	8.933	107.2
4	10.21	122.5
4 1/2	11.49	137.8
5	12.76	153.1
6	15.31	183.8
8	20.42	245.0
1 x		
1 1/4	4.254	51.05
1 1/2	5.105	61.26
1 3/4	5.956	71.47
2	6.806	81.68
2 1/4	7.657	91.89
2 1/2	8.508	102.1
2 3/4	9.359	112.3

Size In Inches	Est. Wt., Lbs. Per Foot	12-Ft. Bar
1 x		
3	10.21	122.5
3 1/2	11.91	142.9
4	13.61	163.4
4 1/2	15.31	183.8
5	17.02	204.2
6	20.42	245.0
8	27.23	326.7
1 1/4 x		
1 1/2	6.381	76.57
2	8.508	102.1
2 1/2	10.64	127.6
3	12.76	153.1
3 1/2	14.89	178.7
4	17.02	204.2
5	21.27	255.2
6	25.52	306.2
1 1/2 x		
1 3/4	8.933	107.2
2	10.21	122.5
2 1/2	12.76	153.1
3	15.31	183.8
3 1/2	17.87	214.4
4	20.42	245.0
5	25.52	306.2
6	30.63	367.6
1 3/4 x		
2	11.91	142.9
2 1/2	14.89	178.7
3	17.87	214.4
4	23.82	285.8
6	35.73	428.8
2 x		
2 1/2	17.02	204.2
3	20.42	245.0
4	27.23	326.7
5	34.03	408.4
6	40.84	490.1
2 1/2 x		
3	25.52	306.2
4	34.03	408.4
5	42.54	510.5
6	51.05	612.6
3 x		
3 1/2	35.73	428.8
4	40.84	490.1
5	51.05	612.6
6	61.26	735.1

TYPES 303S and 303Se — FREE MACHINING

Stainless Bars

UNS S30300, S30323

Color Marking

Type 303S — Annealed Bars and Pump Shafting: Ends painted Red
High Tensile Bars (Condition B): Ends painted Gray & Orange

Type 303Se — Annealed Bars: Ends painted Purple
High Tensile Bars (Condition B): Ends painted Brown

Type 303 is "18-8" chromium-nickel stainless steel modified by the addition of selenium or sulfur, as well as phosphorus, to improve machinability and non-seizing properties. It is the most readily machinable of all the chromium-nickel grades and has good corrosion resistance. It is non-magnetic in the annealed condition and not hardenable by heat treatment. Tensile strength and hardness can be increased by cold working. It is manufactured by the electric-furnace process and meets the exacting requirements of the aircraft industry.

ANALYSIS

	C Max.	Mn Max.	P Max.	S	Se	Si Max.	Cr	Ni	Mo Max.	Cu Max.
303S	.15	2.00	.15	.15 Min.	——	1.00	17.00/19.00	8.00/10.00	.75	.75
303Se	.15	2.00	.17	.04 Max.	.15/.40	1.00	17/00/19.00	8.00/10.00	.75	.75

SPECIFICATIONS — The following specifications are generally applicable: AMS 5640, ASTM A 314, ASTM A 320, ASTM A 582

APPLICATIONS — Used almost exclusively for parts requiring machining, grinding, or polishing where good corrosion resistance is also required, Its non-seizing and non-galling properties make it ideal for moving parts. Being an austenitic steel, it is useful where low magnetic permeability is desired.

CORROSION RESISTANCE — Because of the elements which are added to improve machinability, Type 303 has slightly less general corrosion resistance than the regular chromium-nickel grades such as Type 304. Maximum corrosion resistance is obtained in the annealed condition.

RESISTANCE TO SCALING — This grade has excellent scale resistance at temperatures up to 1600°F in continuous service. Like other chromium-nickel grades, it has a high coefficient of expansion which should be considered in designing.

MECHANICAL PROPERTIES

	Tensile Strength (psi)	Yield Strength Min. (psi)	Elong-ation in 2" Min.	Reduc-tion of Area Min.	Brinell Hardness
Cond. A (Annealed)					
1/2" and under	125,000 Max	——	——	——	140/255
Over 1/2"	——	——	——	——	140/255
Cond. B (High Tensile)					
Up to 3/4"	125,000 Min.	100,000	12%	35%	321 Max.
Over 3/4" to 1"	115,000 Min.	80,000	15%	35%	321 Max.
Over 1" to 1 1/4"	105,000 Min.	65,000	20%	35%	321 Max.
Over 1 1/4" to 1 1/2"	100,000 Min.	50,000	28%	45%	321 Max.
Over 1 1/2" to 3"	95,000 Min.	45,000	28%	45%	321 Max.

In practice, annealed bars will average as follows:

	Tensile Strength (psi)	Yield Strength (psi)	Elonga-tion in 2"	Reduc-tion of Area	Izod impact Ft. Lbs.	Brinell Hardness
H. R. Ann	90,000	35,000	50%	55%	80%	160
Ann. & C. F.	100,000	60,000	40%	53%	——	228

MACHINABILITY — Type 303 has considerably better machining characteristics than the other chromium-nickel grades. It has machinability rating of approximately 78% with 1212 rated 100%. Surface cutting speed on automatic screw machines is approximately 130 feet per minute.

WELDABILITY — This grade has only fair welding properties.

FORMING — This grade has fairly good forming properties.

FORGING — Forge between 2100° and 2350°F. Do not forge below 1700°F.

ANNEALING — Annealing range is between 1850° and 2050°F. Cool rapidly. Water should be used for heavier sections; air for lighter sections. The stress relieving range is between 400° and 750°F.

TYPES 316 AND 316L
Sheets, Plates, Bars, and Angles
UNS S31600, S31603
TYPES 317 and 317L
Plates
UNS S31700, S31703

Color Markings:

Type 316 Bars —— Ends Pink With Black Stripe
Type 316 Plate —— Corner Striped Pink with Black Stripe
Type 316L Bars —— Ends Pink with Blue Stripe
Type 316L Plate —— Corner Striped Pink with Blue Stripe
Type 317 Plates —— Corner Striped Blue with Pink Stripe
Type 317L Plates —— Corner Striped Aluminum

Types 316 and 317 are "18-8" chromium-nickel stainless steels modified by the addition of molybdenum, which greatly increases the corrosion resistance as well as the mechanical properties at elevated temperatures. These grades are non-magnetic in the annealed condition and not hardenable by heat treatment. Since they have good cold forming and drawing properties, these grades are outstanding stainless steels suitable for a large number of applications. Manufactured by the electric-furnace process, these grades meet the exacting standards of the aircraft industry. Bars and Plates are available not only in the regular Type 316 analysis, but also in an extra low carbon analysis known as Type 316L. The advantage of the reduced carbon content is that it precludes any harmful precipitation in the 800°-1500°F range, such as might otherwise occur in welding heavier sections. Types 317 and 317L are available in plate and with increased chromium, nickel, and molybdenum contents can be used in even more severe corrosive and high temperature applications.

ANALYSIS

	C Max.	Mn Max.	P Max.	S Max.	Si Max.	Cr
316	.08	2.00	.040	.030	1.00	16.00/18.00
316L	.03	2.00	.040	.030	1.00	16.00/18.00
317	.08	2.00	.045	.030	.75	18.00/20.00
317L	.03	2.00	.045	.030	.75	18.00/20.00

	Ni	Mo	Cu Max.	N Max.
316	10.00/14.00	2.00/3.00	.75	.10
316L	10.00/14.00	2.00/3.00	.75	.10
317	11.00/15.00	3.00/4.00	——	.10
317L	11.00/15.00	3.00/4.00	——	. 10

SPECIFICATIONS — The following specifications are generally applicable:

Types 316 and 316L:

Sheets & Plates: ASTM A 167, ASTM A 240, QQ-S-766, AMS 5524, AMS 5507

Bars & Angles: AMS 5648, AMS QQ-S-763, ASTM A 276, ASTM A 479

Types 317 and 317L:

Plates: ASTM A 240

APPLICATIONS — Widely used in the paper, textile, and chemical industries, where parts are subjected to the corrosive effects of salts and reducing acids. Also used in the manufacture of pharmaceuticals in order to avoid excessive metallic contamination. Because Type 316 possesses the highest creep and tensile strength at elevated temperatures than any of the more commonly used stainless steels, it finds extensive use where the combination of high strength and good corrosion resistance at elevated temperatures is required. In aircraft applications, Type 316 is used for parts requiring good corrosion resistance and low magnetic permeability. Types 317 and 317L, with higher alloy content, would be suitable for the more severe corrosion applications.

TYPES 316 AND 317 STAINLESS (Continued)

CORROSION RESISTANCE — Types 316 and 317 are more resistant to atmospheric and general corrosive conditions than any of the other standard stainless steels. They have good resistance to the corrosive effects of sulphates, phosphates, and other salts as well as reducing acids such as sulphuric, sulphurous, and phosphoric. These grades are less susceptible to pitting in applications where acetic acid vapors or solutions of chlorides, bromides, or iodides are encountered. When heated to within the temperature range of 800°-1500°F, or when slowly cooled through this range, these grades are subject to intergranular corrosion. If the application requires this, then the low carbon version, Types 316L and 317L, should be used.

RESISTANCE TO SCALING — Excellent scale resistance at temperatures up to 1650°F in continuous service.

MECHANICAL PROPERTIES — Applicable specifications require the following properties of material in the annealed condition:

	Tensile Strength (psi)	Yield Strength Min. (psi)	Elongation in 2" Min.	Reduction of Area Min.
Sheets	75,000/100,000	30,000	40%	——
H.R. Bars	75,000/115,000	30,000	40%	50%
C.F. Bars				
1/2" & under	90,000/125,000	45,000	35%	45%
Over 1/2"	75,000 Min.	30,000	35%	50%

MACHINABILITY — Types 316 and 317 have a machinability rating of approximately 45%, with 1212 rated 100%. Surface cutting speed on automatic screw machines is approximately 75 feet per minute.

WELDABILITY — Easily welded by all the commercial processes except forge or hammer welding. Annealing after welding is recommended to obtain maximum corrosion resistance.

FORMING — These grades have good drawing and stamping properties.

FORGING — Forge between 2100° and 2300°F. Do not forge below 1700°F.

ANNEALING — Annealing range is between 1850° and 2050°F. Cool rapidly. Water should be used for heavier sections; air for lighter sections. The stress relieving range is between 400° and 750°F.

17-4

AISI 630
UNS S 17400

Precipitation Hardening Stainless Bars and Plates

Color Marking: Bars — Ends painted Blue and Yellow
Plates — Corner striped Blue and Yellow

This is a chromium-nickel grade of stainless steel that may be hardened by a single low-temperature precipitation-hardening heat treatment. Excellent mechanical properties at a high strength level may be obtained by such treatment. Scaling and distortion are minimized. This material should not be used in the solution treated condition.

The strength and corrosion resistance properties of 17-4 hold up well in service temperatures up to 800°F.

Fabrication techniques for this steel are similar to those established for the regular stainless steel grades. This material machines well, has excellent welding characteristics, and forges easily. The combination of excellent mechanical and processing properties makes this grade adaptable to a wide variety of applications.

ANALYSIS

C Max.	Mn Max.	P Max.	S Max.	Si Max.	Cr	Ni	Cu	Cb +Ta
.07	1.00	.04	.03	1.00	15.00/17.50	3.00/5.00	3.00/5.00	5XC/.45

SPECIFICATIONS — AMS 5643 and ASTM A 564 Type 630 are generally applicable.

APPLICATIONS — Used where high strength and good corrosion resistance are required, as well as for applications requiring high fatigue strength, good resistance to galling, seizing and stress corrosion. Suitable for intricate parts requiring machining and welding, and/or where distortion in conventional heat treatment is a problem.

CORROSION RESISTANCE — The corrosion resistance of 17-4 is superior to that of hardenable straight chromium grades such as Type 410. It approaches the corrosion resistance of the chromium nickel grades. In many corrosive media it is equal to such grades as Type 304. Corrosion resisting properties will be affected by such conditions as surface finish and aging heat treatment.

MECHANICAL PROPERTIES — The following may be considered as average or typical room-temperature properties:

Condition	Tensile Strength (psi)	Yield Strength (psi)	Elongation in 2"	Reduction of Area	Rockwell "C" Hardness
A (Annealed)	150,000	110,000	10%	40%	34
H 900 (Hardened at 900°)	200,000	185,000	14%	50%	44
H 1150 (Hardened at 1150°)	145,000	125,000	19%	60%	33

AMS 5643 requires the following after precipitation heat treating at 900°F.

Tensile Strength (psi)	Yield Strength (psi)	Elongation in 2"	Reduction of Area 3" Thick & Under	Reduction of Area Over 3" to 8" Thick
190,000 Min.	170,000 Min.	10% Min.	40% Min.	35% Min.

MACHINABILITY — This grade has a machinability rating of 48% in the annealed condition (Condition A), with surface cutting speed of 80 feet per minute. In the overaged condition (H 1150-M), the machinability rating is 76%, with surface cutting speed of 125 feet per minute.

WELDING — Readily weldable by all the commercial processes. Preheating and post-heating practices used for the standard hardenable stainless grades are not required.

FORGING — Forge between 2050° and 2150°F. Do not forge below 1850°F. Forgings are air cooled to 90°F or lower. Large or intricate forgings should be equalized at some temperature between 1900°F and the forging temperature before air cooling.

ANNEALING (Condition A) — The annealing (solution treatment) temperature is 1900°F, followed by air cooling. Maximum Brinell hardness at mid-radius is 363.

HARDENING —
Condition H 900 —— 900°F for 1 hour, air cool. Rockwell "C" 44 Average.
Condition H 1025 —— 1025°F for 4 hours, air cool. Rockwell "C" 38 Average.
Condition H 1150 —— 1150°F for 4 hours, air cool. Rockwell "C" 33 Average.

STEEL AND ALUMINUM PIPE

Pipe is a tubular product intended primarily for such purposes as the conveying of water, fuel, gas, air, steam, etc. It has also been found to be a convenient form for use as structural members such as columns and railings. It is produced from steel and aluminum in a variety of analyses by the welded, seamless, and extrusion methods.

As distinguished from tubing, pipe is commonly produced in greater quantities and in relatively few standard sizes. It is generally made to less exacting specifications for dimensions, finish, chemical composition, and mechanical properties than tubing.

Sizes and wall thicknesses of pipe were originally standardized to permit threading the end for joining lengths with couplings or other connectors. A large proportion of the product is also used without screw threads (plain end), where lengths are joined together, or fittings attached, by welding or other means.

STANDARD PIPE SIZES AND WEIGHTS —

(For descriptions and properties of various grades. See Pages 99-101.

Standard sizes for steel pipe are established in American National Standards Institute (ANSI) B36.10 and B36.19 of the American National Standards Institute (ANSI). These standards set up a number of "schedules" which specify various wall thicknesses for given standard diameters.

ANSI B36.10 refers to wrought-steel and wrought-iron pipe and includes schedules 10, 20, 30, 40, 60, 80, 100, 120, 140, and 160. ANSI B36.19 refers to stainless steel pipe and includes schedules 5S, 10S, 40S, and 80S.

Aluminum Pipe also is produced in sizes according to ANSI B36.10.

The table on the following three pages indicates standard sizes and gives each the nominal size, actual outside diameter, wall thickness, and weights per foot for Steel and Aluminum.

.049	**Wall thickness in inches**
S .1863	**Weight per foot for Carbon Steel**
A .0645	**Weight per foot for Aluminum**

Weights shown are for plain-end carbon steel pipe. For threaded and coupled pipe, weights are slightly higher. For stainless steel pipe, weights are about 2% higher.

Pipe is generally referred to by **nominal** size, but it would be noted that on sizes up to 12" the actual outside diameter is somewhat greater than the nominal size.

Besides being classified as ANSI Schedule Numbers, **certain** wall thicknesses are also shown by the following commonly used designations:

Standard Weight (abbreviated **STD** in the following table, and identical with ANSI Schedule 40 in sizes through 10").

Extra Strong (abbreviated **XS** in the following table, and identical with ANSI Schedule 80 in sizes through 8").

Double Extra Strong (abbreviated **XXS** in the following table, and not identical with any ANSI Schedule).

STANDARD PIPE SIZES AND WEIGHTS

WALL THICKNESSES AND WEIGHTS PER FOOT

Nominal Pipe Size	Outside Diameter (Inches)	Schedule 5S	Schedule 10S	Schedule 40 & 40S STD	Schedule 80 & 80S XS	Schedule 160	XXS
1/8	.405		.049	.068	.095		
			S .1863	S .2447	S .3145		
			A .0645	A .0847	A .1008		
1/4	.540		.065	.088	.119		
			S .3297	S .4248	S .5351		
			A .1141	A .1470	A .1851		
3/8	.675		.065	.091	.126		
			S .4225	S .5650	S .7388		
			A .1465	A .1955	A .2556		
1/2	.840	.065	.083	.109	.147	.187	.294
		S .5380	S .6710	S .8510	S 1.088	S 1.304	S 1.714
		A .1861	A .2321	A .2944	A .3764	A .4511	A .5930
3/4	1.050	.065	.083	.113	.154	.218	.308
		S .6838	S .8572	S 1.131	S 1.474	S 1.937	S 2.441
		A .2366	A 2.966	A .3913	A .5100	A .6702	A .8445
1	1.315	.065	.109	.133	.179	.250	.358
		S .8678	S 1.404	S 1.679	S 2.172	S 2.844	S 3.659
		A .3002	A .4857	A .5809	A .7515	A .9839	A 1.266
1 1/4	1.660	.065	.109	.140	.191	.250	.382
		S 1.107	S 1.806	S 2.273	S 2.997	S 3.765	S 5.214
		A .3830	A .6248	A .7864	A 1.037	A 1.302	A 1.804
1 1/2	1.900	.065	.109	.147	.200	.281	.400
		S 1.274	S 2.085	S 2.718	S 3.631	S 4.859	S 6.408
		A .4408	A .7214	A .9404	A 1.256	A 1.681	A 2.217
2	2.375	.065	.109	.154	.218	.343	.436
		S 1.604	S 2.638	S 3.653	S 5.022	S 7.444	S 9.029
		A .5549	A .9127	A 1.264	A 1.737	A 2.575	A 3.124
2 1/2	2.875	.083	.120	.203	.276	.375	.552
		S 2.475	S 3.531	S 5.793	S 7.661	S 10.01	S 13.70
		A .8563	A 1.221	A 2.004	A 2.650	A 3.464	A 4.740
3	3.500	.083	.120	.216	.300	.438	.600
		S 3.029	S 4.332	S 7.576	S 10.25	S 14.32	S 18.58
		A 1.048	A 1.498	A 2.621	A 3.547	A 4.945	A 6.428
3 1/2	4.000	.083	.120	.226	.318		
		S 3.472	S 4.973	S 9.109	S 12.51		
		A 1.201	A 1.720	A 3.151	A 4.326		

STANDARD PIPE SIZES AND WEIGHTS (cont.)

)

WALL THICKNESSES AND WEIGHTS PER FOOT								
Nominal Pipe Size	Outside Diameter (Inches)	Schedule 5S	Schedule 10S	Schedule 10	Schedule 20	Schedule 30	STD (Standard Wall)	Schedule 40
4	4.500	.083	.120				.237	.237
		S 3.915	S 5.613				S 10.79	S 10.79
		A 1.354	A 1.942				A 3.733	A 3.733
5	5.563	.109	.134				.258	.258
		S 6.349	S 7.770				S 14.62	S 14.62
		A 2.196	A 2.668				A 5.057	A 5.057
6	6.625	.109	.134				.280	.280
		S 7.585	S 9.289				S 18.97	S 18.97
		A 2.624	A 3.213				A 6.564	A 6.564
8	8.625	.109	.148		.250	.277	.322	.322
		S 9.715	S 13.40		S 22.36	S 24.70	S 28.55	S 28.55
		A 3.429	A 4.635		A 7.735	A 8.543	A 9.878	A 9.878
10	10.750	.134	.165		.250	.307	.365	.365
		S 15.19	S 18.65		S 28.04	S 34.24	S 40.48	S 40.48
		A 5.256	A 6.453		A 9.698	A 11.84	A 14.00	A 14.00
12	12.750	.156	.180		.250	.330	.375	.406
		S 20.98	S 24.16		S 33.38	S 43.77	S 49,56	S 53.52
		A 7.258	A 8.359		A 11.55	A 15.14	A 17.15	A 18.52
14	14.000			.250	.312	.375	.375	.438
				S 36.71	S 45.61	S 54.57	S 54.57	S 63.44
				A 12.70	A 15.78	A 18.88	A 18.88	A 21.95
16	16.000			.250	.312	.375	.375	.500
				S 42.05	S 52.27	S 62.58	S 62.58	S 82.77
				A 14.55	A 18.08	A 21.65	A 21.65	A 28.64
18	18.00			.250	.312	.438		.562
				S 47.39	S 58.94	S 82.15		S 104.7
				A 16.40	A 20.39	A 28.42		A 36.21
20	20.000			.250	.375	.500		.593
				S 52.73	S 78.60	S 104.1		S 122.9
				A 18.24	A 27.19	A 36.03		A 42.52
24	24.000			.250	.375	.562		.687
				S 63.41	S 94.62	S 140.7		S 171.1
				A 21.94	A 32.74	A 48.67		A 59.18
30	30.000			.312	.500	.625		
				S 98.93	S 157.5	S 196.1		
				A 34.23	A 54.50	A 67.84		

SUMMARY OF SPECIFICATIONS APPLYING TO CARBON STEEL PIPE

	ASTM A 53				
WALL TOLERANCES	**Same as ASTM A 106**				
CHEMISTRY		Carbon % Max.	Ma. % Max.	Phos. % Max.	S % Max.
	SEAMLESS (Type S) Open hearth, electric furnace, or basic oxygen				
	Grade A	0.25	0.95	0.05	0.06
	Grade B	0.30	1.20	0.05	0.06
	ELECTRIC WELDED (Type E) Open hearth, electric furnace, or basic oxygen				
	Grade A	0.25	0.95	0.05	0.06
	Grade B	0.30	1.20	0.05	0.06
	BUTT WELDED (Type F) Open hearth, electric furnace, or basic oxygen	—	—	0.08	0.06
PHYSICAL PROPERTIES	**FURNACE WELDED** (Butt Welded)				
					Open hearth Basic Oxygen or Electric Furnace
	Tensile Strength Min. psi				45,000
	Yield Strength Min. psi				25,000
	SEAMLESS or ELECTRIC WELDED				
			Grade A		Grade B
	Tensile Strength Min. psi		48,000		60,000
	Yield Strength Min. psi		30,000		35,000

SUMMARY OF SPECIFICATIONS
APPLYING TO CARBON STEEL PIPE

ASTM A 106

Minimum wall thickness at any point shall be not more than 12.5% under nominal wall specified.

API 5L

SEAMLESS

	Plus	Minus
2⅞" and smaller	20%	12½%
3½"	18%	12½%
4" and larger	15%	12½%

WELDED

	Plus	Minus
2⅞" and smaller	20%	12½%
3½"	18%	12½%
4" thru 18"	15%	12½%
20" and larger	17½%	10%

	Grade A	Grade B	Grade C
Carbon, Max.	0.25%	0.30%	0.30%
Manganese	0.27/ 0.93%	0.29/ 1.06%	0.29/ 1.06%
Phosp., Max	0.048%	0.048%	0.048%
Sulphur, Max	0.058%	0.058%	0.058%
Silicon, Min.	0.01.%	0.10%	0.10%

	C	Mn		P		S
	% Max.	% Max.	% Max.	% Max.	% Max.	% Max
SEAMLESS						
Grade A	0.22	—	0.90	—	0.040	0.05
Grade B	0.27	—	1.15	—	0.040	0.05
Grade C	0.27	—	1.15	—	0.040	0.05
ELECTRIC WELDED						
Grade A	0.21	—	0.90	—	0.040	0.05
Grade B	0.26	—	1.15	—	0.040	0.05

	SEAMLESS		
	Grade A	Grade B	Grade C
Tensile Strength Min. psi	48,000	60,000	70,000
Yield Strength Min. psi	30,000	35,000	40,000

SEAMLESS OR ELECTRIC WELDED		
	Tensile Strength	Yield Strength
	Min. psi	Min. psi
Grade A	48,000	30,000
Grade B	60,000	35,000

CARBON STEEL PIPE

SEAMLESS AND WELDED

ASTM A 53, Grade A and Grade B: ASME Boiler and Pressure Vessel Code Specifications SA 53, Grade B (Seamless Type S or Welded Type E)

API Standard 5L (Seamless or Welded)

ASTM A 106, Grade B; ASME Boiler and Pressure Vessel Code specification SA 106, Grade B (Seamless–For High Temperature Service)

This pipe is produced from basic oxygen process steel in low carbon analysis.

Seamless pipe is produced from pierced billets. The severity of the piercing operation dictates that the material must have a good surface and above average internal soundness. The result is a product that has a uniform and refined grain structure as well as good strength and ductility.

Welded pipe is produced by the butt welding or electric resistance welding method. In the butt welding process, also known as continuous welding (CW), skelp is heated to the welding temperature and drawn through a die or welding rolls where the material is bent into tubular form. The edges became welded as they are pressed together. In the electric resistance welding (EW) process, strip is formed continuously by a series of rolls into a round shape and the welding is a accomplished by pressure from heat generated by the resistance of current flowing across the seam.

Most sizes are available in both single and double random lengths.

APPLICATIONS — This pipe is used for a variety of applications ranging from conveying gas and liquids to mechanical applications such as conveyors, rolls, and structural applications such as fence posts, railings, and columns.

Line pipe is used principally for the conveying of gas, oil, or water and is produced with ends plain, threaded, grooved, beveled, flanged, or expanded as required, as well as various types of mechanical couplers or welded joints.

Pressure pipe is used for conveying fluids at normal or elevated temperatures or both, but it is not subjected to external heat.

Galvanized pipe is used where resistance to corrosion is desired.

TOLERANCES

Outside Diameter:

Nominal Sizes	
1 1/2" and under	Plus 1/64", Minus 1/32"
Over 1 1/2" to 4", include	Plus or minus 1/32"
Over 4" to 8", include	Plus 1/16", Minus 1/32"
Over 8" to 18", include	Plus 3/32", Minus 1/32"
Over 18"	Plus 1/8", Minus 1/32"

STANDARD SIZES — Refer to Pages 99-101 of this section.

Copper Water Tube continued

DIMENSIONAL DATA – COPPER WATER TUBE – TYPE "K"

TYPE "K" Hard Drawn: 20-ft. (6.1m) Straight Lengths
Soft Annealed: 20-ft. (6.1m) Straight Lengths, or 40-ft. (12.2m) and 60-ft. (18.3m) Length Coils (to and including size 1 1/2)
: For underground service and general purpose plumbing and heating installations under severe conditions.

Nominal Water Tube Size (In Inches)	Outside Diameter		Tolerances (Hard Drawn Only) Tubing OD Min.		Tolerances (Hard Drawn Only) Tubing OD Max.		Nominal Wall Thickness		Weight Per Foot		Hard Drawn Bursting Pressure[A]		Hard Drawn Safe Working Pressure[B]		Soft Annealed Bursting Pressure[A]		Soft Annealed Safe Working Pressure[C]	
	Inch	(mm)	Inch	(mm)	Inch	(mm)	Inch	(mm)	Lb	(kg)	psi	(bars)	psi	(bars)	psi	(bars)	psi	(bars)
1/4	0.375	(9.53)	0.373	(9.47)	0.376	(9.55)	0.035	(0.89)	0.145	(0.07)	N/A	N/A	1612	(111)	N/A	N/A	913	(63)
3/8	0.500	(12.70)	0.497	(12.62)	0.501	(12.73)	0.049	(1.24)	0.269	(0.12)	N/A	N/A	1675	(115)	N/A	N/A	960	(66)
1/2	0.625	(15.88)	0.622	(15.80)	0.626	(15.90)	0.049	(1.24)	0.344	(0.16)	9840	(678)	1337	(92)	4535	(313)	758	(52)
5/8	0.750	(19.05)	0.747	(18.97)	0.751	(19.08)	0.049	(1.24)	0.418	(0.19)	N/A	N/A	1104	(76)	N/A	N/A	626	(43)
3/4	0.875	(22.23)	0.872	(22.15)	0.876	(22.25)	0.065	(1.65)	0.641	(0.29)	9300	(641)	1278	(88)	4200	(290)	724	(50)
1	1.125	(28.58)	1.122	(28.50)	1.127	(28.63)	0.065	(1.65)	0.839	(0.38)	7200	(496)	982	(68)	3415	(235)	557	(38)
1 1/4	1.375	(34.93)	1.372	(34.85)	1.377	(34.98)	0.065	(1.65)	1.040	(0.47)	5525	(381)	797	(55)	2800	(193)	452	(31)
1 1/2	1.625	(41.28)	1.621	(41.17)	1.627	(41.33)	0.072	(1.83)	1.360	(0.62)	5000	(345)	742	(51)	2600	(179)	420	(29)
2	2.125	(53.98)	2.121	(53.87)	2.127	(54.03)	0.083	(2.11)	2.060	(0.93)	3915	(270)	652	(45)	2235	(154)	370	(26)
2 1/2	2.625	(66.68)	2.621	(66.57)	2.627	(66.73)	0.095	(2.41)	2.930	(1.33)	3575	(246)	597	(41)	N/A	N/A	338	(23)
3	3.125	(79.38)	3.121	(79.27)	3.127	(79.43)	0.109	(2.77)	4.000	(1.81)	3450	(238)	578	(40)	N/A	N/A	328	(23)
3 1/2	3.625	(92.08)	3.621	(91.97)	3.627	(92.13)	0.120	(3.05)	5.120	(2.32)	N/A	N/A	549	(38)	N/A	N/A	311	(21)
4	4.125	(104.78)	4.121	(104.67)	4.127	(104.83)	0.134	(3.40)	6.510	(2.95)	3415	(235)	540	(37)	N/A	N/A	306	(21)
5	5.125	(130.18)	5.121	(130.07)	5.127	(130.23)	0.160	(4.06)	9.670	(4.39)	3585	(247)	517	(36)	N/A	N/A	293	(20)
6	6.125	(155.58)	6.121	(155.47)	6.127	(155.63)	0.192	(4.88)	13.900	(6.30)	3425	(236)	520	(36)	N/A	N/A	295	(20)
8	8.125	(206.38)	8.119	(206.22)	8.127	(206.43)	0.271	(6.88)	25.900	(11.75)	3635	(251)	553	(38)	N/A	N/A	314	(22)
10	10.125	(257.18)	10.119	(257.02)	10.127	(257.23)	0.338	(8.59)	40.300	(18.28)	N/A	N/A	553	(38)	N/A	N/A	314	(22)
12	12.125	(307.98)	12.119	(307.82)	12.127	(308.03)	0.405	(10.29)	57.800	(26.22)	N/A	N/A	555	(38)	N/A	N/A	314	(22)

Note: Information and data contained in these charts, as taken from ASTM Specifications B 88. Rated internal pressure for copper water tube based on the strength of the tube alone and applicable to systems using suitable mechanical joints.

[A] Based on actual laboratory test data provided by Copper Development Association, Inc.

[B] Based upon 150°F (65.6°C) with an allowable stress of 9500 psi (668 kPa).

[C] Based upon 150°F (65.6°C) with an allowable stress of 5100 psi (359 kPa).

Copper Tube Data

Type L					
Tube Size	O.D. Tubing	O.D.	Wall Thick.	Weight per Foot (lbs)	Weight of Water per Foot (lbs)
¼	⅜	0.375	0.030	0.126	0.034
⅜	½	0.500	0.035	0.198	0.062
½	⅝	0.625	0.040	0.285	0.100
⅝	¾	0.750	0.042	0.362	0.151
¾	⅞	0.875	0.045	0.455	0.209
1	1⅛	1.125	0.050	0.655	0.357
1¼	1⅜	1.375	0.055	0.884	0.546
1½	1⅝	1.625	0.060	1.140	0.767
2	2⅛	2.125	0.070	1.750	1.341
2½	2⅝	2.625	0.080	2.480	2.064
3	3⅛	3.125	0.090	3.330	2.949
3½	3⅝	3.625	0.100	4.290	3.989
4	4⅛	4.125	0.110	5.380	5.188
5	5⅛	5.125	0.125	7.610	8.081
6	6⅛	6.125	0.140	10.200	11.616
8	8⅛	8.125	0.200	19.290	20.289
10	10⅛	10.125	0.250	30.100	31.590
12	12⅛	12.125	0.280	40.400	45.426

Type K					
Tube Size	O.D. Tubing	O.D.	Wall Thick.	Weight per Foot (lbs)	Weight of Water per Foot (lbs)
¼	⅜	0.375	0.035	0.145	0.032
⅜	½	0.500	0.049	0.269	0.055
½	⅝	0.625	0.049	0.344	0.094
⅝	¾	0.750	0.049	0.418	0.144
¾	⅞	0.875	0.065	0.641	0.188
1	1⅛	1.125	0.065	0.839	0.337
1¼	1⅜	1.375	0.065	1.040	0.527
1½	1⅝	1.625	0.072	1.360	0.743
2	2⅛	2.125	0.083	2.060	1.310
2½	2⅝	2.625	0.095	2.920	2.000
3	3⅛	3.125	0.109	4.000	2.960
3½	3⅝	3.625	0.120	5.120	3.900
4	4⅛	4.125	0.134	6.510	5.060
5	5⅛	5.125	0.160	9.670	8.000
6	6⅛	6.125	0.192	13.870	11.200
8	8⅛	8.125	0.271	25.900	19.500
10	10⅛	10.125	0.338	40.300	30.423
12	12⅛	12.125	0.405	57.800	43.675

DIMENSIONAL DATA – COPPER WATER TUBE – TYPE "L"

TYPE "L" Hard Drawn: 20-ft. (6.1m) Straight Lengths
Soft Annealed: 20-ft. (6.1m) Straight Lengths, or 40-ft. (12.2m) and 60-ft. (18.3m) Length Coils (to and including size 1 1/2)

Usage: For general purpose plumbing and heating conditions.

Nominal Water Tube Size (In Inches)	Outside Diameter		Tolerances (Hard Drawn Only) Tubing OD Min.		Tolerances (Hard Drawn Only) Tubing OD Max.		Nominal Wall Thickness		Weight Per Foot		Hard Drawn Bursting Pressure[A]		Hard Drawn Safe Working Pressure[B]		Soft Annealed Bursting Pressure[A]		Soft Annealed Safe Working Pressure[C]	
	Inch	(mm)	Inch	(mm)	Inch	(mm)	Inch	(mm)	Lb	(kg)	psi	(bars)	psi	(bars)	psi	(bars)	psi	(bars)
1/4	0.375	(9.53)	0.373	(9.47)	0.376	(9.55)	0.030	(0.76)	0.126	(0.06)	N/A	N/A	1367	(94)	N/A	N/A	775	(53)
3/8	0.500	(12.70)	0.497	(12.62)	0.501	(12.73)	0.035	(0.89)	0.198	(0.09)	N/A	N/A	1168	(81)	N/A	N/A	662	(46)
1/2	0.625	(15.88)	0.622	(15.80)	0.626	(15.90)	0.040	(1.02)	0.285	(0.13)	7765	(535)	1082	(75)	3885	(268)	613	(42)
5/8	0.750	(19.05)	0.747	(18.97)	0.751	(19.08)	0.042	(1.07)	0.362	(0.16)	N/A	N/A	947	(65)	N/A	N/A	537	(37)
3/4	0.875	(22.23)	0.872	(22.15)	0.876	(22.25)	0.045	(1.14)	0.455	(0.21)	5900	(407)	873	(60)	2935	(202)	495	(34)
1	1.125	(28.58)	1.122	(28.50)	1.127	(28.63)	0.050	(1.27)	0.655	(0.30)	5115	(353)	741	(51)	2650	(183)	420	(29)
1 1/4	1.375	(34.93)	1.372	(34.85)	1.377	(34.98)	0.055	(1.40)	0.884	(0.40)	4550	(314)	658	(45)	2400	(165)	373	(26)
1 1/2	1.625	(41.28)	1.621	(41.17)	1.627	(41.33)	0.060	(1.52)	1.140	(0.52)	4100	(283)	613	(42)	2200	(152)	347	(24)
2	2.125	(53.98)	2.121	(53.87)	2.127	(54.03)	0.070	(1.78)	1.750	(0.79)	3365	(232)	545	(38)	1910	(132)	309	(21)
2 1/2	2.625	(66.68)	2.621	(66.57)	2.627	(66.73)	0.080	(2.03)	2.480	(1.12)	3215	(222)	504	(35)	N/A	N/A	285	(20)
3	3.125	(79.38)	3.121	(79.27)	3.127	(79.43)	0.090	(2.29)	3.330	(1.51)	2865	(198)	476	(33)	N/A	N/A	270	(19)
3 1/2	3.625	(92.08)	3.621	(91.97)	3.627	(92.13)	0.100	(2.54)	4.290	(1.95)	N/A	N/A	455	(31)	N/A	N/A	258	(18)
4	4.125	(104.78)	4.121	(104.67)	4.127	(104.83)	0.110	(2.79)	5.380	(2.44)	2865	(198)	440	(30)	N/A	N/A	249	(17)
5	5.125	(130.18)	5.121	(130.07)	5.127	(130.23)	0.125	(3.18)	7.610	(3.45)	2985	(206)	404	(28)	N/A	N/A	229	(16)
6	6.125	(155.58)	6.121	(155.47)	6.127	(155.63)	0.140	(3.56)	10.200	(4.63)	2690	(185)	376	(26)	N/A	N/A	213	(15)
8	8.125	(206.38)	8.119	(206.22)	8.127	(206.43)	0.200	(5.08)	19.290	(8.75)	2650	(183)	406	(28)	N/A	N/A	230	(16)
10	10.125	(257.18)	10.119	(257.02)	10.127	(257.23)	0.250	(6.35)	30.100	(13.65)	N/A	N/A	407	(28)	N/A	N/A	231	(16)
12	12.125	(307.98)	12.119	(307.82)	12.127	(308.03)	0.280	(7.11)	40.400	(18.33)	N/A	N/A	380	(26)	N/A	N/A	215	(15)

Note: Information and data contained in these charts, as taken from ASTM Specifications B 88. Rated internal pressure for copper water tube based on the strength of the tube alone and applicable to systems using suitable mechanical joints.

[A] Based on actual laboratory test data provided by Copper Development Association, Inc.

[B] Based upon 150°F (65.6°C) with an allowable stress of 9500 psi (668 kPa).

[C] Based upon 150°F (65.6°C) with an allowable stress of 5100 psi (359 kPa).

Copper Water Tube continued

DIMENSIONAL DATA – COPPER WATER TUBE – TYPE "M"

TYPE "M" Hard Drawn Only: 20-ft. (6.1m) Straight Lengths

Usage: For general purpose plumbing, heating and drainage installations.

Nominal Water Tube Size (In Inches)	Outside Diameter		Tolerances (Hard Drawn Only) Tubing OD				Nominal Wall Thickness		Weight Per Foot		Hard Drawn			
			Min.		Max.						Bursting Pressure[A]		Safe Working Pressure[B]	
	Inch	(mm)	Inch	(mm)	Inch	(mm)	Inch	(mm)	Lb	(kg)	psi	(bars)	psi	(bars)
1/4	0.375	(9.53)	0.373	(9.47)	0.376	(9.55)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3/8	0.500	(12.70)	0.497	(12.62)	0.501	(12.73)	0.025	(0.64)	0.145	(0.07)	N/A	N/A	855	(59)
1/2	0.625	(15.88)	0.622	(15.80)	0.626	(15.90)	0.028	(0.71)	0.204	(0.09)	6135	(423)	741	(51)
5/8	0.750	(19.05)	0.747	(18.97)	0.751	(19.08)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3/4	0.875	(22.23)	0.872	(22.15)	0.876	(22.25)	0.032	(0.81)	0.328	(0.15)	4717	(325)	611	(42)
1	1.125	(28.58)	1.122	(28.50)	1.127	(28.63)	0.035	(0.89)	0.465	(0.21)	3865	(266)	506	(35)
1 1/4	1.375	(34.93)	1.372	(34.85)	1.377	(34.98)	0.042	(1.07)	0.682	(0.31)	3875	(267)	507	(35)
1 1/2	1.625	(41.28)	1.621	(41.17)	1.627	(41.33)	0.049	(1.24)	0.940	(0.43)	3550	(245)	497	(34)
2	2.125	(53.98)	2.121	(53.87)	2.127	(54.03)	0.058	(1.47)	1.460	(0.66)	2935	(202)	448	(31)
2 1/2	2.625	(66.68)	2.621	(66.57)	2.627	(66.73)	0.065	(1.65)	2.030	(0.92)	2800	(193)	411	(28)
3	3.125	(79.38)	3.121	(79.27)	3.127	(79.43)	0.072	(1.83)	2.680	(1.22)	2665	(184)	380	(26)
3 1/2	3.625	(92.08)	3.621	(91.97)	3.627	(92.13)	0.083	(2.11)	3.580	(1.62)	N/A	N/A	378	(26)
4	4.125	(104.78)	4.121	(104.67)	4.127	(104.83)	0.095	(2.41)	4.660	(2.11)	2215	(153)	377	(26)
5	5.125	(130.18)	5.121	(130.07)	5.127	(130.23)	0.109	(2.77)	6.660	(3.02)	2490	(172)	349	(24)
6	6.125	(155.58)	6.121	(155.47)	6.127	(155.63)	0.122	(3.10)	8.920	(4.05)	2000	(138)	328	(23)
8	8.125	(206.38)	8.119	(206.22)	8.127	(206.43)	0.170	(4.32)	16.500	(7.48)	2285	(158)	344	(24)
10	10.125	(257.18)	10.119	(257.02)	10.127	(257.23)	0.212	(5.38)	25.600	(11.61)	N/A	N/A	344	(24)
12	12.125	(307.98)	12.119	(307.82)	12.127	(308.03)	0.254	(6.45)	36.700	(16.65)	N/A	N/A	345	(24)

Note: Information and data contained in these charts, as taken from ASTM Specifications B 88. Rated internal pressure for copper water tube based on the strength of the tube alone and applicable to systems using suitable mechanical joints.

[A] Based on actual laboratory test data provided by Copper Development Association, Inc.

[B] Based upon 150°F (65.6°C) with an allowable stress of 9500 psi (668 kPa).

DIMENSIONAL DATA – COPPER WATER TUBE – TYPE "DWV"

TYPE "DWV" Hard Drawn Only: 20-ft. (6.1m) Straight Lengths

Usage: For drain, waste, vent and other non-pressure applications.

Nominal Water Tube Size (In Inches)	Outside Diameter		Tolerances (Hard Drawn Only) Tubing OD				Nominal Wall Thickness		Weight Per Foot		Hard Drawn Bursting Pressure[A]	
			Min.		Max.							
	Inch	(mm)	Inch	(mm)	Inch	(mm)	Inch	(mm)	Lb	(kg)	psi	(bars)
1/4	0.375	(9.53)	0.373	(9.47)	0.376	(9.55)	N/A	N/A	N/A	N/A	N/A	N/A
3/8	0.500	(12.70)	0.497	(12.62)	0.501	(12.73)	N/A	N/A	N/A	N/A	N/A	N/A
1/2	0.625	(15.88)	0.622	(15.80)	0.626	(15.90)	N/A	N/A	N/A	N/A	N/A	N/A
5/8	0.750	(19.05)	0.747	(18.97)	0.751	(19.08)	N/A	N/A	N/A	N/A	N/A	N/A
3/4	0.875	(22.23)	0.872	(22.15)	0.876	(22.25)	N/A	N/A	N/A	N/A	N/A	N/A
1	1.125	(28.58)	1.122	(28.50)	1.127	(28.63)	N/A	N/A	N/A	N/A	N/A	N/A
1 1/4	1.375	(34.93)	1.372	(34.85)	1.377	(34.98)	0.040	(1.02)	0.650	(0.29)	N/A	N/A
1 1/2	1.625	(41.28)	1.621	(41.17)	1.627	(41.33)	0.042	(1.07)	0.809	(0.37)	440	(30)
2	2.125	(53.98)	2.121	(53.87)	2.127	(54.03)	0.042	(1.07)	1.070	(0.49)	326	(22)
2 1/2	2.625	(66.68)	2.621	(66.57)	2.627	(66.73)	N/A	N/A	N/A	N/A	N/A	N/A
3	3.125	(79.38)	3.121	(79.27)	3.127	(79.43)	0.045	(1.14)	1.690	(0.77)	239	(16)
3 1/2	3.625	(92.08)	3.621	(91.97)	3.627	(92.13)	N/A	N/A	N/A	N/A	N/A	N/A
4	4.125	(104.78)	4.121	(104.67)	4.127	(104.83)	0.058	(1.47)	2.870	(1.30)	225	(16)
5	5.125	(130.18)	5.121	(130.07)	5.127	(130.23)	0.072	(1.83)	4.430	(2.01)	227	(16)
6	6.125	(155.58)	6.121	(155.47)	6.127	(155.63)	0.083	(2.11)	6.100	(2.77)	223	(15)
8	8.125	(206.38)	8.119	(206.22)	8.127	(206.43)	0.109	N/A	10.600	(4.81)	219	(15)
10	10.125	(257.18)	10.119	(257.02)	10.127	(257.23)	N/A	N/A	N/A	N/A	N/A	N/A
12	12.125	(307.98)	12.119	(307.82)	12.127	(308.03)	N/A	N/A	N/A	N/A	N/A	N/A

DWV Tube is for sanitary drainage applications. The tubing wall is thinner than Type "M" – making it both lighter and less expensive. Research indicates that DWV tube has a service life of approximately 100 years – considerably longer than any building in which it might be installed.

The advantages of copper systems are augmented in DWV installations. Its light weight makes handling and transportation easier – only 0.34 lb. (0.15 kg) for a 20 ft. (6.1 m) length of size 3. Its thinner wall allows faster soldering.

These advantages offer an economical option without sacrificing stability or longevity for both contractor and the home owner. Further information will be furnished on request from NIBCO's Technical Services Department, at 1-888-446-4226

Note: Information and data contained in these charts, as taken from ASTM Specifications B 88. Rated internal pressure for copper water tube based on the strength of the tube alone and applicable to systems using suitable mechanical joints.

[A] Based on actual laboratory test data provided by Copper Development Association, Inc.

[B] Based upon 150°F (65.6°C) with an allowable stress of 9500 psi (668 kPa).

[C] Based upon 150°F (65.6°C) with an allowable stress of 5100 psi (359 kPa).

SQUARE AND RECTANGULAR STEEL STRUCTURAL TUBING

Structural Tubing is available in steel and aluminum in a wide range of sizes in round, square and rectangular shapes. It has become a most important basic section for structural applications because of its adaptability to such varied uses. For stock sizes of Square and Rectangle Steel Structural Tubing, refer to Pages 109-112 and Square and Rectangular Aluminum Tubing, refer to Pages 92-93 of this section.

Structural tubing is an efficient structural member with many inherent advantages, including strength and lightness. For example, for a given weight the round section distributes stresses in compression and vertical loading equally and in all directions. In torsion it is capable of carrying a greater load than any other structural member of equal weight. Where there is uneven loading, rectangular sections may be used.

STRUCTURAL STEEL TUBING

Structural Steel Tubing is made from flat rolled basic oxygen steel, which is formed into a tubular shape and then welded by the electric resistance process. In this continuous welding process there is no loss of properties, and no irregularity that may be observed in the structure. Over the years, tests and service have demonstrated that the tube weld is as strong as the base metal. Structural Steel Tubing is available in two grades. **Standard** Structural Steel Tubing is the more common grade that is used for a variety of applications in many different industries. **High Strength** Structural is a higher strength grade that is used in more limited applications where further weight reduction is advantageous.

STANDARD STRUCTURAL STEEL TUBING

Standard Structural Steel Tubing conforms to ASTM A 500. This specification covers cold formed welded and seamless carbon steel structural tubing respectively. Following are minimum mechanical properties:

MECHANICAL PROPERTIES—The following minimum mechanical properties apply:

	Tensile Strength (psi)	Yield Strength (psi)	Elongation 2" Min.
ASTM A 500			
Grade A	45,000	33,000	25%
Grade B	58,000	42,000	23%
Grade C	62,000	46,000	21%

Standard Structural Steel Tubing has the advantage of ease of fabrication, and all the standard fabrication techniques may be employed. it may be expanded or swaged, flattened or flared, bent or drawn. It may be mechanically joined or welded by all the commonly used techniques and practices.

HIGH STRENGTH STRUCTURAL STEEL TUBING

High Strength Structural Steel Tubing is higher in strength than the structural grade allowing substantial weight reductions in design. With a minimum yield strength of 50,000 psi, this tubing has a high torque value. For many applications, its use results in lower cost than other tubing and structural shapes.

High Strength Structural Tubing may be fabricated by all the standard techniques. It is easy to saw cut and drill. Flattening or flaring are best accomplished after heating. Welding may be performed with the ordinary techniques.

TOLERANCES FOR SQUARE AND RECTANGULAR STRUCTURAL TUBING

OUTSIDE DIMENSIONS TOLERANCES

Largest Outside Dimension Across Flats, Inches	* Tolerance, plus and minus in Inches
2 1/2 and under	0.020
Over 2 1/2 to 3 1/2 include	0.025
Over 3 1/2 to 5 1/2 include	0.030
Over 5 1/2	1%

*Tolerances include allowance for convexity or concavity. Tolerance may be increased 50% when applied to the smaller dimension of rectangular sections whose ratio of the cross-sectional dimensions is between 1.5 and 3, and 100 percent when the ratio exceed 3.

WALL THICKNESS TOLERANCE

The tolerance for wall thickness exclusive of weld are shall be plus or minus 10% of the nominal wall thickness specified. The wall thickness is to be measured at the center of the flat.

SPECIFIED MILL LENGTH TOLERANCES

Length Tolerance for Specified Mill Length	22 Feet and Under		Over 22 Feet to 44 Feet include.	
	Over	Under	Over	Under
Inches	1/2	1/4	3/4	1/4

STRAIGHTNESS TOLERANCE

The permissible variation for straightness shall be 1/8" times the number of feet of the total length divided by 5.

SQUARENESS OF SIDES

Adjacent sides may deviate from 90° by a tolerance of plus or minus 2° maximum.

RADIUS OF CORNERS

The radius of the outside corner of the section shall not exceed three times the specified wall thickness.

TWIST TOLERANCES

Specified Dimension of Longest Side Inches	Maximum Twist in 3 Feet
1 1/2 and under	0.050"
Over 1 1/2 to 2 1/2 include	0.062"
Over 2 1/2 to 4 include	0.075"
Over 4 to 6 include	0.087"
Over 6 to 8 include	0.100"
Over 8	0.112"

Twist is measured by holding down one end of 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.

WEIGHT FORMULAS

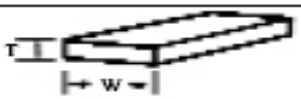
Steel bar weights are based on .2836 lb. per cubic inch. Aluminum weights are based on .098 lb. per cubic inch, which applies to 1100 alloy. (See next page for conversion factors for other alloys.)

ROUNDS

Steel:
Lbs. per lineal foot = 2.6729 X D^2
Lbs. per lineal inch = .22274 x D^2

Aluminum:
Lbs. per lineal foot = .924 x D^2
D = Size in inches

FLATS



Steel:
Lbs. per lineal foot = 3.4032 x T x W
Lbs. per lineal inch = .2836 x T x W

Aluminum:
Lbs. per lineal foot = 1.18 x T x W

T = Thickness in inches
W = Width in inches

SQUARES

Steel:
Lbs. per lineal foot = 3.4032 x D^2
Lbs. per lineal inch = .2836 x D^2

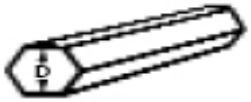
Aluminum:
Lbs. per lineal foot = 1.18 X D^2
D = Size in inches

TUBING

Steel:
Lbs. per lineal foot = 10.68 x (OD - W) x W
Lbs. per lineal inch = .89 x (OD - W) x W

Aluminum:
Lbs. per lineal foot = 3.70 x (OD - W) x W
OD = Outside Diameter to 3 decimal places
W = Wall Thickness to 3 decimal places

HEXAGONS



Steel:
Lbs. per lineal foot = 2.9473 x D^2
Lbs. per lineal inch = .2456 X D^2

Aluminum:
Lbs. per lineal foot = 1.02 x D^2
D = Size in inches

CIRCLES

Steel:
Wt. of Circle in Lbs. = .22274 x T x D^2

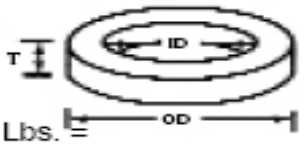
Aluminum:
Wt. of Circle in Lbs. = .077 x T x D^2
D = Diameter in inches
T = Thickness in inches

OCTAGONS

Steel:
Lbs. per lineal foot = 2.8193 x D^2
Lbs. per lineal inch = .23494 x D^2

Aluminum:
Lbs. per lineal foot = .974 x D^2
D = Size in inches

RINGS



Steel:
Wt. of Ring in Lbs. =
.22274 x T x (OD^2 — ID^2)

Aluminum:
Wt. of Ring in Lbs. =
.077 x T x (OD^2 — ID^2)
OD = Outside Diameter in inches
ID = Inside Diameter in inches
T = Thickness in inches

WEIGHT CONVERSION FACTORS

To Obtain Weight of	Density (Weight Lbs. per Cubic Inch)	Multiply Weight of Steel by
Aluminum	0.098	.3462
1100 Aluminum	0.098	.3462
2011 Aluminum	0.102	.3604
2014 Aluminum	0.101	.3568
2017 Aluminum	0.101	.3568
2024 Aluminum	0.101	.3568
3003 Aluminum	0.099	.3498
5005 Aluminum	0.098	.3462
5052 Aluminum	0.097	.3427
5056 Aluminum	0.095	.3356
5083 Aluminum	0.096	.3392
5086 Aluminum	0.096	.3392
6061 Aluminum	0.098	.3462
6063 Aluminum	0.097	.3427
7075 Aluminum	0.101	.3568
7178 Aluminum	0.102	.3604
Gold	0.698	2.466
Tungsten	0.697	2.462
Tantalum	0.600	2.120
Lead	0.410	1.448
Silver	0.379	1.339
Molybdenum	0.369	1.303
Copper	0.324	1.144
Nickel	0.322	1.137
Columbium	0.310	1.095
Brass	0.307	1.084
Monel	0.307	1.084
Stainless Steels		
300 Series	0.286	1.010
400 Series	0.283	1.000
Carbon and Alloy Steels	0.283	1.000
Tin	0.264	0.932
Cast Iron	0.258	0.911
Zirconium	0.230	0.812
Titanium Com'l Pure	0.163	0.575
Titanium 3AL 2½ V	0.162	0.572
Beryllium	0.067	0.236
Magnesium	0.065	0.229
Gray Iron	0.260	0.919
Ductile Iron	0.255	0.901

MILLIMETERS CONVERTED TO DECIMAL AND FRACTIONAL INCHES

Milli-meters	Decimal Inches	Fractional Inches (to nearest 64th)	Milli-meters	Decimal Inches	Fractional Inches (to nearest 64th)	Milli-meters	Decimal Inches	Fractional Inches (to nearest 64th)
1	.0394	3/64	34	1.339	1 11/32	67	2.638	2 41/64
2	.0787	5/64	35	1.378	1 3/8	68	2.677	2 43/64
3	.1181	1/8	36	1.417	1 27/64	69	2.717	2 23/32
4	.1575	5/32	37	1.457	1 29/64	70	2.756	2 3/4
5	.1969	13/64	38	1.496	1 1/2	71	2.795	2 51/64
6	.2362	15/64	39	1.535	1 17/32	72	2.835	2 53/64
7	.2756	9/32	40	1.575	1 37/64	73	2.874	2 7/8
8	.3150	5/16	41	1.614	1 39/64	74	2.913	2 29/32
9	.3543	23/64	42	1.654	1 21/32	75	2.953	2 61/64
10	.3937	25/64	43	1.693	1 11/16	76	2.992	2 63/64
11	.4331	7/16	44	1.732	1 47/64	77	3.031	3 1/32
12	.4724	15/32	45	1.772	1 49/64	78	3.071	3 5/64
13	.5118	33/64	46	1.811	1 13/16	79	3.110	3 7/64
14	.5512	35/64	47	1.850	1 27/32	80	3.150	3 5/32
15	.5906	19/32	48	1.890	1 57/64	81	3.189	3 3/16
16	.6299	5/8	49	1.929	1 59/64	82	3.228	3 15/64
17	.6693	43/64	50	1.969	1 31/32	83	3.268	3 17/64
18	.7087	45/64	51	2.008	2 1/64	84	3.307	3 5/16
19	.7480	3/4	52	2.047	2 3/64	85	3.346	3 11/32
20	.7874	25/32	53	2.087	2 3/32	86	3.386	3 25/64
21	.8268	53/64	54	2.126	2 1/8	87	3.425	3 27/64
22	.8661	55/64	55	2.165	2 11/64	88	3.465	3 15/32
23	.9055	29/32	56	2.205	2 13/64	89	3.504	3 1/2
24	.9449	15/16	57	2.244	2 1/4	90	3.543	3 35/64
25	.9843	63/64	58	2.283	2 9/32	91	3.583	3 37/64
26	1.024	1 1/32	59	2.323	2 21/64	92	3.622	3 5/8
27	1.063	1 1/16	60	2.362	2 23/64	93	3.661	3 21/32
28	1.102	1 7/64	61	2.402	2 13/32	94	3.701	3 45/64
29	1.142	1 9/64	62	2.441	2 7/16	95	3.740	3 47/64
30	1.181	1 3/16	63	2.480	2 31/64	96	3.780	3 25/32
31	1.220	1 7/32	64	2.520	2 33/64	97	3.819	3 13/16
32	1.260	1 17/64	65	2.559	2 9/16	98	3.858	3 55/64
33	1.299	1 19/64	66	2.598	2 19/32	99	3.898	3 57/64
						100	3.937	3 15/16

Decimal Equivalents Of Fractions

1/64 ..... 0.015625	23/64 ..... 0.359375	45/64 ..... 0.703125
1/32 ..... 0.03125	3/8 ... 0.375	23/32 ..... 0.71875
3/64 ..... 0.046875	25/64 ..... 0.390625	47/64 ..... 0.734375
1/16 ..... 0.0625	13/32 ..... 0.40625	3/4 ..... 0.75
5/64 ..... 0.078125	27/64 ..... 0.421875	49/64 ..... 0.765625
3/32 ..... 0.09375	7/16 ..... 0.4375	25/32 ..... 0.78125
7/64 ..... 0.109375	29/64 ..... 0.453125	51/64 ..... 0.796875
1/8 ... 0.125	15/32 ..... 0.46875	13/16 ..... 0.8125
9/64 ..... 0.140625	31/64 ..... 0.484375	53/64 ..... 0.828125
5/32 ..... 0.15625	1/2 ..... 0.5	27/32 ..... 0.84375
11/64 ..... 0.171875	33/64 ..... 0.515625	55/64 ..... 0.859375
3/16 ..... 0.1875	17/32 ..... 0.53125	7/8 ... 0.875
13/64 ..... 0.203125	35/64 ..... 0.546875	57/64 ..... 0.890625
7/32 ..... 0.21875	9/16 ..... 0.5625	29/32 ..... 0.90625
15/64 ..... 0.234375	37/64 ..... 0.578125	59/64 ..... 0.921875
1/4 ..... 0.25	19/32 ..... 0.59375	15/16 ..... 0.9375
17/64 ..... 0.265625	39/64 ..... 0.609375	61/64 ..... 0.953125
9/32 ..... 0.28125	5/8 ... 0.625	31/32 ..... 0.96875
19/64 ..... 0.296875	41/64 ..... 0.640625	63/64 ..... 0.984375
5/16 ..... 0.3125	21/32 ..... 0.65625	1 1
21/64 ..... 0.328125	43/64 ..... 0.671875	
11/32 ..... 0.34375	11/16 ..... 0.6875	

SHEET GAUGES

Gauge No.	STEEL SHEETS		GALVANIZED SHEETS		STAINLESS STEEL SHEETS			ALUMINUM SHEETS	
					Wt., Lbs. per Sq. Ft.				
	Weight Lbs. per Square Foor	Thick-ness in Inches	Weight Lbs. per Square Foot	Thick-ness in Inches	Straight Chromium (400) Series	Chromium Nickel (300 Series)	Approx. Thick-ness in Inches	Weight Lbs. per Sq. Ft. (1000)	Thick-ness in Inches
38	.25000	.0060						.0558	.00396
37	.26562	.0064						.0627	.00445
36	.28125	.0067						.0705	.00500
35	.31250	.0075						.0791	.00561
34	.34375	.0082						.0888	.00630
33	.37500	.0090						.0998	.00708
32	.40625	.0097	.56250	.0134	.3708	.3780	.010	.1121	.00795
31	.43750	.0105	.59375	.0142	.4506	.4594	.011	.1259	.00893
30	.50000	.0120	.65625	.0157	.5150	.5250	.013	.1410	.0100
29	.56250	.0135	.71875	.0172	.5794	.5906	.014	.1593	.0113
28	.62500	.0149	.78125	.0187	.6438	.6562	.016	.1777	.0126
27	.68750	.0164	.84375	.0202	.7081	.7218	.017	.2002	.0142
26	.75000	.0179	.90625	.0217	.7725	.7875	.019	.2242	.0159
25	.87500	.0209	1.03125	.0247	.9013	.9187	.022	.2524	.0179
24	1.0000	.0239	1.15625	.0276	1.0300	1.0500	.025	.2834	.0201
23	1.1250	.0269	1.28125	.0306	1.1587	1.1813	.028	.3187	.0226
22	1.2500	.0299	1.40625	.0336	1.2875	1.3125	.031	.3567	.0253
21	1.3750	.0329	1.53125	.0366	1.4160	1.4437	.034	.4019	.0285
20	1.5000	.0359	1.65625	.0396	1.5450	1.5750	.038	.4512	.0320
19	1.7500	.0418	1.90625	.0456	1.8025	1.8375	.044	.5062	.0359
18	2.0000	.0478	2.15625	.0516	2.0600	2.1000	.050	.5682	.0403
17	2.2500	.0538	2.40625	.0575	2.3175	2.3625	.056	.6387	.0453
16	2.5000	.0598	2.65625	.0635	2.5750	2.6250	.063	.7163	.0508
15	2.8125	.0673	2.96875	.0710	2.8968	2.9531	.070	.8051	.0571
14	3.1250	.0747	3.28125	.0785	3.2187	3.2812	.078	.9038	.0641
13	3.7500	.0897	3.90625	.0934	3.8625	3.9375	.094	1.015	.0720
12	4.3750	.1046	4.53125	.1084	4.5063	4.5937	.109	1.139	.0808
11	5.0000	.1196	5.15625	.1233	5.1500	5.2500	.125	1.279	.0907
10	5.6250	.1345	5.78125	.1382	5.7937	5.9062	.141	1.437	.1019
9	6.2500	.1495	6.40625	.1532	6.4375	6.5625	.156	1.613	.1144
8	6.8750	.1644	7.03125	.1681	7.0813	7.2187	.172	1.812	.1285
7	7.5000	.1793						2.035	.1443
6	8.1250	.1943						2.284	.1620
5	8.7500	.2092						2.565	.1819
4	9.3750	.2242						2.881	.2043
3	10.000	.2391						3.235	.2294

Barlow's Formula

Barlow's Formula is a safe, easy method for finding the relationship between internal fluid pressure and stress in the pipe wall. The formula predicts bursting pressures that have been found to be safely within the actual test bursting pressures.

It is interesting to note that the formula uses the "outside diameter" of pipe and is sometimes referred to as the "outside diameter formula."

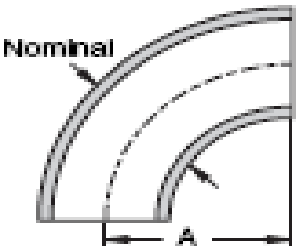
$$P = (2 * t * S) / D$$

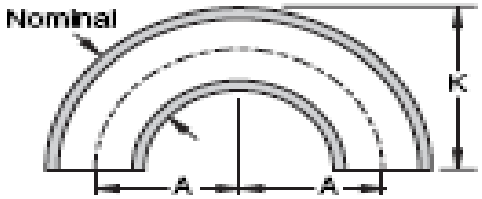
Where:

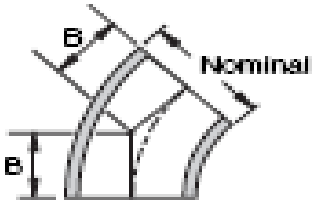
P = internal units pressure, in psi

Pacemaker Steel & Piping Company Binghamton Plant

Weld Fitting—90° Elbow, 180° Return, 45° Elbow



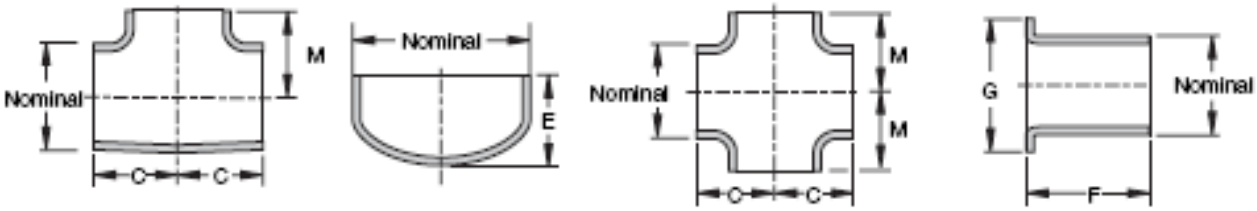




Nom. Pipe Size	90° ELBOWS Long R A	90° ELBOWS Short R A	180° RETURNS Long R K	180° RETURNS Short R K	45° LR Elbow B
1/2	1 1/2	–	1 7/8	–	5/8
3/4	1 1/8	–	1 11/16	–	7/16
1	1 1/2	1	2 3/16	1 5/8	7/8
1 1/4	1 7/8	1 1/4	2 3/4	2 1/16	1
1 1/2	2 1/4	1 1/2	3 1/4	2 7/16	1 1/8
2	3	2	4 3/16	3 3/16	1 3/8
2 1/2	3 3/4	2 1/2	5 3/16	3 15/16	1 3/4
3	4 1/2	3	6 1/4	4 3/4	2
3 1/2	5 1/4	3 1/2	7 1/4	5 1/2	2 1/4
4	6	4	8 1/4	6 1/4	2 1/2
5	7 1/2	5	10 5/16	7 3/4	3 1/8
6	9	6	12 5/16	9 5/16	3 3/4
8	12	8	16 5/16	12 5/16	5
10	15	10	20 3/8	15 3/8	6 1/4
12	18	12	24 3/8	18 3/8	7 1/2
14	21	14	28	21	8 3/4
16	24	16	32	24	10
18	27	18	36	27	11 1/4
20	30	20	40	30	12 1/2
22	33	22	44	–	13 1/2
24	36	24	48	36	15
26	39	26	52	–	16
30	45	30	60	45	18 1/2
34	51	34	–	–	21
36	54	36	72	54	22 1/4
42	63	48	–	–	26

All dimensions shown are in inches.

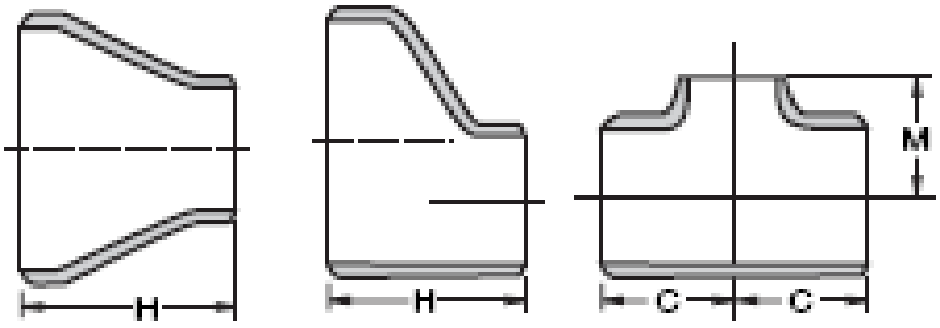
Weld Fitting—Tee, Cap, Cross, Stub End



Nom. Pipe Size	Straight Tees C & M	Caps E	Straight Crosses C & M	Long Pattern Stub Ends F	Long Pattern Stub Ends G
1/2	1	1	–	3	1 3/8
3/4	1 1/8	1	–	3	1 11/16
1	1 1/2	1 1/2	–	4	2
1 1/4	1 7/8	1 1/2	1 7/8	4	2 1/2
1 1/2	2 1/4	1 1/2	2 1/4	4	2 7/8
2	2 1/2	1 1/2*	2 1/2	6	3 5/8
2 1/2	3	1 1/2*	3	6	4 1/8
3	3 3/8	2*	3 3/8	6	5
3 1/2	3 3/4	2 1/2*	3 3/4	6	5 1/2
4	4 1/8	2 1/2*	4 1/8	6	6 3/16
5	4 7/8	3*	4 7/8	8	7 5/16
6	5 5/8	3 1/2*	5 5/8	8	8 1/2
8	7	4*	7	8	10 5/8
10	8 1/2	5*	8 1/2	10	12 3/4
12	10	6*	10	10	15
14	11	6 1/2*	11	12	16 1/4
16	12	7*	12	12	18 1/2
18	13 1/2	8*	13 1/2	12	21
20	15	9*	15	12	23
22	16 1/2	10	–	–	–
24	17	10 1/2	17	12	27 1/4
26	19 1/2	10 1/2	–	–	–
30	22	10 1/2	–	–	–
34	25	10 1/2	–	–	–
36	26 1/2	10 1/2	–	–	–
42	C=30, M=28	12	–	–	–

*Dimensions apply to STD and XS only.
All dimensions shown are in inches.

Weld Fitting—Reducers and Reducing Outlet Tees



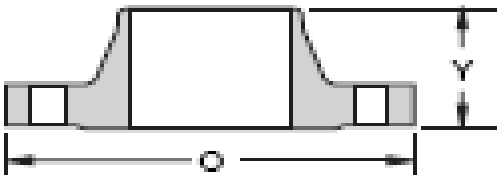
H: Concentric & Eccentric Reducers C, M: Reducing Outlet Tees

Nom. Pipe Size	H	C	M
1/2 x 1/4	–	1	1
3/8	–	1	1
3/4 x 3/8	1 1/2	1 1/8	1 1/8
1/2	1 1/2	1 1/8	1 1/8
1 x 3/8	2	1 1/2	1 1/2
1/2	2	1 1/2	1 1/2
3/4	2	1 1/2	1 1/2
1 1/4 x 1/2	2	1 7/8	1 7/8
3/4	2	1 7/8	1 7/8
1	2	1 7/8	1 7/8
1 1/2 x 1/2	2 1/2	2 1/4	2 1/4
3/4	2 1/2	2 1/4	2 1/4
1	2 1/2	2 1/4	2 1/4
1 1/4	2 1/2	2 1/4	2 1/4
2 x 3/4	3	2 1/2	1 3/4
1	3	2 1/2	2
1 1/4	3	2 1/2	2 1/4
1 1/2	3	2 1/2	2 3/8

Nom. Pipe Size		H	C	M
2 1/2 x	1	3 1/2	3	2 1/4
	1 1/4	3 1/2	3	2 1/2
	1 1/2	3 1/2	3	2 5/8
	2	3 1/2	3	2 3/4
3 x	1	—	3 3/8	2 5/8
	1 1/4	3 1/2	3 3/8	2 3/4
	1 1/2	3 1/2	3 3/8	2 7/8
	2	3 1/2	3 3/8	3
	2 1/2	3 1/2	3 3/8	3 1/4
3 1/2 x	1 1/4	4	—	—
	1 1/2	4	3 3/4	3 1/8
	2	4	3 3/4	3 1/4
	2 1/2	4	3 3/4	3 1/2
	3	4	3 3/4	3 5/8
4 x	1 1/2	4	4 1/8	3 3/8
	2	4	4 1/8	3 1/2
	2 1/2	4	4 1/8	3 3/4
	3	4	4 1/8	3 7/8
5 x	2	5	4 7/8	4 1/8
	2 1/2	5	4 7/8	4 1/4
	3	5	4 7/8	4 3/8
	3 1/2	5	4 7/8	4 1/2
	4	5	4 7/8	4 5/8
6 x	2 1/2	5 1/2	5 5/8	4 3/4
	3	5 1/2	5 5/8	4 7/8
	3 1/2	5 1/2	5 5/8	5
	4	5 1/2	5 5/8	5 1/8
	5	5 1/2	5 5/8	5 3/8
8 x	3	—	7	6
	3 1/2	6	7	6
	4	6	7	6 1/8
	5	6	7	6 3/8
	6	6	7	6 5/8
10 x	4	7	8 1/2	7 1/4
	5	7	8 1/2	7 1/2
	6	7	8 1/2	7 5/8
	8	7	8 1/2	8
12 x	5	8	10	8 1/2
	6	8	10	8 5/8
	8	8	10	9
	10	8	10	9 1/2
14 x	6	13	11	9 3/8
	8	13	11	9 3/4
	10	13	11	10 1/8
	12	13	11	10 5/8

All dimensions shown are in inches.

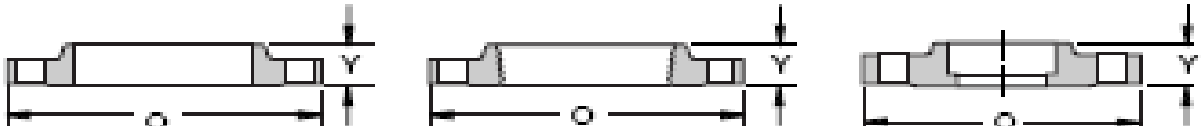
Weld Fitting—Welding Neck Flanges



Nom. Pipe Size	150 LB. O	150 LB. Y(1)	300 LB. O	300 LB. Y(1)	400 LB. O	400 LB. Y(2)	600 LB. O	600 LB. Y(2)
1/2	3 1/2	1 7/8	3 3/4	2 1/16	3 3/4	2 1/16	3 3/4	2 1/16
3/4	3 7/8	2 1/16	4 5/8	2 1/4	4 5/8	2 1/4	4 5/8	2 1/4
1	4 1/4	2 3/16	4 7/8	2 7/16	4 7/8	2 7/16	4 7/8	2 7/16
1 1/4	4 5/8	2 1/4	5 1/4	2 9/16	5 1/4	2 5/8	5 1/4	2 5/8
1 1/2	5	2 7/16	6 1/8	2 11/16	6 1/8	2 3/4	6 1/8	2 3/4
2	6	2 1/2	6 1/2	2 3/4	6 1/2	2 7/8	6 1/2	2 7/8
2 1/2	7	2 3/4	7 1/2	3	7 1/2	3 1/8	7 1/2	3 1/8
3	7 1/2	2 3/4	8 1/4	3 1/8	8 1/4	3 1/4	8 1/4	3 1/4
3 1/2	8 1/2	2 13/16	9	3 3/16	9	3 3/8	9	3 3/8
4	9	3	10	3 3/8	10	3 1/2	10 3/4	4
5	10	3 1/2	11	3 7/8	11	4	13	4 1/2
6	11	3 1/2	12 1/2	3 7/8	12 1/2	4 1/16	14	4 5/8
8	13 1/2	4	15	4 3/8	15	4 5/8	16 1/2	5 1/4
10	16	4	17 1/2	4 5/8	17 1/2	4 7/8	20	6
12	19	4 1/2	20 1/2	5 1/8	20 1/2	5 3/8	22	6 1/8
14	21	5	23	5 5/8	23	5 7/8	23 3/4	6 1/2
16	23 1/2	5	25 1/2	5 3/4	25 1/2	6	27	7
18	25	5 1/2	28	6 1/4	28	6 1/2	29 1/4	7 1/4
20	27 1/2	5 11/16	30 1/2	6 3/8	30 1/2	6 5/8	32	7 1/2
22	29 1/2	5 7/8	33	6 1/2	33	6 3/4	34 1/4	7 3/4
24	32	6	36	6 5/8	36	6 7/8	37	8
26	34 1/4	5	38 1/4	7 1/4	38 1/4	7 5/8	40	8 3/4
30	38 3/4	5 1/8	43	8 1/4	43	8 5/8	44 1/2	9 3/4
34	43 3/4	5 5/16	47 1/2	9 1/8	47 1/2	9 1/2	49	10 5/8
36	46	5 3/8	50	9 1/2	50	9 7/8	51 3/4	11 1/8
42	53	5 5/8	50 3/4	7 7/8	52	8 13/16	55 1/4	11

(1) The 1/16" raised face is included in length thru Hub, "Y".
(2) The 1/4" raised face is not included in length thru Hub, "Y".
All dimensions shown are in inches.

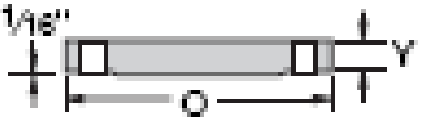
Slip-on, Threaded and Socket Flanges



Nom. Pipe Size	150 LB. O	150 LB. Y(1)	300 LB. O	300 LB. Y(1)	400 LB.† O	400 LB.† Y(2)	600 LB. O	600 LB. Y(2)
½	3½	5/8	3¾	7/8	3¾	7/8	3¾	7/8
¾	3⅞	5/8	4⅝	1	4⅝	1	4⅝	1
1	4¼	11/16	4⅞	1 1/16	4⅞	1 1/16	4⅞	1 1/16
1¼	4⅝	13/16	5¼	1 1/16	5¼	1⅛	5¼	1⅛
1½	5	7/8	6⅛	1 3/16	6⅛	1¼	6⅛	1¼
2	6	1	6½	1 5/16	6½	1 7/16	6½	1 7/16
2½	7	1⅛	7½	1½	7½	1⅝	7½	1⅝
3	7½	1 3/16	8¼	1 11/16	8¼	1 13/16	8¼	1 13/16
3½	8½	1¼†	9	1¾†	9	1 15/16	9	1 15/16†
4	9	1 5/16†	10	1⅞†	10	2	10¾	2⅛†
5	10	1 7/16†	11	2†	11	2⅛	13	2⅜*†
6	11	1 5/16†	12½	2 1/16†	12½	2¼	14	2⅝†
8	13½	1¾†	15	2 7/16†	15	2 11/16	16½	3†
10	16	1 15/16†	17½	2⅝†	17½	2⅞	20	3⅜†
12	19	2 3/16†	20½	2⅞†	20½	3⅛	22	3⅝†
14	21	2¼†	23	3†	23	3 5/16	23¾	3 11/16†
16	23½	2½†	25½	3¼†	25½	3 11/16	27	4 3/16†
18	25	2 11/16†	28	3½†	28	3⅞	29¼	4⅝†
20	27½	2⅞†	30½	3¾†	30½	4	32	5†
22	29½	3⅛ *†	33	4*†	33	4¼*	34¼	5¼*†
24	32	3¼†	36	4 3/16†	36	4½	37	5½†
26	34¼	3⅜*†	38¼	7¼*†	38¼	7⅝*	40	8¾*†
30	38¾	3½*†	43	8¼*†	43	8⅝*	44½	9¾*†
34	43¾	3 11/16*†	47½	9⅛*†	47½	9½*	49	10⅝*†
36	46	3¾*†	50	9½*†	50	9⅞*	51¾	11⅛*†
42	53	4*†	-	-	-	-	-	-

* Not available in Threaded type
† Not available in Socket type
(1) The 1/16" raised face is included in length thru Hub, "Y".
(2) The 1/4" raised face is not included in length thru Hub, "Y".
All dimensions shown are in inches.

Blind Flanges



Nom. Pipe Size	150 LB. O	150 LB. Y(1)	300 LB. O	300 LB. Y(1)	400 LB. O	400 LB. Y(2)	600 LB. O	600 LB. Y(2)
1/2	3 1/2	7/16	3 3/4	9/16	For	3 3/4	5/16	
3/4	3 7/8	1/2	4 5/8	5/8	sizes	4 5/8	5/8	
1	4 1/4	9/16	4 7/8	1 1/16	3 1/2	4 7/8	1 1/16	
1 1/4	4 5/8	5/8	5 1/4	3/4	and	5 1/4	1 3/16	
1 1/2	5	1 1/16	6 1/8	1 3/16	smaller	6 1/8	7/8	
2	6	3/4	6 1/2	7/8	use	6 1/2	1	
2 1/2	7	7/8	7 1/2	1	600 LB.	7 1/2	1 1/8	
3	7 1/2	1 5/16	8 1/4	1 1/8	Standard	8 1/4	1 1/4	
3 1/2	8 1/2	1 5/16	9	1 3/16		9	1 3/8	
4	9	1 5/16	10	1 1/4	10	1 3/8	10 3/4	1 1/2
5	10	1 5/16	11	1 3/8	11	1 1/2	13	1 3/4
6	11	1	12 1/2	1 7/16	12 1/2	1 5/8	14	1 7/8
8	13 1/2	1 1/8	15	1 5/8	15	1 7/8	16 1/2	2 3/16
10	16	1 3/16	17 1/2	1 7/8	17 1/2	2 1/8	20	2 1/2
12	19	1 1/4	20 1/2	2	20 1/2	1/4	22	2 5/8
14	21	1 3/8	23	2 1/8	23	2 3/8	23 3/4	2 3/4
16	23 1/2	1 7/16	25 1/2	2 1/4	25 1/2	2 1/2	27	3
18	25	1 5/16	28	2 3/8	28	2 5/8	29 1/4	3 1/4
20	27 1/2	1 11/16	30 1/2	2 1/2	30 1/2	2 3/4	32	3 1/2
22	29 1/2	1 13/16	33	2 5/8	33	2 7/8	34 1/4	3 3/4
24	32	1 7/8	36	2 3/4	36	3	37	4
26	34 1/4	2	38 1/4	3 1/8	38 1/4	3 1/2	40	4 1/4
30	38 3/4	2 1/8	43	3 5/8	43	4	44 1/2	4 1/2
34	43 3/4	2 5/16	47 1/2	4	47 1/2	4 3/8	49	4 3/4
36	46	2 3/8	50	4 1/8	50	4 1/2	51 3/4	4 7/8
42	53	2 5/8	57	4 5/8	57	5 1/8	58 3/4	5 1/2

(1) The 1/16" raised face is included in Thickness, "Y".
(2) The 1/4" raised face is not included in Thickness, "Y".

Bolting Dimensions for 150 to 300 Lb. Steel Flange

	125/150 LB. FLANGE					250/300 LB. FLANGE				
Nom. Pipe Size	Bolt Circle Dia.	Bolt Dia.	No. of Bolts	*Stud Len.	Bolt Len.	Bolt Circle Dia.	Bolt Dia.	No. of Bolts	*Stud Len.	Bolt Len.
1/2	2 3/8	1/2	4	2 1/4	1 3/4	2 5/8	1/2	4	2 1/2	2
3/4	2 3/4	1/2	4	2 1/4	2	3 1/4	5/8	4	2 3/4	2 1/2
1	3 1/8	1/2	4	2 1/2	2	3 1/2	5/8	4	3	2 1/2
1 1/4	3 1/2	1/2	4	2 1/2	2 1/4	3 7/8	5/8	4	3	2 3/4
1 1/2	3 7/8	1/2	4	2 3/4	2 1/4	4 1/2	3/4	4	3 1/2	3
2	4 3/4	5/8	4	3	2 3/4	5	5/8	8	3 1/4	3
2 1/2	5 1/2	5/8	4	3 1/4	3	5 7/8	3/4	8	3 3/4	3 1/4
3	6	5/8	4	3 1/2	3	6 5/8	3/4	8	4	3 1/2
3 1/2	7	5/8	8	3 1/2	3	7 1/4	3/4	8	4 1/4	3 3/4
4	7 1/2	5/8	8	3 1/2	3	7 7/8	3/4	8	4 1/4	3 3/4
5	8 1/2	3/4	8	3 3/4	3 1/4	9 1/4	3/4	8	4 1/2	4
6	9 1/2	3/4	8	3 3/4	3 1/4	10 5/8	3/4	12	4 3/4	4 1/4
8	11 3/4	3/4	8	4	3 1/2	13	7/8	12	5 1/4	4 3/4
10	14 1/8	7/8	12	4 1/2	3 3/4	15 1/4	1	16	6	5 1/4
12	17	7/8	12	4 1/2	4	17 3/4	1 1/8	16	6 1/2	5 3/4
14	18 3/4	1	12	5	4 1/4	20 1/4	1 1/8	20	6 3/4	6
16	21 1/4	1	16	5 1/4	4 1/2	22 1/2	1 1/4	20	7 1/4	6 1/2
18	22 3/4	1 1/8	16	5 3/4	4 3/4	24 3/4	1 1/4	24	7 1/2	6 3/4
20	25	1 1/8	20	6	5 1/4	27	1 1/4	24	8	7
22	27 1/4	1 1/4	20	6 1/2	5 1/2	29 1/4	1 1/2	24	8 3/4	7 1/2
24	29 1/2	1 1/4	20	6 3/4	5 3/4	32	1 1/2	24	9	7 3/4
26	31 3/4	1 1/4	24	7	6	34 1/2	1 5/8	28	10	8 3/4
30	36	1 1/4	28	7 1/4	6 1/4	39 1/4	1 3/4	28	11 1/4	10
34	40 1/2	1 1/2	32	8	7	43 1/2	1 7/8	28	12 1/4	10 3/4
36	42 3/4	1 1/2	32	8 1/4	7	46	2	32	12 3/4	11 1/4
42	49 1/2	1 1/2	36	8 3/4	7 1/4	52 3/4	2	36	13 3/4	13 1/2

*1/16" Raised Face

Stud lengths for lap joint flanges are equal to lengths shown plus the thickness of two laps of the stub ends.

Drill Sizes For NPT Pipe Taps

Tap Size	Threads/In.	Drill Dia.
1/8	27	R
1/4	18	7/16
3/8	18	37/64
1/2	14	23/32
3/4	14	59/64
1	11 1/2	1 5/32
1 1/4	11 1/2	1 1/2
1 1/2	11 1/2	1 47/64
2	11 1/2	2 7/32
2 1/2	8	2 5/8
3	8	3 1/4
3 1/2	8	3 3/4
4	8	4 1/4

Tap & Drill Sizes

(Unified National Coarse)

Tap Size	Threads/In.	Drill Size
1/4	20	7
5/16	18	F
3/8	16	5/16
7/16	14	U
1/2	13	27/64
9/16	12	31/64
5/8	11	17/32
3/4	10	21/32
7/8	9	49/64
1	8	7/8
1 1/8	7	63/64
1 1/4	7	1 7/64
1 3/8	6	1 7/32
1 1/2	6	1 11/32
1 3/4	5	1 9/16
2	4 1/2	1 25/32

Boiling Points Of Water At Various Pressures

Vacuum, in Inches of Mercury	Boiling Point
29	76.62
28	99.93
27	114.22
26	124.77
25	133.22
24	140.31
23	146.45
22	151.87
21	156.75
20	161.19
19	165.24
18	169.00
17	172.51
16	175.80
15	178.91

Vacuum, in Inches of Mercury	Boiling Point
14	181.82
13	184.61
12	187.21
11	189.75
10	192.19
9	194.50
8	196.73
7	198.87
6	200.96
5	202.25
4	204.85
3	206.70
2	208.50
1	210.25

Pressure Gauge Lbs	Boiling Point
0	212.0
1	215.6
2	218.5
4	224.4
6	229.8
8	234.8
10	239.4
15	249.8
25	266.8
50	297.7
75	320.1
100	337.9
125	352.9
200	387.9

Pipe & Water Weight/Foot

Nom. Pipe Size	WEIGHT (Lb.) STD Pipe	Water	WEIGHT (Lb.) XS Pipe	Water
½	0.851	0.132	1.088	0.101
¾	1.131	0.230	1.474	0.188
1	1.679	0.374	2.172	0.311
1¼	2.273	0.648	2.997	0.555
1½	2.718	0.882	3.631	0.765
2	3.653	1.455	5.022	1.280
2½	5.793	2.076	7.661	1.837
3	7.580	3.200	10.250	2.864
3½	9.110	4.280	12.510	3.850
4	10.790	5.510	14.980	4.980
5	14.620	8.660	20.780	7.890
6	18.970	12.510	28.570	11.290
8	28.550	21.690	43.390	19.800
10	40.480	34.100	54.740	32.300
12	49.580	49.000	65.420	47.000
14	54.570	59.700	72.090	57.500
16	62.580	79.100	82.770	76.500
18	70.590	101.200	93.450	98.400
20	78.600	126.000	104.130	122.800
24	94.620	183.800	125.490	180.100
30	119.000	291.200	158.000	286.200

Weight/Foot - Seamless Brass & Copper Pipe

Nominal Pipe Size	REGULAR Yellow Brass	Red Brass	Copper	EXTRA STRONG Yellow Brass	Red Brass	Copper
½	0.91	0.93	0.96	1.19	1.23	1.25
¾	1.23	1.27	1.30	1.62	1.67	1.71
1	1.73	1.78	1.82	2.39	2.49	2.51
1¼	2.56	2.63	2.69	3.29	3.39	3.46
1½	3.04	3.13	3.20	3.99	4.10	4.19
2	4.01	4.12	4.22	5.51	5.67	5.80

Pipe Hangers

FIG. 11 - Page 12
ADJUSTABLE
CLEVIS HANGER
WW-H-171-E TYPE 1
A-A-1192 A TYPE 1
MSS SP-58 and SP-69 TYPE 1

FIG. 11CI - Page 13
CLEVIS HANGER FOR AWWA DUCTILE
IRON AND PVC C-900 PIPE
MSS SP-58 and SP-69 TYPE 1

FIG. 11F - Page 14
FLAT TOP CLEVIS HANGER

FIG. 11V - Page 16
V-BOTTOM CLEVIS HANGER

FIG. 11WS - Page 16
CLEVIS WITH
WELDED SHIELD

FIG. 11X - Page 17
CLEVIS HANGER WITH
EXTENDED BOTTOM
WW-H-171-E TYPE 1
A-A-1192 A TYPE 1
MSS SP-58 and SP-69 TYPE 1

FIG. 12 - Page 18
V-CHANNEL

FIG. 13, 13I & 13L - Page 18
WELDLESS EYE NUT
WW-H-171-E TYPE 17
A-A-1192 A TYPE 17
MSS SP-58 and SP-69 TYPE 17

FIG. 21, 21L - Page 19
STEEL C-CLAMP
WW-H-171-E TYPE 23
A-A-1192 A TYPE 23
MSS SP-58 and SP-69 TYPE 23

FIG. 21R - Page 20
C-CLAMP RETAINING STRAP

FIG. 22R - Page 20
BEAM CLAMP RETAINING STRAP

FIG. 23L - Page 21
DUCTILE IRON C-CLAMP
WW-H-171-E TYPE 23
A-A-1192 A TYPE 23
MSS SP-58 and SP-69 TYPE 23

FIG. 24 - Page 21
PURLIN CLAMP

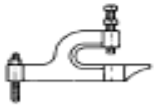


FIG. 26L - Page 22
EXTENDED C-CLAMP

FIG. 28 & 28W - PAGE 22
PLAIN & WELDED EYE ROD

FIG. 31 - Page 23
ADJUSTABLE BAND HANGER
WW-H-171-E TYPE 7
A-A-1192 A TYPE 7
MSS SP-58 and SP-69 TYPE 7

FIG. 31CT, 31CTI - Page 24
COPPER PLATED AND EPOXY COATED
(COPPER-GARD), COPPER TUBING
BAND HANGER
WW-H-171-E TYPE 7
A-A-1192 A TYPE 7

FIG. 34 - Page 26
VIBRATION HANGER - NEOPRENE
SERIES- "RH"/"RHD"

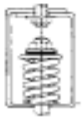


FIG. 36 - Page 26-27
VIBRATION SPRING-FLEX
HANGER - "SH" SERIES

FIG. 38 - Page 28-29
VIBRATION SPRING-FLEX AND NEO-
PRENE HANGER - "RSH" SERIES

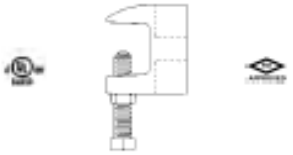


FIG. 61 - Page 43
TOP BEAM CLAMP
A-A-1192 A TYPE 19
MSS SP-58 and SP-69 TYPE 19

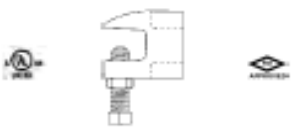


FIG. 62 - Page 44
JUNIOR TOP BEAM CLAMP
A-A-1192 A TYPE 19
MSS SP-58 and SP-69 TYPE 19

FIG. 63 - Page 44
ELECTRICAL ROD
SUPPORT CLAMP

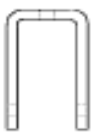


FIG. 66 - Page 45
WELDING BEAM ATTACHMENT
WITH AND WITHOUT BOLT
WW-H-171-E TYPE 22
A-A-1192 A TYPE 22
MSS SP-58 and SP-69 TYPE 22

FIG. 37 - Page 29
LIGHT DUTY U-BOLT

FIG. 41 - Page 30
SPLIT RING
EXTENSION HANGER
WW-H-171-E TYPE 25
A-A-1192 A TYPE 12
MSS SP-58 and SP-69 TYPE 12

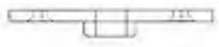


FIG. 41A, 41ACT - Page 30
HANGER FLANGE PLATE

FIG. 41CT - Page 31
COPPER SPLIT RING
EXTENSION HANGER
WW-H-171-E TYPE 25
A-A-1192 A TYPE 12
MSS SP-58 and SP-69 TYPE 12

FIG. 41H - Page 31
HINGE TYPE SPLIT RING
EXTENSION HANGER
WW-H-171-E TYPE 25
A-A-1192 A TYPE 12
MSS SP-58 and SP-69 TYPE 12

FIG. 41HCT - Page 32
COPPER HINGE TYPE SPLIT RING
EXTENSION HANGER
WW-H-171-E TYPE 25
A-A-1192 A TYPE 12
MSS SP-58 and SP-69 TYPE 12

FIG. 41SSI & 41SXI - Page 33
STAINLESS STEEL SPLIT RING
EXTENSION HANGER
MSS SP-58 and SP-69 TYPE 12

FIG. 47 - Page 33
EYE SOCKET
WW-H-171-E TYPE 16
A-A-1192 A TYPE 16
MSS SP-58 and SP-69 TYPE 16

FIG. 48, 48PC - Page 34
PLASTIC PIPE and PLASTIC COATED
PVC RISER CLAMP
WW-H-171-E TYPE 8
A-A-1192 A TYPE 8
MSS SP-58 and SP-69 TYPE 8

FIG. 60 - Page 35
RISER CLAMP
WW-H-171-E TYPE 8
A-A-1192 A TYPE 8
MSS SP-58 and SP-69 TYPE 8

FIG. 50CT, 50CTI - Page 36
COPPER PLATED AND EPOXY COATED
(COPPER-GARD) COPPER TUBING RISER
CLAMP
WW-H-171-E TYPE 8
A-A-1192 A TYPE 8
MSS SP-58 and SP-69 TYPE 8

FIG. 60SA - Page 37
SHORT ARM RISER CLAMP
WW-H-171-E TYPE 8
A-A-1192 A TYPE 8
MSS SP-58 and SP-69 TYPE 8

FIG. 96 - Page 62
OFFSET PIPE CLAMP

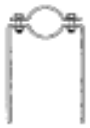


FIG. 97 - Page 63
EXTENDED PIPE CLAMP

FIG. 110 - Page 64
ADJUSTABLE CLEVIS
HANGER, LIGHTWEIGHT
WW-H-171-E TYPE 12
MSS SP-58 and SP-69 TYPE 1

FIG. 110CT, 110CTI - Page 65
COPPER PLATED AND COPPER EPOXY
(COPPER-GARD) TUBING SIZE CLEVIS
HANGER.
WW-H-171-E TYPE 12
MSS SP-58 and SP-69 TYPE 1

FIG. 110PC - Page 66
ADJUSTABLE CLEVIS
HANGER, PLASTIC COATED
WW-H-171-E TYPE 12
MSS SP-58 and SP-69 TYPE 1

FIG. 114 - Page 66
TURNBUCKLE ADJUSTER
WW-H-171-E TYPE 15
A-A-1192 A TYPE 15
MSS SP-58 and SP-69 TYPE 15

FIG. 126 - Page 67
ONE HOLE CLAMP

FIG. 127CT - Page 67
NATICK HANGER,
COPPER TUBE SIZE

FIG. 129CT - Page 68
VAN (BELL TYPE) HANGER,
COPPER PLATED

FIG. 131CT - Page 68
MILFORD HANGER,
COPPER TUBE SIZE

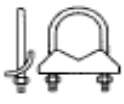


FIG. 138 - Page 69
RIGHT ANGLE CLAMP

FIG. 137 - Page 80
STANDARD U-BOLT
WITH 4 HEX NUTS
WW-H-171-E TYPE 24
A-A-1192 A TYPE 24
MSS SP-58 and SP-69 TYPE 24

FIG. 146 - Page 61
STRAIGHT J-HOOK

FIG. 148 - Page 61
OFFSET J-HOOK

FIG. 150 - Page 62
BEAM CLAMP
WW-H-171-E TYPE 21
A-A-1192 A TYPE 21
MSS SP-58 and SP-69 TYPE 21

FIG. 152 - Page 62
RETURN LINE ANGLE

FIG. 163 - Page 63
SIDE BEAM CONNECTOR

FIG. 166 - Page 63
STEEL BEAM CLAMP

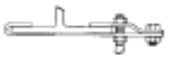


FIG. 168 - Page 64
STEEL BEAM CLAMP
WW-H-171-E TYPE 53
A-A-1192 A TYPE 25
MSS SP-58 and SP-69 TYPE 25

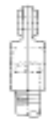


FIG. 167 - PAGE 64
EXTENSION PIECE

FIG. 218 - Page 76
MALLEABLE IRON CENTER
LOAD BEAM CLAMP

FIG. 229 - Page 76
MALLEABLE BEAM CLAMP
WITH EXTENSION PIECE
WW-H-171-E TYPE 30
A-A-1192 A TYPE 30
MSS SP-58 and SP-69 TYPE 30

FIG. 231 - Page 76
TWO HOLE PIPE STRAP

FIG. 231CT - Page 77
COPPER TWO HOLE
TUBING STRAP

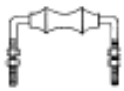


FIG. 271 - Page 85
ADJUSTABLE ROLLER SUPPORT

FIG. 272 - Page 86
ADJUSTABLE ROLLER HANGER
WW-H-171-E TYPE 44
A-A-1192 A TYPE 43
MSS SP-58 and SP-69 TYPE 43

FIG. 272SS - Page 87
ADJUSTABLE ROLLER HANGER,
STAINLESS STEEL
WW-H-171-E TYPE 44
A-A-1192 A TYPE 43
MSS SP-58 and SP-69 TYPE 43

FIG. 273 - Page 88
ADJUSTABLE TWO-ROD
ROLLER SUPPORT

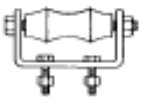


FIG. 276 - Page 89
ROLLER CHAIR

FIG. 277 - Page 90
ADJUSTABLE TWO ROD
ROLLER HANGER
WW-H-171-E TYPE 42
A-A-1192 A TYPE 41
MSS SP-58 and SP-69 TYPE 41

FIG. 277SS - Page 91
ADJUSTABLE TWO ROD
ROLLER HANGER, STAINLESS STEEL
WW-H-171-E TYPE 42
A-A-1192 A TYPE 41
MSS SP-58 and SP-69 TYPE 41

FIG. 278S & 279SS - Page 92
PIPE ROLL STAND, CARBON STEEL &
304 STAINLESS STEEL
WW-H-171-E TYPE 45
A-A-1192 A TYPE 44
MSS SP-58 and SP-69 TYPE 44

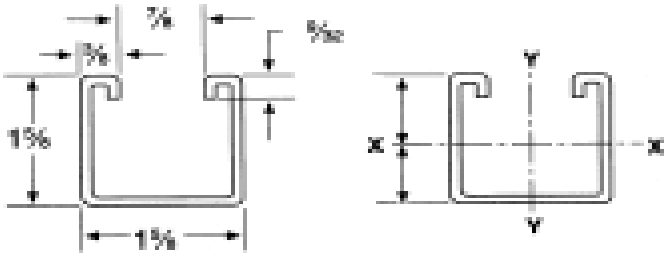
FIG. 280S & 280SS - Page 93
ADJUSTABLE PIPE ROLL STAND,
CARBON STEEL & STAINLESS STEEL
WW-H-171-E TYPE 47
A-A-1192 A TYPE 46
MSS SP-58 and SP-69 TYPE 46

FIG. 310 - Page 94
"EM-LOK" ADJUSTABLE SWIVEL RING
HANGER
WW-H-171-E TYPE 10
A-A-1192 A TYPE 10
MSS SP-58 and SP-69 TYPE 10

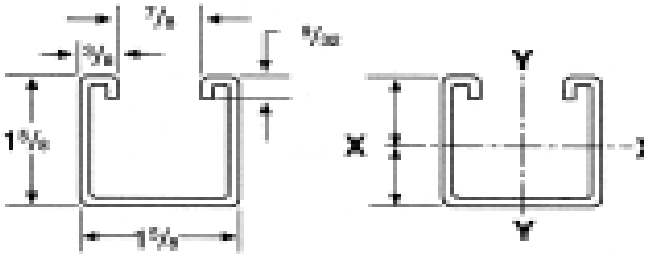
FIG. 310CT, 310CTI- Page 96
COPPER PLATED AND EPOXY COAT-
ED *(COPPER-GARD)* "EM-LOK"
ADJUSTABLE SWIVEL
RING HANGER,TUBING SIZE
WW-H-171-E TYPE 10
A-A-1192 A TYPE 10
MSS SP-58 and SP-69 TYPE 10

FIG. 310NF - Page 96
"EM-LOK" ADJUSTABLE SWIVEL
RING HANGER, NFPA
WW-H-171-E TYPE 10
A-A-1192 A TYPE 10
MSS SP-58 and SP-69 TYPE 10

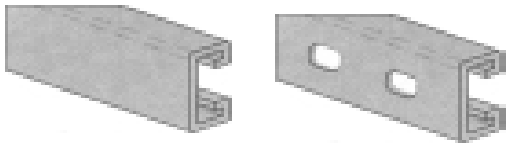
1-5/8 X 1-5/8
12 GAUGE STRUT
SOLID & SLOTTED

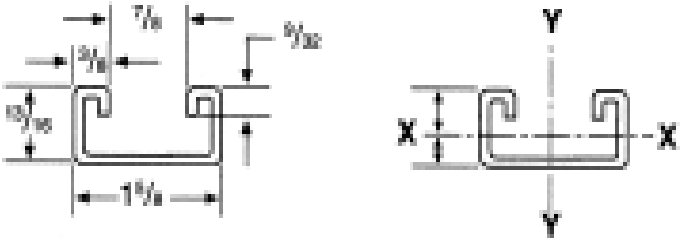


1-5/8 X 1-5/8
14 GAUGE STRUT
SOLID & SLOTTED



13/16" X 1-5/8
14 GAUGE STRUT
SOLID & SLOTTED





STRUT NUT
WITHOUT SPRING

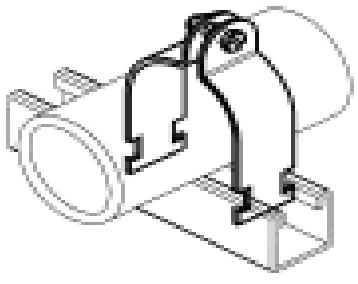
Material:
Electro-galvanized carbon steel.
Also available in stainless steel.

STRUT NUT WITH
REGULAR SPRING

Material:
Electro-galvanized carbon steel.
Also available in stainless steel. (8100SX)
Note: To be used on 1-3/8" and 1-5/8" strut.

RIGID IPS STRUT CLAMP
ASSEMBLED

Material:
8200-Electro-galvanized carbon steel
8200SS-304 stainless steel



VALVE TYPE	NIBCO	APOLLO	CRANE	GRINNELL	WATTS	KEYSTONE	MILWAUKEE	STOCKHAM
Bronze Ball - 2 pc./std. port	T/S580-70	70	—	3700/3700SJ	B6000	—	BA100/BA150	—
Bronze Ball - 2 pc./full port	T/S585-70	77	93xx-B	3750/3750SJ	B6080 (400 psi)	—	—	S206-BR1
Bronze Ball - 3 pc./full port	T/S595-Y	82	—	3810/3810SJ	B6800	—	—	—
Bronze Gate - Class 125	T124	—	428 UB	3080/3080SJ	—	—	1152	B105
Bronze Gate 150	T134	—	431 UB	3080/3080SJ	—	—	1151/1169	B120/B124
Bronze Globe - Class 125	T/S211-Y	—	5TF	3210/3210SJ	—	—	—	B13T/B14T
Bronze Globe - Class 150	T/S235-Y	—	7TF/1310	3240/3240SJ	—	—	590T/1590T	B22/B24
Bronze Globe - Class 200	T256-AP	—	212P	3270	—	—	592A	B62
Bronze Angle - Class 125	T/S311-Y	—	2/1311	3220	—	—	—	—
Bronze Angle - Class 150	T/S335-Y	—	17TF	—	—	—	595T	B222T
Bronze Angle - Class 300	T376-AP	—	384P	3280	—	—	—	B274
Bronze Check - Class 125	T/S413-Y	—	34 1/2/1303	3310/3310SJ	—	—	509T/1509T	B320TY/B310TY
Bronze Check - Class 150	T/S433-Y	—	137	3330/3330SJ	—	—	510T/1510T	—
Bronze Check - Spring Act.	T/S480-Y	61	—	3600/3600SJ	—	—	—	—
Brass Ball - 2 pc./full port	FP600	64	92XX-B	171	FBV-3	—	BA475	S206-UFBR
DI Lug Butterfly - Buna/DI	LD3110	—	23FRB	LD8191	—	122/129	ML122B	LD711DS3B
DI Lug Butterfly-EPDM/bronze	LD2000	—	—	LD8281	—	AR-2	—	—
DI Lug Butterfly - Buna/Bronze	LD2100	—	14TL	LC8181	—	122/129	ML123B	LD711BS3B
CI Lug Butterfly - EPDM/Bronze	N200235	—	44BXZ	LC1281	BF03-121	222	CL223-E	LG712BS3E
DI Grooved Butterfly - Buna	GD4775	—	—	GE7712	—	—	—	LG812
DI Grooved Butterfly - EPDM	GD4765	—	—	GE7722	—	—	GG145	LG812

VALVE TYPE	NIBCO	APOLLO	CRANE	GRINNELL	WATTS	KEYSTONE	MILWAUKEE	STOCKHAM
Iron Gate - Class 125	F617-0	—	465½	6020A	—	—	F2885A	G623
Iron Globe - Class 125	F718-B	—	351	6200A	—	—	F2981A	G512
Iron Angle - Class 125	F818-B	—	353	—	—	—	—	G515
Iron Check - Class 125	F918-B	—	373	6300A	—	—	F2974A	G931
Iron Stop Check - Class 250	F869-B	—	30-E	6869A	—	—	—	F541
Iron Gate - Class 250	F667-0	—	7½E	6100A	—	—	F2894A	F667
Iron Globe - Class 250	F768-B	—	21-E	6250A	—	—	—	F532
Iron Angle - Class 250	F869-B	—	—	—	—	—	—	—
Iron Check - Class 250	F968-B	—	39-E	6350A	—	—	—	F947
Iron Check - Lift	F910-B	—	—	402B	—	—	1800	—
Iron Check - Dbl. Door	W920-W/KW900-W	—	—	300	—	—	—	WG970
Iron Check-Lever & Spring/Weight	F918-B/L&S/L&W	—	—	—	—	—	—	—
Bronze Gate - UL/FM	T104-0	—	—	66	—	—	—	B133
Bronze Ball - UL/FM	KT/KG505-8W	—	—	—	—	—	—	—
Iron Gate - OS&Y UL/FM	F607-OTS/RW	—	467	A2078	—	—	—	G634/G610
Iron Gate/300 UL/FM	F697-0	—	—	A2078	—	—	—	F670
Iron Gate - NRS UL/FM	F/M609/RW	—	—	A2074	—	—	—	G600/G601
Indicator Post - UL/FM	NIP1-AJ/2-AJ	—	—	A20804	—	—	—	G950/G951
Iron Swing Check - UL/FM	F908-W	—	—	A2122-6	—	—	—	G940
Iron Wafer Check - UL/FM	KW900-W	—	—	A2102	—	—	—	WG990
DI Wafer Butterfly - UL/FM	WD3510-8	—	—	WC82823FP	—	—	—	LG52UF
DI Grooved Butterfly - UL/FM	GD4765-8N	—	—	7700FP	—	—	—	LG82UF

Comparing Ductile Iron Valves to Cast Steel Valves

DUCTILE IRON	CAST STEEL				
NIBCO	CRANE	POWELL	STOCKHAM	KITZ	VELAN
OS &Y Gate F-637-31 F-637-33	47	1503	15-OF	K150-SCL	F-006C-02
NRS Gate F-639-31 F-639-33	Not Available	Not Available	Not Available	Not Available	Not Available
Globe F-738-31	143	1531	15-GSF	K-150-SCJ	F-007C-02
Angle Globe F-838-31	145	1533	15-APF	Not Available	Not Available
Swing Check F-938-31 F-938-33	147	1561	15-SF	K150-SCO	F-001C-02

NIBCO®
TAKE THE NEXT STEP!

Basic Radiant

NIBCO® DURA-PEX® is a Complete System

NIBCO DURA-PEX tubing, fittings, valves, and manifolds are designed to be used as a complete system. Therefore, NIBCO cannot guarantee that tubing and/or components from other systems are compatible for use with the NIBCO DURA-PEX system. NIBCO offers more versatility with the choice of three different connections - crimp, clamp or sleeve.

Standards and Approvals

NIBCO DURA-PEX is an outside diameter controlled tubing of one standard dimension ratio (SDR 9) that is manufactured to comply with the requirements of CSA B137.5, ASTM F 876, and ASTM F 2023. NIBCO DURA-PEX insert fittings and copper crimp rings are manufactured to comply with CSA B137.5 and ASTM F 1807. NIBCO DURA-PEX tubing, fittings, and crimp rings are tested as a system to the requirements of ASTM F 877. NIBCO DURA-PEX tubing components are listed for compliance to NSF/ANSI 14 and NSF/ANSI 61 by NSF International for use in potable water systems. NIBCO DURA-PEX tubing has also been tested and certified by Wamock Hershey International (WHI) and the International Association of Plumbing and Mechanical Officials(IAPMO).

Operating Pressure Limits

Water: 160 PSI @ 73° F (1.10 MPa @ 23° C)
100 PSI @ 180° F (0.69 MPa @ 82° C)
80 PSI @ 200° F (0.55 MPa @ 93° C)

Chlorinated Water: 80 PSI @ 140° F (0.55 MPa @ 60° C)
The water temperature must be 140° F (60° C) or lower and the water pressure must be 80 PSI (0.55 MPa) or lower*

NIBCO® DURA-PEX® Tube
Potable Water and Radiant Heat (non-ferrous systems)

Steel Sheet & Plate

HR Sheet HR Plate HR Diamond Plate
CR Sheet Galvanized Galvannealed
Expanded Metal Walkway Bar Grating

Steel Bar

Cold Finished
Hot Roll
Merchant Bar


Structural & Tube

Angle - Channel
Beam - Square
& Rect. Tube


Round
Rebar
Mesh


Stainless Steel

Sheet 2B & #4
Tube
Bar & Structural


Aluminum

Sheet / Plate
Tube, Bar &
Structural


Pipe

Bare Black T&C Black PE
Grooved Stainless Galvanized
Aluminum PVC Copper Tube


Fittings

Black Mal. Cast Iron Forged Steel
Galvanized Weld Gruvlock
Stainless Copper PVC

Nibco Valves

Brass Ball Stainless Ball Gas Cock
Check Globe Butterfly
O S & Y PVC Import



PACEMAKER

STEEL AND PIPING COMPANY