
Your Full Line
Service Center



PACIFIC
STEEL™

SERVICE CENTERS

STEEL HANDBOOK

www.Pacific-Steel.com



PACIFIC
STEEL & RECYCLING™



Pacific Steel & Recycling was built on a strong foundation, centered around our customers - reaching out to them, identifying their needs and offering the very best in service and quality. By following that philosophy, we've had customers like you depend on us for more than 120 years. We know that by putting you first and adapting to your needs, we can stay in business for another century.

100% EMPLOYEE-OWNED FOR THE ULTIMATE IN CUSTOMER SATISFACTION

The founders of Pacific Steel & Recycling decided the best way to retain hard-working, service-oriented employees was to give them a stake in the company - an idea that endures to this day. That means you, our valued customer, are working with employees who have a wealth of knowledge and a vested interest in your success - because your success is ultimately our success. We also hire employees with industry experience, and then we work to keep them. Your steel, recycling and ag needs are better served with more efficient solutions due to our employees' dedication and skill.

HERE FOR OUR COMMUNITIES

Headquartered in Great Falls, Montana, Pacific Steel & Recycling has about 40 branch offices in Washington, Nevada, Idaho, Utah, Wyoming, South Dakota, North Dakota, Colorado, Montana and Alberta, Canada. Each branch is uniquely committed to its own community's well-being, because we live and work there. In addition to contributing to the local economy by offering jobs and benefits, we actively support schools, youth sports teams and charitable causes. Giving back has long been a key part of the Pacific philosophy, and always will be.

STEEL STOCKING LOCATIONS

Montana

Pacific Steel
1401 3rd Street N.W.
Great Falls, MT 59404
(406) 771-7222
Fax (406) 727-3503

Pacific Steel
225 Rock Road
Belgrade, MT 59714
(406) 924-7170
Fax (406) 924-7171

Pacific Steel
145 Sugar Avenue
Billings, MT 59101
(406) 259-1114
Fax (406) 259-1128

Pacific Steel
2828 Palmer
Missoula, MT 59807
(406) 542-0381
Fax (406) 549-7217

Pacific Steel and Recycling
105 Montclair Drive
Kalispell, MT 59901
(406) 755-7011
Fax (406) 755-7010

Pacific Steel and Recycling
1530 National Avenue
Helena, MT 59601
(406) 442-7851
Fax (406) 442-6220

Pacific Steel and Recycling
1805 Highway 2 North
Havre, MT 59501
(406) 265-5824
Fax (406) 265-7618

Idaho

Pacific Steel
1900 20th Street North
Nampa, ID 83687
(208) 467-2113
Fax (208) 466-9571

Pacific Steel & Recycling
1987 Highland Avenue E.
Twin Falls, ID 83301
(208) 734-7440
Fax (208) 734-9902

Pacific Steel & Recycling
604 12th Street North
Lewiston, ID 83501
(208) 743-2181
Fax (208) 743-3150

Pacific Steel & Recycling
1000 Triangle
Ponderay, ID 83852
(208) 263-2584
Fax (208) 265-5422

Pacific Steel
257 East Anderson
Idaho Falls, ID 83401
(208) 523-3225
Fax (208) 529-1568

Pacific Steel
2206 North Main
Pocatello, ID 83204
(208) 232-2355
Fax (208) 232-2389

Pacific Steel
Hayden, ID 83835
7448 Aqua Circle
Dalton Gardens, ID 83815
(208) 762-4766
Fax (208) 762-5210

Pacific Steel & Recycling
5120 Emerald St.
Boise, ID 83706
(208) 375-2131
Fax (208) 375-2267

North Dakota

Pacific Steel & Recycling
13818 West Front Street
Williston, ND 58801
(701) 572-2373
Fax (701) 572-5327

South Dakota

Pacific Steel and Recycling
4280 Biernbaum Road
Rapid City, SD 57701
(605) 343-0334
Fax (605) 343-3274

Utah

Pacific Steel
2850 West 900 South
Salt Lake City, UT 84104
(801) 973-9068
Fax (801) 972-8949

Pacific Steel
Clearfield, UT 84089
404 South 1080 West
Syracuse, UT 84075
(801) 547-6627
(801) 525-8353

Colorado

Pacific Steel & Recycling
2365 River Road
Grand Junction, CO 81502
(970) 241-2551
Fax (970) 243-9625

Nevada

Pacific Steel & Recycling
9250 East Idaho Street
Elko, NV 89801
(775) 753-6300
Fax (775) 753-6324

Washington

Pacific Steel & Recycling
1114 North Ralph
Spokane, WA 99202
(509) 535-1673
Fax (509) 534-2298

Pacific Steel
925 North Oregon Avenue
Pasco, WA 99301
(509) 545-0688
Fax (509) 545-0697

Pacific Steel & Recycling
409 Butterfield Road
Yakima, WA 98901
(509) 453-1852
Fax (509) 453-9408

Wyoming

Pacific Steel & Recycling
130 Hudson Street
Mills, WY 82644
(307) 234-6006
Fax (307) 472-2910

Pacific Steel
1110 Robertson Circle
Gillette, WY 82718
(307) 363-9900

Pacific Steel and Recycling
819 Elk Street
Rock Springs, WY 82901
(307) 382-7970
Fax (307) 382-7972

OTHER NON-STOCKING LOCATIONS

**Pacific Recycling
(Downtown)**
777 4th Avenue North
Billings, MT 59101
(406) 245-3133
Fax (406) 248-4847

**Pacific Recycling
(Lockwood Facility)**
3385 Coulson Road
Billings, MT 59101
(406) 259-9135
Fax (406) 259-9519

Pacific Recycling
315 W. Griffin Drive
Bozeman, MT 59715
(406) 587-0662
Fax (406) 587-7541

Pacific Recycling
905 Gaylord Street
Butte, MT 59701-4852
(406) 782-0402
Fax (406) 782-9371

Pacific Recycling
1001 Larch Street
Gillette, WY 82716
(307) 686-2764
Fax (307) 682-6243

Pacific Recycling
1624 12th Avenue North
Great Falls, MT 59401
(406) 791-8550
Fax (406) 268-8192

Pacific Recycling
1155 N. Higbee
Idaho Falls, ID 83401
(208) 529-4180
Fax (208) 529-4521

Pacific Recycling
2515 E. Comstock Avenue
Nampa, ID 83687
(208) 466-1105
Fax (208) 466-6282

Pacific Recycling
3575 Highway 30 West
Pocatello, ID 83204
(208) 233-7720
Fax (208) 233-8658

Pacific Steel & Recycling
1939 Highland Avenue E.
Twin Falls, ID 83301
(208) 734-7440
Fax (208) 734-9902

Pacific Recycling
2600 Latimer
Missoula, MT 59808
(406) 543-7280
Fax (406) 543-7396

Pacific Recycling
315 Gum Street
Kennewick, WA 99336
(509) 582-2134
Fax (509) 586-3129

Pacific Recycling (Transload)
18727 38th Avenue East
Tacoma, WA 98446
(253) 846-2640
Fax (253) 846-6198

Pacific Recycling (Shredder)
19100 NW Waste Site Drive
Mayfield, ID 83716
(208) 796-2161
Fax (208) 796-2162

**Pacific Recycling
(Catalytic Converters)**
1401 3rd Street NW
Great Falls, MT 59804
(406) 791-8537
Fax (406) 791-8517

Pacific E-Recycling
1508 11th Avenue North
Nampa, ID 83687
(208) 461-5306
Fax (208) 461-5223

Alberta, Canada

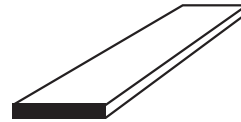
Pacific Steel & Recycling
5601 Range Road #63NW
Medicine Hat, AB Canada
T1A 5P1
(403) 504-1978
Fax (403) 526-5133

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HOT ROLLED STRIPS AND FLATS

(Stock Lengths - 20')



Size in Inches		Wt./Ft.	Wt./20'	Size in Inches		Wt./Ft.	Wt./20'
1/8 x	1/2	.213	4.26	5/16 x	1/2	.531	10.63
	3/4	.319	6.38		3/4	.797	15.94
	1	.425	8.50		1	1.063	21.26
	1 1/4	.531	10.62		1 1/4	1.328	26.56
	1 1/2	.638	12.76		1 1/2	1.594	31.88
	2	.850	17.00		2	2.125	42.50
	2 1/2	1.060	21.20		2 1/2	2.656	53.12
	3	1.275	25.50		3	3.188	63.76
	3 1/2	1.488	29.76		3 1/2	3.719	74.38
	4	1.700	34.00		4	4.250	85.00
	5	2.125	42.50		5	5.313	106.26
	6	2.550	51.00		6	6.375	127.50
	8	3.400	68.00		8	8.500	170.00
	10	4.250	85.00		10	10.630	212.60
	12	5.100	102.00		12	12.750	255.00
3/16 x	1/2	.319	6.38	3/8 x	1/2	.638	12.76
	3/4	.478	9.56		3/4	.956	19.12
	1	.638	12.76		1	1.275	25.50
	1 1/4	.797	15.94		1 1/4	1.594	31.88
	1 1/2	.956	19.12		1 1/2	1.913	38.26
	2	1.275	25.50		2	2.550	51.00
	2 1/2	1.594	31.88		2 1/2	3.188	63.76
	3	1.913	38.26		3	3.825	76.50
	3 1/2	2.231	44.62		3 1/2	4.463	89.26
	4	2.550	51.00		4	5.100	102.00
	5	3.188	63.76		5	6.375	127.50
	6	3.825	76.50		6	7.650	153.00
	8	5.100	102.00		8	10.200	204.00
	10	6.380	127.60		10	12.750	255.00
	12	7.650	153.00		12	15.300	306.00
1/4 x	1/2	.425	8.50	1/2 x	3/4	1.275	25.50
	3/4	.638	12.76		1	1.700	34.00
	1	.850	17.00		1 1/4	2.125	42.50
	1 1/4	1.063	21.26		1 1/2	2.550	51.00
	1 1/2	1.275	25.50		2	3.400	68.00
	2	1.700	34.00		2 1/2	4.250	85.00
	2 1/2	2.125	42.50		3	5.100	102.00
	3	2.550	51.00		3 1/2	5.950	119.00
	3 1/2	2.975	59.50		4	6.800	136.00
	4	3.400	68.00		5	8.500	170.00
	5	4.250	85.00		6	10.200	204.00
	6	5.100	102.00		8	13.600	272.00
	8	6.800	136.00		10	17.000	340.00
	10	8.500	170.00		12	20.400	408.00
	12	10.200	204.00				

HOT ROLLED STRIPS AND FLATS, cont.

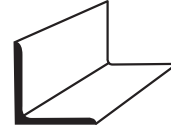
(Stock Lengths - 20')



Size in Inches				Size in Inches				
		Wt./Ft.	Wt./20'			Wt./Ft.	Wt./20'	
5/8 x	1	2.125	42.50	1 x	1 1/4	4.25	85.0	
	1 1/4	2.656	53.12		1 1/2	5.10	102.0	
	1 1/2	3.188	63.76		2	6.80	136.0	
	2	4.250	85.00		2 1/2	8.50	170.0	
	2 1/2	5.313	106.26		3	10.20	204.0	
	3	6.375	127.50		3 1/2	11.90	238.0	
	3 1/2	7.438	148.76		4	13.60	272.0	
	4	8.500	170.00		5	17.00	340.0	
	5	10.625	212.50		6	20.40	408.0	
	6	12.750	255.00		8	27.20	544.0	
	8	17.000	340.00		10	34.00	680.0	
	10	21.250	425.00		12	40.80	816.0	
	12	25.500	510.00					
3/4 x	1	2.550	51.00	1 1/4 x	1 1/2	6.38	127.6	
	1 1/4	3.188	63.76		2	8.50	170.0	
	1 1/2	3.825	76.50		2 1/2	10.63	212.6	
	2	5.100	102.00		3	12.75	255.0	
	2 1/2	6.375	127.50		3 1/2	14.88	297.6	
	3	7.650	153.00		4	17.00	340.0	
	3 1/2	8.925	178.50		5	21.25	425.0	
	4	10.200	204.00		6	25.50	510.0	
	5	12.750	255.00		8	34.00	680.0	
	6	15.300	306.00		10	42.50	850.0	
	8	20.400	408.00		12	51.00	1020.0	
	10	25.500	510.00					
	12	30.600	612.00		1 1/2 x	2	10.20	204.0
7/8 x	1	2.975	59.50	2 1/2		12.75	255.0	
	1 1/4	3.719	74.38	3		15.30	306.0	
	1 1/2	4.463	89.26	3 1/2		17.85	357.0	
	2	5.950	119.00	4		20.40	408.0	
	2 1/2	7.438	148.76	5		25.50	510.0	
	3	8.925	178.50	6		30.60	612.0	
	3 1/2	10.413	208.26	8		40.80	816.0	
	4	11.900	238.00	10		51.00	1020.0	
	6	17.850	357.00	12		61.20	1224.0	
	8	23.800	476.00					
	10	29.750	595.00	2 x		2 1/2	17.00	340.0
	12	35.700	714.00			3	20.40	408.0
	Other sizes are available. Please check with your local Pacific branch.				3 1/2	23.80	476.0	
4					27.20	544.0		
5					34.00	680.0		
6					40.80	816.0		
8					54.40	1088.0		
10					68.00	1360.0		
12					81.60	1632.0		

STRUCTURAL ANGLES

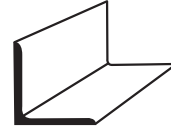
(Stock Lengths - 20')



Size	Wt./Ft.	Wt./20
1/2 x 1/2 x 1/8	38	7.60
3/4 x 3/4 x 1/8	59	11.80
1 x 1 x 1/8	.80	16.00
3/16	1.16	23.20
1/4	1.49	29.80
1 1/4 x 1 1/4 x 1/8	1.01	20.20
3/16	1.48	29.60
1/4	1.92	38.40
1 1/2 x 1 1/2 x 1/8	1.23	24.60
3/16	1.80	36.00
1/4	2.34	46.80
1 3/4 x 1 3/4 x 1/8	1.44	28.80
3/16	2.12	42.40
1/4	2.77	55.40
2 x 1 1/2 x 1/8	1.44	28.80
3/16	2.12	42.40
1/4	2.77	55.40
2 x 2 x 1/8	1.65	33.00
3/16	2.44	48.80
1/4	3.19	63.80
5/16	3.92	78.40
3/8	4.70	94.00
2 1/2 x 1 1/2 x 3/16	2.44	48.80
1/4	3.19	63.80
2 1/2 x 2 x 3/16	2.75	55.00
1/4	3.62	72.40
5/16	4.50	90.00
3/8	5.30	106.00
2 1/2 x 2 1/2 x 3/16	3.07	61.40
1/4	4.10	82.00
5/16	5.00	100.00
3/8	5.90	118.00
1/2	7.70	154.00

STRUCTURAL ANGLES

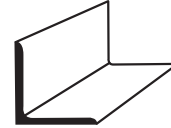
(Stock Lengths - 20' or 40')



Size	Wt./Ft.	Wt./20'	Wt./40'
3 x 2 x	3/16	3.1	62
	1/4	4.1	82
	5/16	5.0	100
	3/8	5.9	118
	1/2	7.7	154
3 x 2 1/2 x	3/16	3.3	66
	1/4	4.5	90
	5/16	5.6	112
	3/8	6.6	132
	1/2	8.5	170
3 x 3 x	3/16	3.7	74
	1/4	4.9	98
	5/16	6.1	122
	3/8	7.2	144
	1/2	9.4	188
3 1/2 x 2 1/2 x	1/4	4.9	98
	5/16	6.1	122
	3/8	7.2	144
	1/2	9.4	188
3 1/2 x 3 x	1/4	5.4	108
	5/16	6.6	132
	3/8	7.9	158
	1/2	10.2	204
3 1/2 x 3 1/2 x	1/4	5.8	116
	5/16	7.2	144
	3/8	8.5	170
	1/2	11.1	222
4 x 3 x	1/4	5.8	116
	5/16	7.2	144
	3/8	8.5	170
	1/2	11.1	222
	5/8	13.6	272

STRUCTURAL ANGLES, cont.

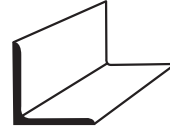
(Stock Lengths - 20' or 40')



Size		Wt./Ft.	Wt./20'	Wt./40'
4 x 3 ¹ / ₂ x	1/4	6.2	124	248
	5/16	7.7	154	308
	3/8	9.1	182	364
	1/2	11.9	238	476
4 x 4 x	1/4	6.6	132	264
	5/16	8.2	164	328
	3/8	9.8	196	392
	1/2	12.8	256	512
	5/8	15.7	314	628
5 x 3 x	1/4	6.6	132	264
	5/16	8.2	164	328
	3/8	9.8	196	392
	1/2	12.8	256	512
5 x 3 ¹ / ₂ x	1/4	7.0	140	280
	5/16	8.7	174	348
	3/8	10.4	208	416
	1/2	13.6	272	544
5 x 5 x	5/16	10.3	206	412
	3/8	12.3	246	492
	1/2	16.2	324	648
6 x 3 ¹ / ₂ x	1/4	7.9	158	316
	5/16	9.8	196	392
	3/8	11.7	234	468
	1/2	15.3	306	612
6 x 4 x	5/16	10.3	206	412
	3/8	12.3	246	492
	1/2	16.2	324	648
	5/8	20.0	400	800
	3/4	23.6	472	944
6 x 6 x	5/16	12.5	250	500
	3/8	14.9	298	596
	1/2	19.6	392	784
	5/8	24.2	484	968
	3/4	28.7	574	1148

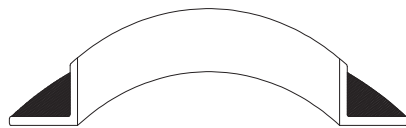
STRUCTURAL ANGLES, cont.

(Stock Lengths - 20' or 40')



Size		Wt./Ft.	Wt./20'	Wt./40'
7 x 4 x	3/8	13.6	272	544
	1/2	17.9	358	716
	5/8	22.1	442	884
	3/4	26.2	524	1048
8 x 4 x	1/2	19.6	392	784
	5/8	24.2	484	968
	3/4	28.7	574	1148
8 x 6 x	1/2	26.4	528	1056
	5/8	28.5	570	1140
	3/4	33.8	676	1352
	1	44.2	884	1768
8 x 8 x	1/2	26.4	528	1056
	5/8	32.7	654	1308
	3/4	38.9	778	1556
	1	51.0	1020	2040

Let us roll your angle into rings for you.



Leg Out

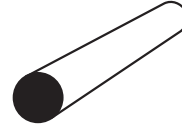
Specify inside diameter and,
if unequal, which leg is out.



Leg In

Specify outside diameter and,
if unequal, which leg is in.

ROUNDS



Description of Grades Comparison Chart of Average Mechanical Properties

Guide to Selection

Mild Steel, Hot Rolled

Low carbon, general-purpose steel, providing economy, formability and weldability.

ASTM A-36, Hot-Rolled Carbon Steel Bar

Covers carbon steel shapes, plates and bars for general construction. Suitable for forming and welding.

C-1018 Cold-Drawn

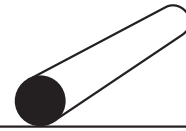
Low carbon, good case-hardening properties. Excellent steel for bending, cold-forming and shafting applications. Good brazing and welding properties.

4140 Heat Treated, Stress Relieved

A general purpose alloy, high in chromium and molybdenum. Has good hardness, penetration, strength, toughness and durability. Use is common in all well tool joints, axle shafts and many other applications that require a metal that will withstand extreme stress and fatigue. Difficult to weld, but can be welded by any common welding process if proper welding rod is used, and if material is preheated prior to welding. Joint area should be stress relieved after welding. Sizes through 3" are cold drawn, 3 1/4" and larger are hot rolled.

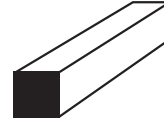
	Tensile Strength PSI	Yield Strength PSI	Brinell Hardness	Rating***	S.F.M.**	Weldability	Color Code
A-36 Hot-rolled	58,000	36,000	Approx. 126			Good brazing & welding properties	
C-1018	82,000	70,000	163	70%	125	Good brazing & welding properties	Green
C-1045 Cold-rolled	91,000	77,000	179	56%	95	Fair brazing & welding properties	Blue
LaSalle Stressproof* Cold-drawn	125,000	100,000	269	83%	83	Difficult to weld	Bronze
Hot rolled 4140 heat treated stress relieved	134-156*	120-135*	269-321*	50% & Less	---	Difficult to weld	Light Blue
Cold drawn 4140 heat treated stress relieved	134-156*	120-135*	269-321*	50% & Less	---	Difficult to weld	White

HOT & COLD DRAWN ROUNDS



Size in Inches	Wt. Per Ft. in Lbs.	Size in Inches	Wt. Per Ft. in Lbs.
1/8	.042	2 7/8	22.07
3/16	.094	2 15/16	23.04
1/4	.167	3	24.03
5/16	.261	3 1/16	25.05
3/8	.376	3 1/8	26.08
7/16	.511	3 3/16	27.13
1/2	.668	3 1/4	28.21
9/16	.845	3 5/16	29.30
5/8	1.04	3 3/8	30.42
11/16	1.26	3 7/16	31.55
3/4	1.50	3 1/2	32.71
13/16	1.76	3 9/16	33.89
7/8	2.04	3 5/8	35.09
15/16	2.35	3 11/16	36.31
1	2.67	3 3/4	37.55
1 1/16	3.01	3 13/16	38.81
1 1/8	3.38	3 7/8	40.10
1 3/16	3.77	3 15/16	41.40
1 1/4	4.17	4	42.73
1 5/16	4.60	4 1/16	44.07
1 3/8	5.05	4 1/8	45.44
1 7/16	5.52	4 3/16	46.83
1 1/2	6.01	4 1/4	48.23
1 9/16	6.52	4 5/16	49.66
1 5/8	7.05	4 3/8	51.11
1 11/16	7.60	4 7/16	52.58
1 3/4	8.18	4 1/2	54.08
1 13/16	8.77	4 9/16	55.59
1 7/8	9.39	4 5/8	57.12
1 15/16	10.02	4 11/16	58.67
2	10.68	4 3/4	60.25
2 1/16	11.36	4 13/16	61.85
2 1/8	12.06	4 7/8	63.46
2 3/16	12.78	4 15/16	65.10
2 1/4	13.52	5	66.76
2 5/16	14.28	5 1/4	73.60
2 3/8	15.06	5 1/2	80.78
2 7/16	15.87	5 3/4	88.29
2 1/2	16.69	6	96.13
2 9/16	17.53	6 1/4	104.30
2 5/8	18.40	6 1/2	112.80
2 11/16	19.29	7	130.90
2 3/4	20.19	7 1/4	140.40
2 13/16	21.12	7 1/2	150.20
		8	170.90

HOT ROLLED & COLD DRAWN SQUARES



Size in Inches	Wt. Per Ft.	Cold Rolled Wt., 12' Bar	Hot Rolled Wt./20' Bar
1/8	.0531	.64	
3/16	.120	1.44	
1/4	.213	2.56	
5/16	.332	3.98	
3/8	.478	5.74	9.56
7/16	.651	7.81	13.02
1/2	.850	10.20	17.00
9/16	1.08	12.96	21.52
5/8	1.33	15.96	26.56
11/16	1.61	19.32	
3/4	1.91	22.92	36.26
1 3/16	2.24	26.88	
7/8	2.60	31.20	32.06
1 5/16	2.99	35.88	
1	3.40	40.80	68.00
1 1/16	3.84	46.08	
1 1/8	4.30	51.60	86.00
1 3/16	4.80	57.60	
1 1/4	5.31	63.72	106.3
1 5/16	5.86	70.32	
1 3/8	6.43	77.16	128.6
1 7/16	7.03	84.36	
1 1/2	7.65	91.80	153.0
1 5/8	8.98	107.8	179.6
1 3/4	10.42	125.1	208.4
2	13.61	163.4	272.2
2 1/4	17.23	206.7	344.6
2 1/2	21.27	255.2	425.4
2 3/4	25.74	308.8	514.8
3	30.63	367.5	612.6
3 1/4	35.95	431.4	
3 1/2	41.69	500.3	833.9
4	54.45	653.4	1089.0
4 1/2	68.91	827.0	1378.2

Let us cut the pieces you need.

SQUARE TUBING

Mech. Sizes — ASTM - A513
Struct. Sizes — ASTM - A500B

Wall Thickness

Size Gauge	.049 18 ga.	.065 16 ga.	.072 15 ga.	.083 14 ga.	.095 13 ga.	.109 12 ga.	.120 11 ga.	.134 10 ga.	.148 9 ga.	.188 3/16"	.203 6 ga.	.250 1/4"	.313 5/16"	.375 3/8"	.500 1/2"
1/2 x 1/2	.301	.385													
3/4 x 3/4	.467	.606	.664	.753											
1 x 1	.634	.827	.909	1.035	1.169	1.321	1.436								
1 1/4 x 1 1/4		1.048	1.154	1.317	1.492	1.691	1.844								
1 1/2 x 1 1/2		1.163	1.398	1.600	1.815	2.062	2.252	2.33	2.53	3.04					
1 3/4 x 1 3/4		1.379		1.882	2.138	2.433	2.66								
2 x 2		1.710		2.16	2.46	2.80	3.07	3.24	3.54	4.32	4.60	5.40			
2 1/2 x 2 1/2					3.03	3.44	3.90	4.15	4.54	5.60	5.98	7.10			
3 x 3							4.75	5.07	5.55	6.88	7.36	8.80			
3 1/2 x 3 1/2							5.60	5.98	6.55	8.16	8.74	10.50			
4 x 4				4.36	4.97	5.66	6.45	6.89	7.56	9.44	10.12	12.20	14.84	17.25	21.61
4 1/2 x 4 1/2										10.71	11.50	13.90	16.96	19.80	25.01
5 x 5										11.99	12.88	15.60	19.09	22.35	28.41
6 x 6										14.55	15.64	19.00	23.35	27.45	35.21
7 x 7										17.11	18.40	22.40	27.60	32.55	42.01
8 x 8										19.66	21.16	25.80	31.86	37.65	48.81
10 x 10										24.77	26.68	32.59	40.37	47.85	62.40
12 x 12												39.41	48.83	58.08	76.06

Weights per ft. may vary according to our source.



RECTANGULAR TUBING

Mech. Sizes — ASTM - A513
Struct. Sizes — ASTM - A500B

Wall Thickness

Size Gauge	.065 16 ga.	.072 15 ga.	.083 14 ga.	.095 13 ga.	.109 12 ga.	.120 11 ga.	.134 10 ga.	.188 3/16"	.250 1/4"	.313 5/16"	.375 3/8"	.500 1/2"
1 x 1/2	.606	.664	.753									
1 1/2 x 1	1.048	1.154	1.317	1.492	1.691	1.844						
2 x 1	1.269	1.398	1.60	1.815	2.062	2.252						
2 x 1 1/2	1.490	1.643	1.882	2.138	2.433	2.660						
2 1/2 x 1 1/2	1.710	1.84	2.16	2.46	2.80	3.07	3.24	4.32	5.40			
3 x 1	1.71	1.84	2.16	2.46	2.80	3.07	3.24	4.32	5.40			
3 x 1 1/2		2.09	2.39	2.70	3.07	3.48	3.70	4.96	6.25			
3 x 2			2.67	3.03	3.44	3.90	4.15	5.60	7.10			
4 x 1	2.10					3.85						
4 x 2				3.67	4.18	4.75	5.07	6.88	8.80			
4 x 3				4.32	4.92	5.60	5.98	8.16	10.50			
5 x 2					4.92	5.60	5.98	8.16	10.50			
5 x 3					5.66	6.45	6.89	9.44	12.20	14.84	17.25	21.61
5 x 4								10.72	13.91	16.98	19.82	25.03
6 x 2					5.66	6.45	6.89	9.44	12.20	14.84	17.25	21.61
6 x 3								10.71	13.90	16.96	19.80	25.01
6 x 4								11.99	15.60	19.09	22.35	28.41
7 x 4								13.27	17.30	21.22	24.90	31.81

Weights per ft. may vary according to our source.



RECTANGULAR TUBING

Mech. Sizes — ASTM - A513
Struct. Sizes — ASTM - A500B

Wall Thickness

Size Gauge	.065 16 ga.	.072 15 ga.	.083 14 ga.	.095 13 ga.	.109 12 ga.	.120 11 ga.	.134 10 ga.	.188 3/16"	.250 1/4"	.313 5/16"	.375 3/8"	.500 1/2"
7 x 5								14.55	19.00	23.35	27.45	35.21
8 x 2						7.85		11.99	15.60	19.09	22.35	
8 x 3									17.32		24.92	31.83
8 x 4								14.55	19.00	23.35	27.45	35.21
8 x 6								17.11	22.40	27.60	32.55	42.01
9 x 4								15.80	20.71	25.46		
9 x 6								18.35	24.11	29.71		
10 x 2								14.53	19.02	23.34	27.48	
10 x 4								17.11	22.40	27.60	32.55	42.01
10 x 6								19.66	25.80	31.86	37.65	48.81
12 x 2								17.11	22.40	27.60	32.55	42.01
12 x 4								19.66	25.80	31.86	37.65	48.81
12 x 6								22.22	29.20	36.12	42.75	55.60

Approximate weight per foot.

Weights may vary according to source.



ROUND MECHANICAL TUBING

ASTM - A513

Wall Thickness

Size Gauge	.035 20 ga.	.049 18 ga.	.065 16 ga.	.072 15 ga.	.083 14 ga.	.095 13 ga.	.109 12 ga.	.120 11 ga.	.134 10 ga.	.180 7 ga.
1/2" OD	.1739	.2360	.3020	.3291						
5/8"	.2205	.3014	.3888	.4253	.4805	.5377				
3/4"	.2673	.3669	.4756	.5214	.5913	.6646	.7462	.8074		
7/8"	.3140	.4322	.5623	.6175	.7021	.7914	.8917	.9676		
1		.4977	.6491	.7136	.8129	.9183	1.037	1.128		
1 1/4"		.6285	.8227	.9059	1.035	1.172	1.328	1.448	1.555	
1 3/8"		.6939	.9094	1.002	1.145	1.299	1.474	1.608	1.776	
1 1/2"		.7594	.9962	1.098	1.256	1.426	1.619	1.769	1.995	
1 5/8"		.8247	1.083	1.194	1.367	1.552	1.765	1.929	2.134	
1 3/4"		.8902	1.170	1.290	1.478	1.679	1.910	2.089	2.313	
1 7/8"		.9555	1.257	1.387	1.589	1.806	2.056	2.249	2.492	
2			1.343	1.483	1.699	1.933	2.201	2.409	2.670	
2 1/4"			1.517	1.675	1.921	2.187	2.492	2.730	3.028	
2 1/2"			1.690	1.867	2.143	2.440	2.783	3.050	3.386	4.46
2 3/4"			1.864	2.059	2.364	2.694	3.075	3.371	3.744	4.94
3			2.038	2.250	2.590	2.950	3.370	3.690	4.100	5.65

Approximate weight per foot.



Weights may vary according to source.

PIPE SPECIFICATIONS

A-53	- For mechanical & pressure application - Typically black epoxy coated or galvanized - Type F: Furnace butt welded, continuous welded grade A - Type E: Electric resisitace welded, Grades A & B - Type S: Seamless, Grades A & B	<table><tr><td></td><td colspan="4">% Max</td></tr><tr><td></td><td>C</td><td>Mn</td><td>P</td><td>S</td></tr><tr><td>Type F</td><td></td><td></td><td>.08</td><td>.06</td></tr><tr><td>Type E & S</td><td></td><td></td><td></td><td></td></tr><tr><td>Grade A</td><td>.25</td><td>.95</td><td>.05</td><td>.06</td></tr><tr><td>Grade B</td><td>.30</td><td>1.20</td><td>.05</td><td>.06</td></tr></table> Ladle & Check Limits		% Max					C	Mn	P	S	Type F			.08	.06	Type E & S					Grade A	.25	.95	.05	.06	Grade B	.30	1.20	.05	.06	<table><tr><td></td><td colspan="2">Min. PSI</td></tr><tr><td></td><td>Yield</td><td>Tensile</td></tr><tr><td>Type F</td><td>25000</td><td>45000</td></tr><tr><td>Grade A</td><td>30000</td><td>48000</td></tr><tr><td>Grade B</td><td>35000</td><td>60000</td></tr></table>		Min. PSI			Yield	Tensile	Type F	25000	45000	Grade A	30000	48000	Grade B	35000	60000
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Type F	25000	45000																																														
Grade A	30000	48000																																														
Grade B	35000	60000																																														
A-106	- For mechanical & pressure application - Seamless - Used at higher pressure and temperatures - Suitable for bending, flanging and similar forming	<table><tr><td></td><td colspan="3">% Max</td><td colspan="2">% Min</td></tr><tr><td></td><td>C</td><td>Mn</td><td>P</td><td>S</td><td>SI</td></tr><tr><td>Grade A</td><td>.25</td><td>.93</td><td>.048</td><td>.058</td><td>.10</td></tr><tr><td>Grade B</td><td>.30</td><td>1.06</td><td>.048</td><td>.058</td><td>.10</td></tr><tr><td>Grade C</td><td>.35</td><td>1.06</td><td>.048</td><td>.058</td><td>.10</td></tr></table> Ladle & Check Limits		% Max			% Min			C	Mn	P	S	SI	Grade A	.25	.93	.048	.058	.10	Grade B	.30	1.06	.048	.058	.10	Grade C	.35	1.06	.048	.058	.10	<table><tr><td></td><td colspan="2">Min. PSI</td></tr><tr><td></td><td>Yield</td><td>Tensile</td></tr><tr><td>Grade A</td><td>30000</td><td>48000</td></tr><tr><td>Grade B</td><td>35000</td><td>60000</td></tr></table>		Min. PSI			Yield	Tensile	Grade A	30000	48000	Grade B	35000	60000			
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Grade A	.25	.93	.048	.058	.10																																											
Grade B	.30	1.06	.048	.058	.10																																											
Grade C	.35	1.06	.048	.058	.10																																											
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Grade A	30000	48000																																														
Grade B	35000	60000																																														
A-500	- For structural & general contruction applications - Typically bare finish	<table><tr><td></td><td colspan="3">% Max</td><td colspan="2">% Min</td></tr><tr><td></td><td>C</td><td>Mn</td><td>P</td><td>S</td><td>Cu</td></tr><tr><td>Grade A</td><td>.26</td><td>1.35</td><td>.035</td><td>.035</td><td>.20</td></tr><tr><td>Grade B</td><td>.26</td><td>1.35</td><td>.035</td><td>.035</td><td>.20</td></tr><tr><td>Grade C</td><td>.23</td><td>1.35</td><td>.035</td><td>.035</td><td>.20</td></tr></table>		% Max			% Min			C	Mn	P	S	Cu	Grade A	.26	1.35	.035	.035	.20	Grade B	.26	1.35	.035	.035	.20	Grade C	.23	1.35	.035	.035	.20	<table><tr><td></td><td colspan="2">Min. PSI</td></tr><tr><td></td><td>Yield</td><td>Tensile</td></tr><tr><td>Grade A</td><td>33000</td><td>45000</td></tr><tr><td>Grade B</td><td>42000</td><td>58000</td></tr><tr><td>Grade C</td><td>46000</td><td>62000</td></tr></table>		Min. PSI			Yield	Tensile	Grade A	33000	45000	Grade B	42000	58000	Grade C	46000	62000
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PIPE

A53 Grd. A & B
 Black Sch 40 and Sch 80 Plain End
 Black Sch 40 Threaded and Coupled
 Galv Sch 40 Threaded and Coupled
 Bare Pipe A500 ½" -12"

Nominal Pipe Size Inches	Outside Diameter Inches		I.P.S. Schedule	Wall Thickness Inches	Inside Diameter Inches	Wt./Ft. Lbs.
1/8	.405	Std.	40	.068	.269	.2447
		X-Hvy.	80	.095	.215	.3145
1/4	.540	Std.	40	.088	.364	.4248
		X-Hvy.	80	.119	.302	.5351
3/8	.675	Std.	40	.091	.493	.5676
		X-Hvy.	80	.126	.423	.7388
1/2	.840	Std.	40	.109	.622	.8510
		X-Hvy.	80	.147	.546	1.088
			160	.187	.466	1.304
3/4	1.050		XX-Hvy.	.294	.252	1.714
		Std.	40	.113	.824	1.131
		X-Hvy.	80	.154	.742	1.474
			160	.218	.614	1.937
1	1.315		XX-Hvy.	.308	.434	2.441
		Std.	40	.133	1.049	1.679
		X-Hvy.	80	.179	.957	2.172
			160	.250	.815	2.844
1 1/4	1.660		XX-Hvy.	.358	.599	3.659
		Std.	40	.140	1.380	2.273
		X-Hvy.	80	.191	1.278	2.997
			160	.250	1.160	3.765
1 1/2	1.900		XX-Hvy.	.382	.896	5.214
		Std.	40	.145	1.610	2.718
		X-Hvy.	80	.200	1.500	3.631
			160	.281	1.338	4.859
2	2.375		XX-Hvy.	.400	1.100	6.408
		Std.	40	.154	2.067	3.653
		X-Hvy.	80	.218	1.939	5.022
			160	.343	1.689	7.444
2 1/2	2.875		XX-Hvy.	.436	1.503	9.029
		Std.	40	.203	2.469	5.793
		X-Hvy.	80	.276	2.323	7.661
			160	.375	2.125	10.010
			XX-Hvy.	.552	1.771	13.690



PIPE, cont.

Nominal Pipe Size Inches	Outside Diameter Inches		I.P.S. Schedule	Wall Thickness Inches	Inside Diameter Inches	Wt./Ft. Lbs.
3	3.500	Std.	40	.216	3.068	7.58
		X-Hvy.	80	.300	2.900	10.25
			160	.438	2.624	14.32
			XX-Hvy.	.600	2.300	18.58
3 1/2	4.000	Std.	40	.226	3.548	9.11
		X-Hvy.	80	.318	3.364	12.51
			XX-Hvy.	.636	2.728	22.85
4	4.500	Std.	40	.237	4.026	10.79
		X-Hvy.	80	.337	3.826	14.98
			120	.438	3.624	19.00
			160	.531	3.438	22.52
			XX-Hvy.	.674	3.152	27.54
5	5.563	Std.	40	.258	5.047	14.62
		X-Hvy.	80	.375	4.813	20.78
			120	.500	4.563	27.04
			160	.625	4.313	32.96
			XX-Hvy.	.750	4.063	38.55
6	6.625		—	.250	6.125	17.02
		Std.	40	.280	6.056	18.79
		X-Hvy.	80	.432	5.761	28.57
			120	.562	5.501	36.39
			160	.718	5.189	45.30
			XX-Hvy.	.864	4.897	53.16
8	8.626		—	.188	8.250	16.94
			20	.250	8.125	22.36
			30	.277	8.071	24.70
		Std.	40	.322	7.981	28.55
			60	.406	7.813	35.64
			80	.500	7.625	43.39
		X-Hvy.	100	.593	7.439	50.87
			120	.718	7.189	60.63
			140	.812	7.001	67.76
			XX-Hvy.	.875	6.875	72.42
			160	.906	6.813	74.69
10	10.750		—	.188	10.375	21.21
			20	.250	10.250	28.04
			30	.307	10.136	34.24
		Std.	40	.365	10.020	40.48
		X-Hvy.	60	.500	9.750	54.74
			80	.593	9.564	64.33
			100	.718	9.314	76.93



PIPE, cont.

Nominal Pipe Size Inches	Outside Diameter Inches		I.P.S. Schedule	Wall Thickness Inches	Inside Diameter Inches	Wt./Ft. Lbs.
10	10.750	XX-Hvy.	120	.843	9.064	89.20
			140	1.000	8.750	104.10
			160	1.125	8.500	115.70
12	12.750		20	.250	12.250	33.38
			30	.330	12.090	43.77
			Std.	.375	12.000	49.56
			40	.406	11.938	53.53
		X-Hvy.		.500	11.750	65.42
			60	.562	11.626	73.16
			80	.687	11.376	88.51
			100	.843	11.064	107.20
		XX-Hvy.	120	1.000	10.750	125.50
			140	1.125	10.500	139.70
			160	1.312	10.126	160.30
14	14.00		10	.250	13.500	36.71
			20	.312	13.375	45.68
		Std.	30	.375	13.250	54.57
			40	.437	13.126	63.37
		X-Hvy.		.500	13.000	72.09
			60	.593	12.814	84.91
			80	.750	12.500	106.10
			100	.937	12.126	130.70
			120	1.093	11.814	150.70
			140	1.250	11.500	170.20
			160	1.406	11.188	189.10
			10	.250	15.500	42.05
			20	.312	15.376	52.36
		Std.	30	.375	15.250	62.58
			40	.500	15.000	82.77
16	16.00	X-Hvy.	—	.625	14.750	102.60
			60	.656	14.688	107.50
			80	.843	14.314	136.50
			100	1.031	13.938	164.80
			120	1.218	13.564	192.30
			140	1.437	13.126	223.50
			160	1.593	12.814	245.10
			10	.250	17.500	47.39
			Std.	.375	17.250	70.59
			30	.438	17.124	82.15
		X-Hvy.		.500	17.000	93.45
			40	.562	16.876	104.80
			60	.750	16.500	138.20
18	18.00					



PIPE, cont.

Nominal Pipe Size Inches	Outside Diameter Inches		I.P.S. Schedule	Wall Thickness Inches	Inside Diameter Inches	Wt./Ft. Lbs.
18	18.00		80	.937	16.126	170.80
			100	1.156	15.688	208.00
			120	1.375	15.250	244.10
			140	1.562	14.876	274.20
			160	1.781	14.438	308.50
20	20.00	Std. X-Hvy.	10	.250	19.500	52.73
			20	.375	19.250	78.60
			30	.500	19.000	104.10
			40	.583	18.810	122.90
			80	1.031	17.938	208.90
			100	1.280	17.440	256.10
			120	1.500	17.000	296.40
			140	1.750	16.500	341.10
			160	1.968	16.064	379.00
22	22.00	Std.	10	.250	21.500	58.07
			20	.375	21.250	86.61
			30	.500	21.000	114.80
			60	.875	20.250	197.40
			80	1.125	19.750	250.80
			100	1.375	19.250	302.90
			120	1.625	18.750	353.60
			140	1.875	18.250	403.00
			160	2.125	17.750	451.10
24	24.00	Std. X-Hvy.	10	.250	23.500	63.41
			20	.375	23.250	94.62
			X-Hvy.	.500	23.000	125.50
			30	.562	22.876	140.80
			40	.687	22.626	171.20
			60	.968	22.064	238.10
			80	1.218	21.564	296.40
			100	1.531	20.938	367.40
			120	1.812	20.376	429.40
			140	2.062	19.876	483.10
			160	2.343	19.314	541.90
30	30.00	Std. X-Hvy.		.250	29.500	79.43
				.375	29.250	118.65
			20	.500	29.000	157.53
			30	.625	28.750	196.08
				.750	28.500	234.29
36	36.00	Std.		.875	28.250	272.17
				.250	35.500	95.45
				.375	35.250	142.68



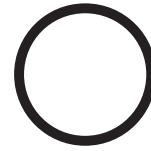
PIPE, cont.

Nominal Pipe Size Inches	Outside Diameter Inches		I.P.S. Schedule	Wall Thickness Inches	Inside Diameter Inches	Wt./Ft. Lbs.
36	36.00	X-Hvy.	20	.500	35.000	189.56
			30	.625	34.750	236.13
			40	.750	34.500	282.35
				.875	34.250	328.24
				1.000	34.000	373.80
42	42.00	X-Hvy.		.375	41.250	166.71
			Std.	.500	41.000	221.61
			20	.625	40.750	276.18
			30	.750	40.500	330.41
			40	.875	40.250	384.31
48	48.00			1.000	40.000	437.88
				.375	47.250	190.74
				.500	47.000	253.65
				.750	46.500	378.47
				.875	46.250	440.38
				1.000	46.000	501.96



LIGHT GAUGE PIPE

American Water Works Assoc. Specs.
AWWA C-200
Equivalent to ASTM A-135 Grade A



OD	Wall Thickness	Weight Per Foot	Weight Per 40' Length
4" x	14 ga.	3.2	128
	12	4.5	180
	10	5.7	228
5" x	14 ga.	4.0	160
	12	5.6	224
	10	7.2	288
6" x	14 ga.	4.8	192
	12	6.8	272
	10	8.6	344
6 ⁵ / ₈ " x	14 ga.	5.4	216
	12	7.5	300
	10	9.6	384
8" x	14 ga.	6.5	260
	12	9.0	360
	10	11.6	464
10" x	12 ga.	11.3	452
	10	14.5	580
	3/16"	19.7	788
	1/4"	26.0	1040
12" x	12 ga.	13.6	544
	10	17.5	700
	3/16"	23.7	948
	1/4"	31.4	1256
14" x	12 ga.	15.9	636
	10	20.4	816
	3/16"	27.7	1108
	1/4"	36.7	1468
16" x	10 ga.	23.4	936
	3/16"	31.7	1268
	1/4"	42.1	1684

Larger diameters are available,
as well as a variety of end finishes and coatings.

RED BUD STRETCHER LEVELER WITH BRADBURY E-DRIVES

As the only Red Bud Stretcher leveler in the Pacific Northwest and Intermountain West, Pacific Steel and Recycling is dedicated to providing you truly flat sheet and plate. With capabilities from 16ga (.0598) to 1/2" (.500) thickness and 36" to 96" wide all on one machine, we stock a wide range of coil products to fit your needs. Pacific can provide custom lengths up to 600" with 1/8" tolerance to satisfy any project requirements.

How "level" is your material? How confident are you that your material will stay flat after punching, shearing, forming, laser or plasma cutting it? Just because material looks flat, does not mean it will stay that way. Due to trapped internal stresses, once material is cut, it can spring back. By using a stretch leveling process we exceed the yield point through the material top to bottom and side to side. This process produces flat material that is significantly more stable than any other product. Pacific Steel and Recycling will provide truly flat material, that stays flat. Custom lengths, custom lift sizes, and tight tolerances are part of our daily routine. Let us help you with your next project.

16ga – 1/2" Thickness

36 – 96" Width

600" Max Length

SHEETS

AISI Thickness Tolerance Ranges

Carbon Steel Sheets

Hot Rolled • H.R.P.&O. • Cold Rolled

Gage No.	Thickness, inches			lbs. per sq.ft.	Gage No.	Thickness, inches		lbs. per sq.ft.
	Dec. Equiv.	Tol. Range				Dec. Equiv.	Tol. Range	
		H.R.& P.O.	C.R.	Wt. Equiv.				C.R.
4	.2242	.2332 .2152		9.375	19	.0418	.0458 .0378	1.75
5	.2092	.2182 .2002		8.75	20	.0359	.0389 .0329	1.5
6	.1943	.2033 .1853		8.125	21	.0329	.0359 .0299	1.375
7	.1793	.1873 .1713	.1883 .1703	7.5	22	.0299	.0329 .0269	1.25
8	.1644	.1724 .1564	.1734 .1554	6.875	23	.0269	.0299 .0239	1.125
9	.1495	.1575 .1415	.1585 .1405	6.25	24	.0239	.0269 .0209	1.0
10	.1345	.1425 .1265	.1405 .1285	5.625	25	.0209	.0239 .0179	.875
11	.1196	.1276 .1116	.1256 .1136	5.0	26	.0179	.0199 .0159	.75
12	.1046	.1126 .0966	.1106 .0986	4.375	27	.0164	.0184 .0144	.688
13	.0897	.0967 .0827	.0947 .0847	3.75	28	.0149	.0169 .0129	.625
14	.0747	.0817 .0677	.0797 .0697	3.125	29	.0135	.0155 .0115	.562
15	.0673	.0733 .0613	.0723 .0623	2.812	30	.0120	.0130 .0110	.50
16	.0598	.0658 .0538	.0648 .0548	2.5				
17	.0538	.0598 .0478	.0548 .0498	2.25				
18	.0478	.0528 .0428	.0518 .0438	2.00				

Weight equivalents based on density of .2904 lb. per cubic inch

Cold rolled gages 4 through 10 tolerances shown for widths over 48" to 72" inclusive

Hot rolled P&O gages 4 through 18 - tolerances shown for widths over 40" to 48" inclusive

All other gages over 15" to 72" inclusive

SHEETS

AISI Thickness Tolerance Ranges

Galvanized Steel Sheets

Gage No.	Thickness, inches		lbs.per sq.ft.	Gage No.	Thickness, inches		lbs.per sq.ft.
	Dec. Equiv.	Tol. Range	Weight Equiv.		Dec. Equiv.	Tol. Range	Weight Equiv.
10	.1382	.1472 .1292	5.78125	21	.0366	.0406 .0326	1.53125
11	.1233	.1323 .1143	5.15625	22	.0336	.0376 .0296	1.40625
12	.1084	.1174 .0994	4.53125	23	.0306	.0346 .0266	1.28125
13	.0934	.1014 .0854	3.90625	24	.0276	.0316 .0236	1.15625
14	.0785	.0865 .0705	3.28125	25	.0247	.0287 .0207	1.03125
15	.0710	.0770 .0650	2.96875	26	.0217	.0247 .0187	.90625
16	.0635	.0695 .0575	2.65625	27	.0202	.0232 .0172	.84375
17	.0575	.0625 .0525	2.40625	28	.0187	.0217 .0157	.78125
18	.0516	.0566 .0466	2.15625	29	.0172	.0202 .0142	.71875
19	.0456	.0506 .0406	1.90625	30	.0157	.0187 .0127	.65625
20	.0396	.0436 .0356	1.65625				

Weight equivalents based on density of .2904 lb. per cubic inch
Cold rolled gages 4 through 10 tolerances shown for widths over 48" to 72" inclusive
Hot rolled P&O gages 4 through 18 - tolerances shown for widths over 40" to 48" inclusive
All other gages over 15" to 72" inclusive

SHEETS

Hot Rolled Sheets, A1011

A low cost commercial quality sheet having a maximum carbon of 0.15 percent. This material is intended for applications where bending, moderate forming or drawing, and welding may be involved.

Cold Rolled Sheets, A1008

A commercial quality sheet supplied in lighter gauges than available in hot rolled sheets. (lighter than 16 ga.). The additional mill processes result in a more controlled thickness, finish, and mechanical properties than hot rolled sheets. The matted finish proves an excellent base for painting operations.

Galvanized Sheets, ASTM A653

Commercial quality sheet is zinc coated in a continuous hot dipped process to produce a low cost corrosion resistant steel. The coating will not peel or flake in most forming operations. Standard coating weight is 690.

"Paint-Ready", Electrolytic Zinc-Coated Steel Sheets

Commercial quality sheets which have been electrolytically plated with zinc and other phosphate coating for better paint adherence. The coating will not peel or flake in most forming operations.

Hot Rolled Pickled & Oiled

is the same sheet steel product further processed through a continuous pickling line. The pickling solution is either sulfuric or hydrochloric acid at a concentration of approximately 15%. These acids remove the scale by attacking the steel surface below the scale. After pickling the steel in the same process line it is sprayed with special rust preventative oils. The surface appearance will vary from dull silver to a dark gray color. The surface roughness or profilometer reading will run 50 to 80 RMS.

HOT ROLLED SHEETS

Gauge	Width & Length	Est. Wt./ Sheet, Lbs.	Gauge	Width & Length	Est. Wt./ Sheet, Lbs.
16 ga. - (.0598") 2.5 lbs. per sq. ft.	48 x 96	80.00	12 ga.	60 x 144	262.50
	48 x 120	100.00		60 x 240	437.50
	48 x 144	120.00		72 x 120	262.50
	60 x 120	125.00		72 x 144	315.00
	60 x 144	150.00		72 x 240	525.00
14 ga. - (.0747") 3.125 lbs. per sq. ft.	48 x 96	100.00	11 ga. - (.1196") 5.0 lbs. per sq. ft.	48 x 96	160.00
	48 x 120	125.00		48 x 120	200.00
	48 x 144	150.00		48 x 240	400.00
	60 x 120	156.25		60 x 120	250.00
	60 x 144	187.50		60 x 144	300.00
	60 x 240	312.50		60 x 240	500.00
12 ga. - (.1046") 4.375 lbs. per sq. ft.	48 x 96	140.00		72 x 120	300.00
	48 x 120	175.00		72 x 240	600.00
	48 x 144	210.00	10 ga. - (.1345") 5.625 lbs. per sq. ft.	48 x 96	180.00
	48 x 240	350.00		48 x 120	225.00
	60 x 120	218.75		48 x 144	270.00
				60 x 120	281.25
				60 x 144	337.50

HOT ROLLED SHEETS, cont.

Gauge	Width & Length	Est. Wt./ Sheet, Lbs.	Gauge	Width & Length	Est. Wt./ Sheet, Lbs.
10 ga.	60 x 240	562.50	7 ga. - (.1793") 7.5 lbs. per sq. ft.		
	72 x 120	337.50			
	72 x 144	405.00		48 x 96	240.00
	72 x 240	675.00		48 x 120	300.00
				48 x 144	360.00
				48 x 240	600.00
				60 x 120	375.00
				60 x 144	450.00
				60 x 240	750.00
				72 x 120	450.00
				72 x 144	540.00
				72 x 240	900.00

COLD ROLLED SHEETS

Gauge	Lbs./Sq. Ft.	Width & Length	Est. Wt. Per Sheet
24 ga. (.0239")	1.00	48 x 120	40
22 ga. (.0299")	1.25	48 x 120	50
20 ga. (.0359")	1.50	48 x 120	60
18 ga. (.0478")	2.00	48 x 120	80

GALVANIZED SHEETS

Gauge	Lbs./Sq. Ft.	Width & Length	Est. Lbs./Sheet
30 ga.	.656	36 x 96	15.74
		36 x 120	19.69
28 ga.	.781	36 x 96	18.74
		36 x 120	23.43
		48 x 96	24.99
26 ga.	.906	36 x 96	21.74
		36 x 120	27.19
		48 x 96	28.99
		48 x 120	36.24
24 ga.	1.156	36 x 96	27.74
		36 x 120	34.68
		48 x 96	36.99
		48 x 120	46.24
22 ga.	1.406	36 x 96	33.74
		36 x 120	42.19
		48 x 96	44.99
		48 x 120	56.24
20 ga.	1.656	36 x 96	39.74
		36 x 120	49.68
		48 x 120	66.24
18 ga.	2.156	36 x 96	51.74
		48 x 96	68.99
		48 x 120	86.24
16 ga.	2.656	36 x 96	63.74
		48 x 96	84.99
		48 x 120	106.24
14 ga.	3.281	36 x 96	78.74
		48 x 96	104.99
		48 x 120	131.24
		48 x 144	157.49
12 ga.	4.531	48 x 96	144.99
		48 x 120	181.24
		48 x 144	217.49
		60 x 144	271.86
10 ga.	5.781	48 x 96	185.00
		48 x 120	231.24
		48 x 144	277.49
		60 x 144	346.86

PLATES

ASTM A-36

A structural quality carbon steel produced to a minimum yield of 36,000 psi. Used for general construction purposes, and provides good weldability.

A 572

Specification A572 defines six grades of high-strength low-alloy steel having specified minimum yield points of 42,000, 45,000, 50,000, 60,000, and 65,000 psi. Grades 42, 45, and 50 are intended for riveted, bolted or welded construction of bridges, buildings, and other structures.

ASTM A-514 (T-1 type)

A structural quality alloy steel which has been heat treated by conventional liquid quenching and tempering to a high strength. The high strength permits reduction in gross design weight because smaller cross sections can be specified.

Abrasion-Resistant AR -Available Formable

Intended for applications where the contact of a material causes wear on the surface of another material. Abrasionresistant steels are not intended for structural applications. The high hardness of this steel causes it to be brittle, and fractures can occur in structural applications.

Stock In
AR 400
AR 500

Brinell Hardness
360 min
485 min

Floor Plate (Deck Plate) A786

A steel plate rolled with a raised lug pattern to provide sure footing and positive traction in every direction. The pattern permits easy cleaning with water or brooms. Good weldability.

PRESSURE VESSEL QUALITY PLATES

ASTM A285-Grade C (Intermediate Tensile)

ASTM A515-Grade 70 (High Temperature)

ASTM A516-Grade 70 (Low Temperature)

Specifications: Carbon steel plate to conform to the above ASTM specifications and the corresponding ASME specifications. This steel meets the requirements of the Hartford Steam Boiler Inspection and Insurance Co.

PLATES

HIGH STRENGTH LOW ALLOY SHEETS & PLATE (50,000# Minimum Yield - Copper Bearing)

Specifications: The listed steels are an open hearth low alloy steel to ASTM Specs. A-588-Grade A, ASTM A-572 Grade 50 and ASTM A-441. Our flexible buying policy normally enables us to supply any trade name or its ASTM equivalent specification. Our A-572 Grade 50 is ordered with a tested charpy V-notch at -50°F for low temperature applications.

Chemical Analysis:

	A-588-Gr A	A-572-Gr 50	A-441	Cor-Ten	Tri-Ten
Carbon	.10/.19	.23 Max.	.22 Max.	.12 Max.	.22 Max.
Manganese	.90/1.25	1.35 Max	.85/1.25	.20/.50	1.25 Max.
Phosphorus	.04 Max.	.04 Max.	.04 Max.	.07/.15	.04 Max.
Sulphur	.05 Max.	.05 Max.	.05 Max.	.05 Max.	.05 Max.
Silicon	.15/.30	.40 Max.	.30 Max.	.25/.75	.30 Max.
Nickel	—	—	—	.65 Max.	—
Chromium	.40/.65	—	—	.30/1.25	—
Molybdenum	—	—	—	—	—
Vanadium	.02/.10	0.01–0.15	.02 Min.	—	.02 Min.
Copper	.25/.40	.20 Min.	.20 Min.	.25/.55	.20 Min.
Boron	—	—	—	—	—
Titanium	—	—	—	—	—

*Copper must be a minimum of 0.20% but only when specified as part of the ASTM A-572-Gr. 50 specification.

Mechanical Properties: (Average Range)

Type	Tensile Strength P.S.I.	Yield Point P.S.I.	Elongation in 8"
A36	58,000 Min.	36,000 Min.	20% Min.
A588-Gr A/Cor-Ten	70,000 Min.	50,000 Min.	18% Min.
572-Gr 50	65,000 Min.	50,000 Min.	18% Min.
A441	70,000 Min.	50,000 Min.	18% Min.
Tri-Ten.	70,000 Min.	50,000 Min.	18% Min.

The above chemical and physical specifications are average specs, and may vary at different times with any producer according to a particular application.

PLATES

Stock Lengths - 96", 120", 144", 240"

(Subject to Plate Thickness and Width)

We can shear or burn plate to your requirements.

Thickness	Width in Inches	Weight Per Sq. Ft.	Weight Per Ft., Lbs.
$\frac{3}{16}$ "	x 48"	7.65	30.6
	x 60"		38.3
	x 72"		45.9
	x 84"		53.6
	x 96"		61.2
$\frac{1}{4}$ "	x 48"	10.21	40.8
	x 60"		51.0
	x 72"		61.3
	x 84"		71.5
	x 96"		81.7
$\frac{5}{16}$ "	x 48"	12.75	51.0
	x 60"		63.8
	x 72"		76.5
	x 96"		102.0
$\frac{3}{8}$ "	x 48"	15.31	61.2
	x 60"		76.6
	x 72"		91.9
	x 84"		107.2
	x 96"		122.5
$\frac{7}{16}$ "	x 48"	17.9	71.6
	x 96"		143.2
$\frac{1}{2}$ "	x 48"	20.42	81.7
	x 60"		102.1
	x 72"		122.5
	x 84"		142.9
	x 96"		163.4
$\frac{9}{16}$ "	x 48"	23.0	92.0
	x 96"		184.0
$\frac{5}{8}$ "	x 48"	25.52	102.1
	x 60"		127.6
	x 72"		153.1
	x 96"		204.2
$\frac{3}{4}$ "	x 48"	30.63	122.5
	x 60"		153.2
	x 72"		183.8
	x 84"		214.4
	x 96"		245.0
$\frac{7}{8}$ "	x 48"	35.73	142.9
	x 96"		285.8

PLATES

Stock Lengths - 96", 120", 144", 240"
 (Subject to Plate Thickness and Width)
 We can shear or burn plate to your requirements.

Thickness	Width in Inches	Weight Per Sq. Ft.	Weight Per Ft., Lbs.
1"	x 48"	40.84	163.2
	x 60"		204.2
	x 72"		245.0
	x 84"		285.9
	x 96"		326.7
1 1/8"	x 96"	45.94	367.5
1 1/4"	x 48"	51.05	204.2
	x 96"		408.4
1 3/8"	x 96"	56.15	449.2
1 1/2"	x 48"	61.26	245.0
	x 60"		306.3
	x 72"		367.6
	x 96"		490.1
1 5/8 "	x 96"	66.4	531.2
1 3/4"	x 96"	71.5	572.0
2"	x 48"	81.68	326.7
	x 60"		408.4
	x 72"		490.1
	x 96"		653.4
2 1/4"		91.9	
2 1/2"		102.1	
2 3/4"		112.31	
3"		122.52	
3 1/4"		132.72	
3 1/2"		142.93	
3 3/4"		153.14	
4"		163.35	
4 1/2"		183.8	
5"		204.19	
6"		245.03	

FLOOR/DECK PLATES

Stock Lengths - 96", 120", 144", 240"

(Subject to Plate Thickness and Width)

We can shear or burn floor plate to your requirements.

Thickness	Width in Inches	Weight Per Sq. Ft.	Weight Per Ft., Lbs.
16 ga.	x 48"	3.00	12.00
14 ga.	x 48"	3.75	15.00
	x 60"		18.75
12 ga.	x 48"	5.25	21.00
	x 60"		26.25
1/8"	x 48"	6.15	24.60
	x 60"		30.75
	x 72"		36.96
3/16"	x 48"	8.70	34.80
	x 60"		43.50
	x 72"		52.20
	x 96"		69.60
1/4"	x 48"	11.25	45.00
	x 60"		56.25
	x 72"		67.50
	x 96"		90.00
5/16"	x 48"	13.80	55.20
	x 60"		69.00
	x 72"		82.80
3/8"	x 48"	16.35	65.40
	x 60"		81.75
	x 72"		98.10
	x 96"		130.80
1/2"	x 48"	21.45	85.80
	x 60"		107.25
	x 72"		128.70
	x 96"		171.60

Plate Processing Services:

- Shearing
- Flame cutting
- Forming
- Punching
- Rolling

STANDARD CHANNEL

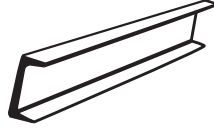
(Stock Lengths - 20' and/or 40')



Designation:	Depth/Inches x Wt./Ft.	Depth in Inches	Flange Width	Web Thickness in Inches
C 3 x	4.1	3	1.410	.170
	5.0	3	1.498	.258
	6.0	3	1.584	.356
C 4 x	5.4	4	1.584	.184
	6.25	4	1.647	.247
	7.25	4	1.721	.321
C 5 x	6.7	5	1.750	.190
	9.0	5	1.885	.325
C 6 x	8.2	6	1.920	.200
	10.5	6	2.034	.314
	13.0	6	2.157	.437
C 7 x	9.8	7	2.090	.210
	12.25	7	2.194	.314
C 8 x	11.5	8	2.260	.220
	13.75	8	2.343	.303
	18.75	8	2.527	.487
C 9 x	13.4	9	2.433	.233
	15.0	9	2.485	.285
C 10 x	15.3	10	2.600	.240
	20.0	10	2.739	.379
	25.0	10	2.886	.526
	30.0	10	3.033	.673
C 12 x	20.7	12	2.942	.282
	25.0	12	3.047	.387
	30.0	12	3.170	.510
C 15 x	33.9	15	3.400	.400
	40.0	15	3.520	.520
	50.0	15	3.176	.716

BAR CHANNELS

(Stock Lengths - 20')



Size* in Inches	Wt. Per Ft. (Lbs.)	Est. Wt. 20' Bar	Size* in Inches	Wt. Per Ft. (Lbs.)	Est. Wt. 20' Bar
$\frac{3}{4}$ X $\frac{3}{8}$ X $\frac{1}{8}$	.56	11.20	2 X $\frac{1}{2}$ X $\frac{1}{8}$	1.43	28.60
1 X $\frac{3}{8}$ X $\frac{1}{8}$	.68	13.60	2 X $\frac{9}{16}$ X $\frac{3}{16}$	1.86	37.20
1 X $\frac{1}{2}$ X $\frac{1}{8}$	.82	16.40	2 X $\frac{5}{8}$ X $\frac{1}{4}$	2.28	45.60
$1\frac{1}{4}$ X $\frac{1}{2}$ X $\frac{1}{8}$	1.01	20.20	2 X 1 X $\frac{1}{8}$	1.59	31.80
$1\frac{1}{2}$ X $\frac{1}{2}$ X $\frac{1}{8}$	1.12	22.40	2 X 1 X $\frac{3}{16}$	2.32	46.40
$1\frac{1}{2}$ X $\frac{9}{16}$ X $\frac{3}{16}$	1.44	28.80	$2\frac{1}{2}$ X $\frac{5}{8}$ X $\frac{3}{16}$	2.27	45.40

*1st number refers to depth; 2nd number, flange width; 3rd number, web thickness. Not all sizes are stock items. Please inquire.

JUNIOR CHANNELS

Designation: Depth/Inches x Wt./Ft.	Depth in Inches	Flange Width	Average Thickness	Web Thickness in Inch
MC 8 x 8.5	8	1.874	.311	.179
MC 10 x 6.5	10	1.127	.202	.152
8.4	10	1.500	.280	.170
MC 12 x 10.6	12	1.500	.309	.190

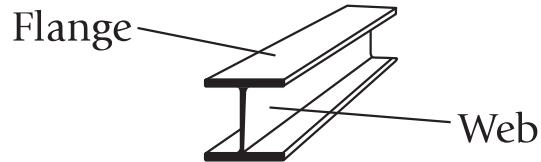
SHIP AND CAR CHANNELS

(Stock Lengths - 20' and/or 40')

Designation: Depth/Inches x Wt./Ft.	Depth in Inches	Flange Width	Average Thickness	Web Thickness in Inch
MC 3 x 7.1	3	1.938	.351	.312
9.0	3	2.122	.351	.497
MC 4 x 13.8	4	2.500	.500	.500
MC 6 x 12.0	6	2.497	.351	.310
15.1	6	2.941	.475	.316
15.3	6	3.500	.385	.340
16.3	6	3.000	.475	.375
18.0	6	3.504	.475	.379
MC 7 x 19.1	7	3.452	.500	.352
22.7	7	3.603	.500	.503
MC 8 x 18.7	8	2.978	.500	.353
21.4	8	3.450	.525	.375
22.8	8	3.502	.525	.427
MC 9 x 23.9	9	3.450	.550	.400
25.4	9	3.500	.550	.450
MC 10 x 21.9	10	3.450	.500	.325
25.3	10	3.550	.500	.425
28.5	10	3.950	.575	.425
33.6	10	4.100	.575	.575
MC 12 x 30.9	12	3.450	.600	.450
35	12	3.767	.700	.467
40	12	3.890	.700	.590
50	12	4.135	.700	.835
MC 13 x 31.8	13	4.000	.610	.375
40	13	4.185	.610	.560
50	13	4.412	.610	.787
MC 18 x 42.7	18	3.950	.625	.450
45.8	18	4.000	.625	.500
51.9	18	4.100	.625	.600
58	18	4.200	.625	.700

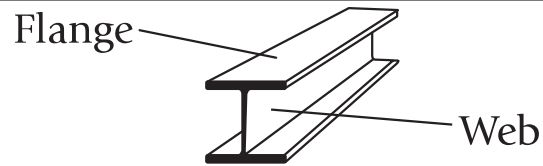
Let us cut the size you need.

WIDE FLANGE BEAMS (W BEAMS)



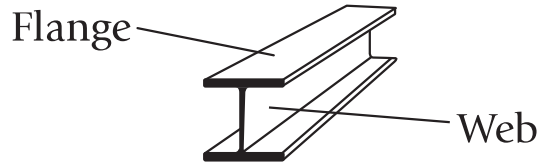
Designation Nom. Depth/In. x Wt./Ft.		Depth in Inches	Flange in Inches		Web Thickness in Inches
			Width	Thickness	
W	4 x 13	4.16	4.060	.345	.280
W	5 x 16	5.01	5.000	.360	.240
	19	5.15	5.030	.430	.270
W	6 x 9	5.90	3.940	.215	.170
	12	6.03	4.000	.280	.230
	15	5.99	5.990	.260	.230
	16	6.28	4.030	.405	.260
	20	6.20	6.020	.365	.260
	25	6.38	6.080	.455	.320
W	8 x 10	7.89	3.940	.205	.170
	13	7.99	4.000	.255	.230
	15	8.11	4.015	.315	.245
	18	8.14	5.250	.330	.230
	21	8.28	5.270	.400	.250
	24	7.93	6.495	.400	.245
	28	8.06	6.535	.465	.285
	31	8.00	7.995	.435	.285
	35	8.12	8.020	.495	.310
	40	8.25	8.070	.560	.360
	48	8.50	8.110	.685	.400
	58	8.75	8.220	.810	.510
	67	9.00	8.280	.935	.570
W	10 x 12	9.87	3.960	.210	.190
	15	9.99	4.000	.270	.230
	17	10.11	4.010	.330	.240
	19	10.24	4.020	.395	.250
	22	10.17	5.750	.360	.240
	26	10.33	5.770	.440	.260
	30	10.47	5.810	.510	.300
	33	9.73	7.960	.435	.290
	39	9.92	7.985	.530	.315
	45	10.10	8.020	.620	.350
	49	9.98	10.000	.560	.340
	54	10.09	10.030	.615	.370
	60	10.22	10.080	.680	.420
	68	10.40	10.130	.770	.470
	77	10.60	10.190	.870	.530
	88	10.84	10.265	.990	.605
	100	11.10	10.340	1.120	.680
	112	11.36	10.415	1.250	.755

WIDE FLANGE BEAMS (W BEAMS), cont.



Designation Nom. Depth/In. x Wt./Ft.	Depth in Inches	Flange in Inches		Web Thickness in Inches
		Width	Thickness	
W 12 x 14	11.91	3.970	.225	.200
16	11.99	3.990	.265	.220
19	12.16	4.005	.350	.235
22	12.31	4.030	.425	.260
26	12.22	6.490	.380	.230
30	12.34	6.520	.440	.260
35	12.50	6.560	.520	.300
40	11.94	8.005	.515	.295
45	12.06	8.045	.575	.335
50	12.19	8.080	.640	.370
53	12.06	9.995	.575	.345
58	12.19	10.010	.640	.360
65	12.12	12.000	.605	.390
72	12.25	12.040	.670	.430
79	12.38	12.080	.735	.470
87	12.53	12.125	.810	.515
96	12.71	12.160	.900	.550
106	12.89	12.220	.990	.610
120	13.12	12.320	1.105	.710
136	13.41	12.400	1.250	.790
W 14 x 22	13.74	5.000	.335	.230
26	13.91	5.025	.420	.255
30	13.84	6.730	.385	.270
34	13.98	6.745	.455	.285
38	14.10	6.770	.515	.310
43	13.66	7.995	.530	.305
48	13.79	8.030	.595	.340
53	13.92	8.060	.660	.370
61	13.89	9.995	.645	.375
68	14.04	10.035	.720	.415
74	14.17	10.070	.785	.450
82	14.31	10.130	.855	.510
90	14.02	14.520	.710	.440
99	14.16	14.565	.780	.485
109	14.32	14.605	.860	.525
W 16 x 26	15.69	5.500	.345	.250
31	15.88	5.525	.440	.275
36	15.86	6.985	.430	.295
40	16.01	6.995	.505	.305
45	16.13	7.035	.565	.345
50	16.26	7.070	.630	.380
57	16.43	7.120	.715	.430

WIDE FLANGE BEAMS (W BEAMS), cont.



Designation Nom. Depth/In. x Wt./Ft.	Depth in Inches	Flange in Inches		Web Thickness in Inches
		Width	Thickness	
W 16 x 67	16.33	10.235	.665	.395
77	16.52	10.295	.760	.455
89	16.75	10.365	.875	.525
100	16.97	10.425	.985	.585
W 18 x 35	17.70	6.000	.425	.300
40	17.90	6.015	.525	.315
46	18.06	6.060	.605	.360
50	17.99	7.495	.570	.355
55	18.11	7.530	.630	.390
60	18.24	7.555	.695	.415
65	18.35	7.590	.750	.450
71	18.47	7.635	.810	.495
76	18.21	11.035	.680	.425
86	18.39	11.090	.770	.480
97	18.59	11.145	.870	.535
106	18.73	11.200	.940	.590
119	18.97	11.265	1.060	.655
W 21 x 44	20.66	6.500	.450	.350
50	20.83	6.530	.535	.380
57	21.06	6.555	.650	.405
62	20.99	8.240	.615	.400
68	21.13	8.270	.685	.430
73	21.24	8.295	.740	.455
83	21.43	8.355	.835	.515
101	21.36	12.290	.800	.500
111	21.51	12.340	.875	.550
132	21.83	12.440	1.035	.650
147	22.06	12.510	1.150	.720
W 24 x 55	23.57	7.005	.505	.395
62	23.74	7.040	.590	.430
68	23.73	8.965	.585	.415
76	23.92	8.990	.680	.440
84	24.10	9.020	.770	.470
94	24.31	9.065	.875	.515
104	24.06	12.750	.750	.500
117	24.26	12.800	.850	.550
131	24.48	12.855	.960	.605
146	24.74	12.900	1.090	.650

I BEAMS (S BEAMS)



Designation	Nom. Depth/In. x Wt./Ft.	Depth in Inches	Flange in Inches		Web Thickness in Inches
			Width	Thickness	
S 3 x	5.7	3	2.330	.260	.170
	7.5	3	2.509	.260	.349
S 4 x	7.7	4	2.663	.293	.193
	9.5	4	2.796	.293	.326
S 5 x	10	5	3.004	.326	.214
	14.75	5	3.284	.326	.434
S 6 x	12.5	6	3.332	.359	.232
	17.25	6	3.565	.359	.465
S 7 x	15.3	7	3.662	.392	.252
	20	7	3.860	.392	.450
S 8 x	18.4	8	4.001	.425	.271
	23	8	4.171	.425	.441
S 10 x	25.4	10	4.661	.491	.311
	35	10	4.994	.491	.594
S 12 x	31.8	12	5.000	.544	.350
	35	12	5.080	.544	.428
	40.8	12	5.252	.659	.472
	50	12	5.477	.659	.687
S 15 x	42.9	15	5.501	.622	.411
	50	15	5.640	.622	.550
S 18 x	54.7	18	6.001	.691	.461
	70	18	6.251	.691	.711
S 20 x	66	20	6.255	.795	.505
	75	20	6.385	.795	.635
S 24 x	80	24	7.000	.870	.500
	90	24	7.125	.870	.625
	100	24	7.245	.870	.747
	106	24.50	7.870	1.090	.620
	121	24.50	8.050	1.090	.800

M BEAMS (JR., H, OR LIGHT BEAMS)

Designation Nom. Depth/In. x Wt./Ft.	Formerly Called	Depth in Inches	Flange in Inches		Web Thickness in Inches
			Width	Thickness	
M 4 x 13	H Beam	4.00	3.940	.371	.254
M 5 x 18.9	H Beam	5.00	5.003	.416	.316
M 6 x 4.4	Jr. Beam	6.00	1.844	.171	.114
20.0	H Beam	6.00	5.938	.379	.250
25.0	H Beam	6.00	5.938	.480	.313
M 8 x 6.5	Jr. Beam	8.00	2.281	.189	.135
M 10 x 9.0	Jr. Beam	10.00	2.690	.206	.157

REINFORCING BARS (REBAR)

Available in ASTM A615 Grade 40 and Grade 60.

	<u>Grade 40</u>	<u>Grade 60</u>
Tensile Strength (PSI)	70,000 min.	90,000 min.
Yield Strength (PSI)	40,000 min.	60,000 min.

Bar Size Description	Metric Sizes	Weight Lbs./Ft.	Diameter in Inches
#3	10	.376	.375
#4	13	.668	.500
#5	16	1.043	.625
#6	19	1.502	.750
#7	22	2.044	.875
#8	25	2.670	1.000
#9	29	3.400	1.128
#10	32	4.303	1.270
#11	36	5.313	1.410
#14	43	7.65	1.693
#18	57	13.600	2.257

Rebar forming available at some locations.

WELDED REINFORCED MESH (REMESH)

Conforms to ASTM A-185

Wire fabric is made from cold drawn steel wires welded at every intersection for maximum strength and rigidity. It is furnished in rolls in the various gauges and spacings shown in the tables below. Other spacings and gauges are furnished for special requirements. The minimum tensile strength is 75,000 psi for two way reinforcement.

Common Stock Styles of Welded Wire Fabric

Style Designation		Steel Area		Weight
New Designation	Old Designation	Sq. In. Per Ft.		Approx. Lbs.
(By W-Number)	(By Steel Wire Gauge)	Longit.	Trans.	Per 100 Sq. Ft.

Rolls

6x6-W1.4xW1.4	6x6-10x10	.028	.028	21
6x6-W2.0xW2.0	6x6-8x8*	.040	.040	29
6x6-W2.9xW2.9	6x6-6x6	.058	.058	42
4x4-W1.4xW1.4	4x4-10x10	.042	.042	31
4x4-W2.0xW2.0	4x4-8x8*	.060	.060	43
4x4-W2.9xW2.9	4x4-6x6	.087	.087	62
4x4-W4.0xW4.0	4x4-4x4	.120	.120	85

Sheets

6x6-W1.4xW1.4	6x6-10x10	.028	.028	21
6x6-W2.9xW2.9	6x6-6x6	.058	.058	42
6x6-W4.0xW4.0	6x6-4x4	.080	.080	58
6x6-W5.5xW5.5	6x6-2x2†	.110	.110	80
4x4-W4.0xW4.0	4x4-4x4	.120	.120	85

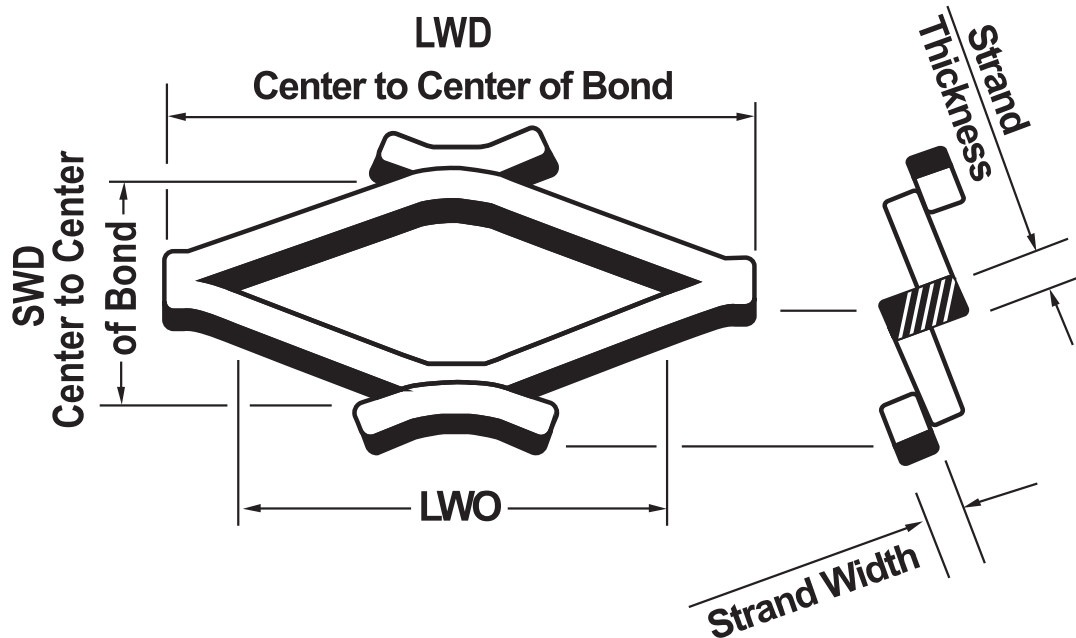
* Exact W-number size for 8 gauge is W2.1.

† Exact W-number size for 2 gauge is W5.4.

We also stock anchorbolts, tie wire
and form ties at some locations.

EXPANDED METAL

Expanded metal is a sheet metal that has been slit and expanded to form a diamond shape pattern. While the sheet may be expanded up to ten times its original width and lose up to 80% of its weight, the expanded metal sheet is stronger and more rigid than the original sheet. Expanded metal is available in a regular (raised) pattern, and a flattened pattern. This material is suitable for a vast number of applications where protection, reinforcement, greater strength with less weight, free passage of air and light, and a decorative or ornamental effect are required. Stocked in carbon steel; also available in aluminum, stainless steel and galvanized.



Standard (Raised)



Flattened



Stock sizes - 48" x 96"

Other widths and lengths are available; please inquire.

STANDARD (RAISED) EXPANDED METAL

* Style Designation	Width & Length (Inches)	Thickness of Strand (Inches)	Lbs. Per Sq. Ft.	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	48 x 96	.036	.43	13.76
1/2" - #18	48 x 96	.048	.70	22.40
1/2" - #16	48 x 96	.060	.86	27.52
1/2" - #13	48 x 96	.092	1.47	47.04
3/4" - #16	48 x 96	.060	.54	17.28
3/4" - #13	48 x 96	.092	.80	25.60
3/4" - #9	48 x 96	.135	1.80	57.60
1 1/2 - #13	48 x 96	.092	.60	19.20
1 1/2 - #9	48 x 96	.135	1.20	38.40
1 1/2 - #6	48 x 96	.198	2.50	80.00

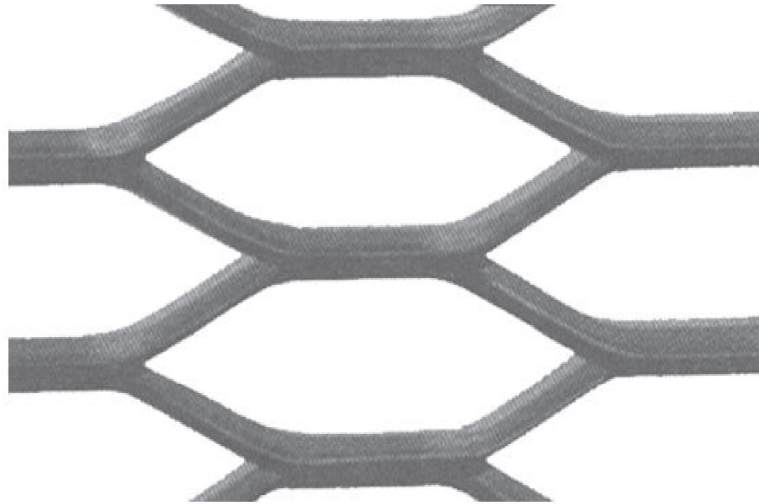
FLATTENED EXPANDED METAL

* Style Designation	Width & Length (Inches)	Thickness of Strand (Inches)	Lbs. Per Sq. Ft.	Lbs. Per Sheet
1/4" - #20	48 x 96	.030	.82	26.24
1/4" - #18	48 x 96	.040	1.08	34.56
1/2" - #20	48 x 96	.029	.40	12.80
1/2" - #18	48 x 96	.039	.66	21.12
1/2" - #16	48 x 96	.050	.82	26.24
1/2" - #13	48 x 96	.070	1.40	44.80
3/4" - #16	48 x 96	.048	.51	16.32
3/4" - #13	48 x 96	.070	.75	24.00
3/4" - #9	48 x 96	.120	1.71	54.72
1 1/2 - #13	48 x 96	.070	.57	18.24
1 1/2 - #9	48 x 96	.110	1.14	36.48

EXPANDED METAL GRATING

Grate-X grating is a heavy-duty expanded metal produced from carbon steel sheet and plate. It is structurally stronger than the original plate, yet lightweight. Grate-X is an excellent slip-resistant, low-cost, open flooring.

Expanded metal grating is available in two patterns: grated with the diamonds running the length of the sheet, and walkway (catwalk) with the diamonds running the width of the sheet.



Stock sizes - 48" x 96"

Other widths and lengths are available. Please inquire.

GRATING CHART

* Style Designation (Lbs. Per Sq. Ft.)	Width & Length (Inches)	Thickness of Strand (Inches)	Lbs. Per Sq. Ft.	Lbs. Per Sheet
3.0 lb.	48 x 96	.183	3.0	96.00
3.14 lb.	48 x 96	.250	3.14	100.48
4.0 lb.	48 x 96	.215	4.0	128.00
4.27 lb.	48 x 96	.250	4.27	136.64
5.0 lb.	48 x 96	.250	5.0	160.00
6.25 lb.	48 x 96	.312	6.25	200.00
7.0 lb.	48 x 96	.312	7.0	224.00

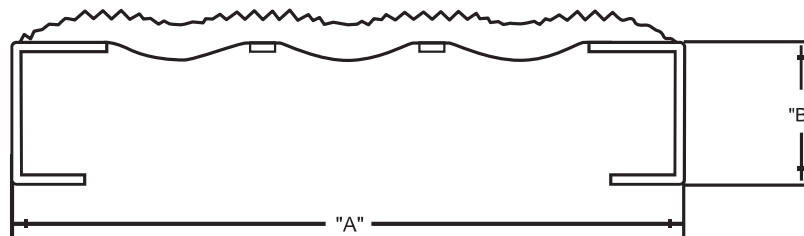
Metal Lathe

		Lbs. Per Sq. Yard	
2.5 lb.	27 x 96	2.5	5
1.75 lb.	27 x 96	1.75	3.5

SAFETY GRATING



- Multi-directional slip resistance
- Meets federal specifications for slip resistance
- Slip resistance listed by Underwriters' Lab., Inc.
- One-piece construction
- Rugged durability
- Unique resilient surface
- Variety of metals and sizes
- Light weight
- High strength-to-weight ratio
- Self framing
- Long span
- Minimum deflection
- Simple and economical installation
- Easy maintenance



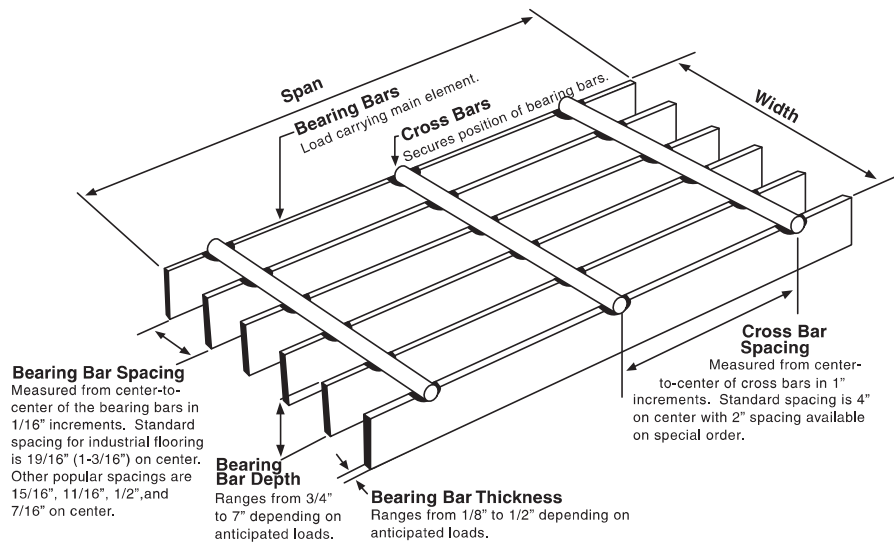
Common Sizes

Product Width (A)	Gauge	Side Channel Depth (B)
4 3/4"	12 ga	1 1/2", 2", 2 1/2"
	14 ga	1 1/2", 2", 2 1/2"
7"	12 ga	1 1/2", 2", 2 1/2", 3"
	14 ga	1 1/2", 2", 2 1/2"
9 1/2"	12 ga	1 1/2", 2", 2 1/2", 3"
	14 ga	1 1/2", 2", 2 1/2"
11 3/4"	12 ga	1 1/2", 2", 2 1/2", 3"
	14 ga	1 1/2", 2", 2 1/2"
18 3/4"	12 ga	1 1/2", 2", 2 1/2", 3"
	14 ga	1 1/2", 2", 2 1/2"
24"	12 ga	2", 3"
	14 ga	2", 3"
	14 ga	2", 3"

Standard Lengths - 10' & 12'

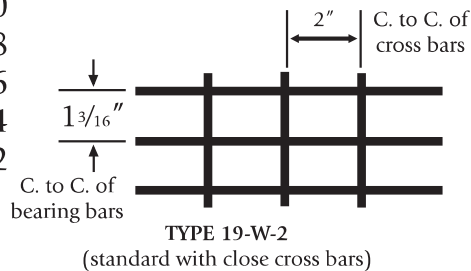
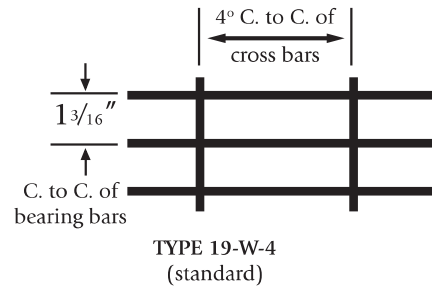
Available Options: HRP&O Steel, Galvanized, Aluminum and Stainless
Other Sizes and Options Available

BAR GRATING



Weight in Pound Per Sq. Ft.

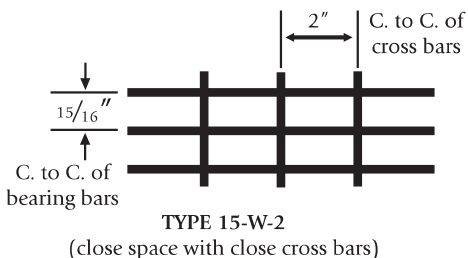
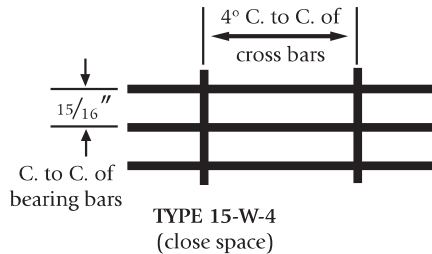
Bearing Bars	Cross Bars	Type 19-W-4	Type 19-W-2
3/4 X 1/8	1/4	3.99	4.63
3/4 X 3/16	1/4	5.67	6.31
* 1 X 1/8	1/4	5.15	5.79
* 1 X 3/16	1/4	7.35	7.99
* 1 1/4 X 1/8	1/4	6.20	6.84
* 1 1/4 X 3/16	1/4	9.03	9.67
* 1 1/2 X 1/8	1/4	7.35	7.99
* 1 1/2 X 3/16	5/16	10.94	11.80
1 3/4 X 3/16	5/16	12.62	13.48
2 X 3/16	5/16	14.30	15.16
2 1/4 X 3/16	5/16	15.87	16.74
2 1/2 X 3/16	5/16	17.55	18.42



*Common Sizes

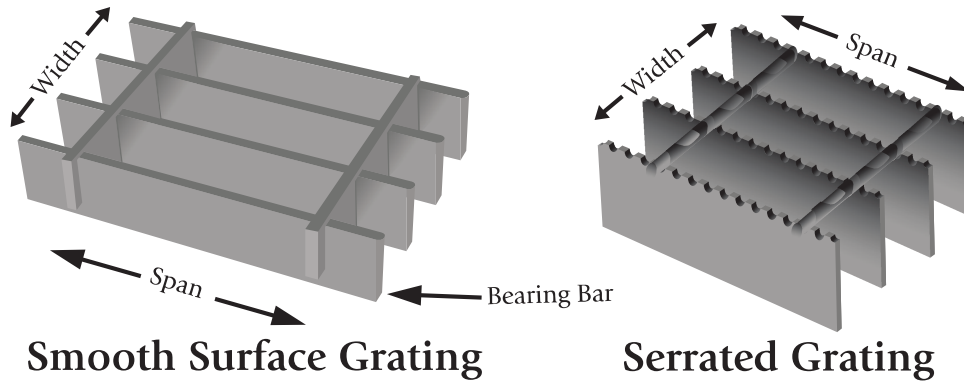
Weight in Pound Per Sq. Ft.

Bearing Bars	Cross Bars	Type 15-W-4	Type 15-W-2
3/4 X 1/8	1/4	4.95	5.59
3/4 X 3/16	1/4	7.11	7.75
1 X 1/8	1/4	6.44	7.08
1 X 3/16	1/4	9.27	9.91
1 1/4 X 1/8	1/4	7.79	8.43
1 1/4 X 3/16	1/4	11.43	12.07
1 1/2 X 1/8	1/4	9.27	9.91
1 1/2 X 3/16	5/16	13.82	14.68
1 3/4 X 3/16	5/16	15.98	16.84
2 X 3/16	5/16	18.14	19.00
2 1/4 X 3/16	5/16	20.16	21.03
2 1/2 X 3/16	5/16	22.32	23.19



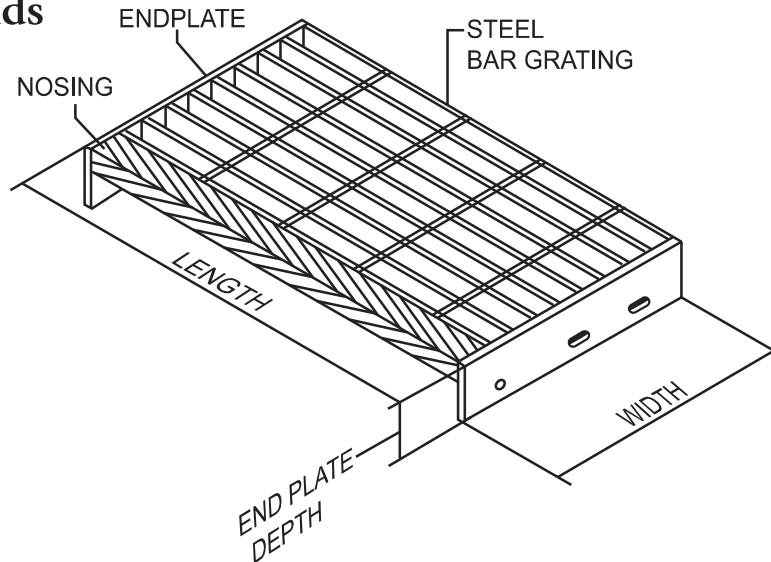
BAR GRATING

Conforms to specifications RR-G-661 and MIL-G-1958



Grating available in carbon steel, aluminum, stainless & fiberglass

Stair Treads



Stair treads are available in many of the grating materials available from Pacific Steel. Some types and sizes are in stock, while others can be quickly fabricated to order.

When ordering grating, specify:

1. Type of grating
2. Size of bearing bars (depth & width)
3. Span (direction of bearing bars)
4. Dimensions of area
5. Painted or galvanized, smooth or serrated.

When ordering stair treads, also specify:

1. Width & length
2. Type of nosing (checker plate or cast abrasive).

ALUMINUM PRODUCTS

The following size and weight charts are for some of our more popular items. Please check with your local service center for size and alloy availability.

Flat 6061

Size	Wt./Ft.	Size	Wt./Ft.
1/8 x 3/4	0.110	1/2 x 3/4	0.441
1/8 x 1	0.147	1/2 x 1	0.587
1/8 x 1 1/4	0.184	1/2 x 1 1/4	0.734
1/8 x 1 1/2	0.220	1/2 x 1 1/2	0.881
1/8 x 2	0.294	1/2 x 1 3/4	1.030
1/8 x 3	0.441	1/2 x 2	1.170
1/8 x 4	0.587	1/2 x 2 1/2	1.470
3/16 x 3/4	0.165	1/2 x 3	1.760
3/16 x 1	0.220	1/2 x 4	2.350
3/16 x 1 1/4	0.275	1/2 x 6	3.520
3/16 x 1 1/2	0.330	1/2 x 8	4.700
3/16 x 2	0.441	5/8 x 1	0.734
3/16 x 2 1/2	0.551	5/8 x 1 1/2	1.100
3/16 x 3	0.661	5/8 x 2	1.470
1/4 x 1/2	0.147	3/4 x 1	0.881
1/4 x 3/4	0.220	3/4 x 1 1/2	1.100
1/4 x 1	0.294	3/4 x 2	1.760
1/4 x 1 1/4	0.367	3/4 x 2 1/2	2.200
1/4 x 1 1/2	0.441	3/4 x 3	2.640
1/4 x 1 3/4	0.514	3/4 x 4	3.520
1/4 x 2	0.587	3/4 x 6	5.290
1/4 x 2 1/2	0.734	3/4 x 8	7.040
1/4 x 3	0.881	1 x 1 1/4	1.470
1/4 x 4	1.170	1 x 1 1/2	1.760
1/4 x 6	1.760	1 x 2	2.350
3/8 x 1/2	0.220	1 x 2 1/2	2.940
3/8 x 3/4	0.330	1 x 3	3.520
3/8 x 1	0.441	1 x 4	4.700
3/8 x 1 1/4	0.551	1 x 6	7.050
3/8 x 1 1/2	0.661	1 x 8	9.400
3/8 x 1 3/4	0.771		
3/8 x 2	0.881		
3/8 x 2 1/2	1.100		
3/8 x 3	1.320		
3/8 x 4	1.760		
3/8 x 6	2.640		

ALUMINUM PRODUCTS

Channel 6061

Size	Wt./Ft.
1" x 1/2" x 1/8"	0.263
2" x 1" x 1/8"	0.563
2" x .130	1.07
3" x .170	1.42
4" x .180	1.85
5" x .190	2.32
6" x .200	2.83

Diamond Tread 3003

Size	Wt./Sq. Ft.
0.040	0.64
0.050	0.8
0.063	1.008
0.08	1.28
0.100	1.6
0.125	2
0.188	3
0.250	3.9

ALUMINUM PRODUCTS

Angle 6061

Size	Wt./Ft.
$\frac{3}{4}$ x $\frac{3}{4}$ x $\frac{1}{8}$	0.2
1 x 1 x $\frac{1}{8}$	0.28
1 x 1 x $\frac{3}{16}$	0.4
1 x 1 x $\frac{1}{4}$	0.51
$1\frac{1}{4}$ x $1\frac{1}{4}$ x $\frac{1}{8}$	0.34
$1\frac{1}{4}$ x $1\frac{1}{4}$ x $\frac{3}{16}$	0.51
$1\frac{1}{4}$ x $1\frac{1}{4}$ x $\frac{1}{4}$	0.66
$1\frac{1}{2}$ x $1\frac{1}{2}$ x $\frac{1}{8}$	0.42
$1\frac{1}{2}$ x $1\frac{1}{2}$ x $\frac{3}{16}$	0.62
$1\frac{1}{2}$ x $1\frac{1}{2}$ x $\frac{1}{4}$	0.81
2 x 2 x $\frac{1}{8}$	0.58
2 x 2 x $\frac{3}{16}$	0.85
2 x 2 x $\frac{1}{4}$	1.11
$2\frac{1}{2}$ x $2\frac{1}{2}$ x $\frac{3}{16}$	1.07
$2\frac{1}{2}$ x $2\frac{1}{2}$ x $\frac{1}{4}$	1.4
3 x 2 x $\frac{1}{4}$	1.4
3 x 3 x $\frac{3}{16}$	1.28
3 x 3 x $\frac{1}{4}$	1.68
4 x 4 x $\frac{1}{4}$	2.28

Rounds 6061

Size	Wt./Ft.
$\frac{1}{4}$	0.058
$\frac{5}{16}$	0.09
$\frac{3}{8}$	0.13
$\frac{7}{16}$	0.177
$\frac{1}{2}$	0.231
$\frac{5}{8}$	0.36
$\frac{3}{4}$	0.519
$\frac{7}{8}$	0.706
1	0.923
$1\frac{1}{4}$	1.44
$1\frac{1}{2}$	2.08
2	3.69

ALUMINUM PRODUCTS

Square 6061

Size	Wt./Sq. Ft.
1/4	0.073
3/8	0.165
1/2	0.294
5/8	0.459
3/4	0.661
1	0.899

Pipe (sch 40) 6063

Size	OD"	Wall	Wt./Ft.
1/4	0.540	0.088	0.147
1/2	0.840	0.109	0.294
3/4	1.050	1.050	0.391
1	1.315	1.315	0.581
1 1/4	1.660	0.140	0.785
1 1/2	1.900	0.145	0.939
2	2.375	0.154	1.26

Tube 6063

Size	Wt./ft.
<u>Square</u>	
3/4 x 3/4 x 0.65	0.197
1 x 1 x 0.62	0.28
1 x 1 x .125	0.526
1 1/4 x 1 1/4 x .125	0.674
1 1/2 x 1 1/2 x .125	0.826
1 3/4 x 1 3/4 x .125	0.974
2 x 2 x .125	1.126
2 x 2 x .188	1.689
2 x 2 x .250	2.252
<u>Rectangular</u>	
1 x 1 1/2 x .125	0.675
1 x 2 x .125	0.826
1 1/2 x 2 x .125	0.976
2 x 3 x .125	1.426

ALUMINUM PRODUCTS

Sheet & Plate 5052

Size	Wt./Ft.
0.030	0.419
0.040	0.559
0.050	0.698
0.063	0.880
0.080	1.117
0.090	1.257
0.100	1.397
0.125	1.746
0.160	2.281
0.188	2.629
0.190	2.658
0.250	3.258
0.375	5.292
0.500	7.056
0.625	8.820
0.750	10.584

STAINLESS STEEL

The following size and weight charts are for some of our more popular items. Please check with your local service center for availability, and additional size and alloy information. All stainless items stocked are type 304.

Sheet & Plate

Size	Wt./Sq. Ft.
24 ga.	0.987
22 ga.	1.231
20 ga.	1.491
18 ga.	2.016
16 ga.	2.499
14 ga.	3.154
12 ga.	4.427
11 ga.	5.04
10 ga.	5.67
3/16"	8.579
1/4"	11.16

STAINLESS STEEL

Angle

Size	Wt./Ft.
$\frac{3}{4} \times \frac{3}{4} \times \frac{1}{8}$	0.59
$1 \times 1 \times \frac{1}{8}$	0.8
$1 \times 1 \times \frac{3}{16}$	1.16
$1 \times 1 \times \frac{1}{4}$	1.49
$1\frac{1}{4} \times 1\frac{1}{4} \times \frac{1}{8}$	1.01
$1\frac{1}{4} \times 1\frac{1}{4} \times \frac{3}{16}$	1.48
$1\frac{1}{4} \times 1\frac{1}{4} \times \frac{1}{4}$	2.02
$1\frac{1}{2} \times 1\frac{1}{2} \times \frac{1}{8}$	1.23
$1\frac{1}{2} \times 1\frac{1}{2} \times \frac{3}{16}$	1.8
$1\frac{1}{2} \times 1\frac{1}{2} \times \frac{1}{4}$	2.34
$2 \times 2 \times \frac{1}{8}$	1.65
$2 \times 2 \times \frac{3}{16}$	2.44
$2 \times 2 \times \frac{1}{4}$	3.19
$2\frac{1}{2} \times 2\frac{1}{2} \times \frac{1}{4}$	4.1
$3 \times 3 \times \frac{1}{4}$	4.64
$3\frac{1}{2} \times 3\frac{1}{2} \times \frac{1}{4}$	5.22

Round

Size	Wt./Ft.
$\frac{1}{8}$	0.042
$\frac{3}{16}$	0.094
$\frac{1}{4}$	0.168
$\frac{5}{16}$	0.262
$\frac{3}{8}$	0.378
$\frac{7}{16}$	0.514
$\frac{1}{2}$	0.671
$\frac{5}{8}$	1.05
$\frac{3}{4}$	1.51
1	2.68
$1\frac{1}{8}$	3.38
$1\frac{3}{16}$	3.76
$1\frac{1}{4}$	4.17
$1\frac{3}{8}$	5.02
$1\frac{7}{16}$	5.52
2	10.68

STAINLESS STEEL

Flat

Size	Wt./Ft.
1/8 X 1/2	0.213
1/8 X 3/4	0.319
1/8 X 1	0.425
1/8 X 1 1/4	0.531
1/8 X 1 1/2	0.638
1/8 X 2	0.85
1/8 X 2 1/2	1.06
1/8 X 3	1.28
1/8 X 4	1.7
1/8 X 6	2.55
3/16 X 3/4	0.479
3/16 X 1	0.638
3/16 X 1 1/4	0.797
3/16 X 1 1/2	0.957
3/16 X 2	1.28
3/16 X 2 1/2	1.594
3/16 X 3	1.914
1/4 X 1/2	0.425
1/4 X 3/4	0.636
1/4 X 1	0.85
1/4 X 1 1/4	1.06
1/4 X 1 1/2	1.28
1/4 X 1 3/4	1.49
1/4 X 2	1.7
1/4 X 2 1/2	2.12
1/4 X 3	2.55
1/4 X 4	3.4
1/4 X 6	5.1
1/4 X 8	6.8
3/8 X 1	1.28
3/8 X 1 1/4	1.72
3/8 X 1 1/2	2.06
3/8 X 2	2.75
3/8 X 2 1/2	3.44
3/8 X 3	4.13
3/8 X 4	5.5
3/8 X 6	8.25
1/2 X 2	3.61
1/2 X 3	5.41
1/2 X 4	7.22

STRAPPING/BANDING

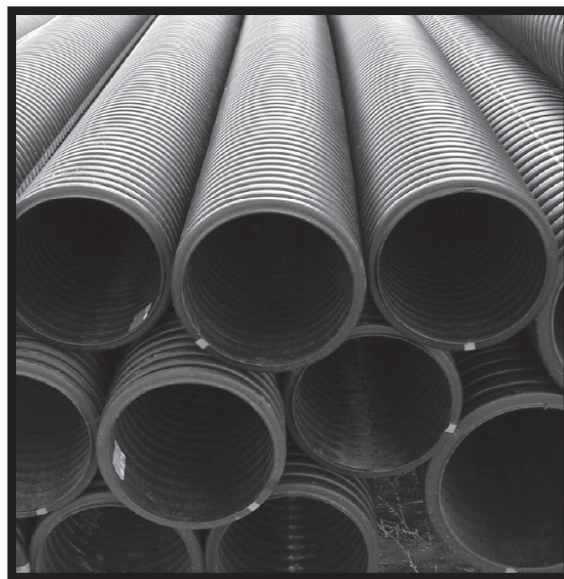
Width in Inches	Thickness in Inches	Approx. Strength Lbs.	Footage Yield Ft./Lb.	Winding Type M-Mill R-Ribbon
Regular Duty				
3/8	.015	680	52.4	M
3/8	.020	880	39.3	M
1/2	.015	910	39.3	M
1/2	.020	1,180	29.4	M
1/2	.023	1,340	25.6	M
5/8	.015	1,130	31.4	M
5/8	.020	1,470	23.6	M
5/8	.023	1,670	20.5	M
3/4	.015	1,360	26.2	M
3/4	.020	1,760	19.6	M
3/4	.023	2,010	17.1	M
3/4	.028	2,300	14.0	M
Super Regular Duty				
3/8	.017	980	47.1	M
1/2	.017	1,305	34.9	M
1/2	.020	1,530	29.4	M
5/8	.017	1,630	28.3	M
5/8	.020	1,900	23.6	M
3/4	.017	1,960	23.6	M
3/4	.020	2,200	19.6	M
High Tensile				
1/2	.020	1,450	29.4	M
1/2	.023	1,660	25.6	M
5/8	.020	1,830	23.6	M
5/8	.023	2,100	20.5	M
3/4	.020	2,100	19.6	M
3/4	.025	2,690	15.7	M/R
3/4	.031	3,250	12.7	M/R
1 1/4	.031	5,500	7.6	R
1 1/4	.044	7,700	5.3	R
2	.044	12,300	3.3	R
3/4	.023	2,470	17.1	M
1 1/4	.025	4,650	9.4	R
1 1/4	.029	5,450	8.1	R
3/8	.017	980	47.1	M
1/2	.017	1,305	34.9	M
5/8	.017	1,630	28.3	M
3/4	.017	1,960	23.6	M

Polyester and polypropylene strapping are also available.



Steel Culvert

16 or 18 gauge galvanized steel construction.
Annular or helical corrugation.
12" to 72" diameters.
Larger sizes available on special order.

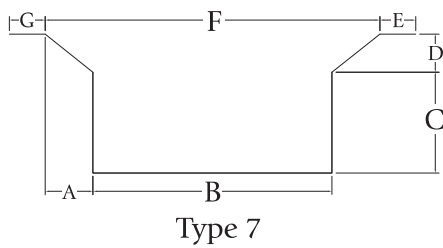
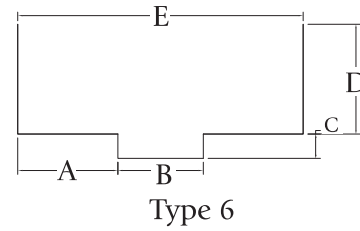
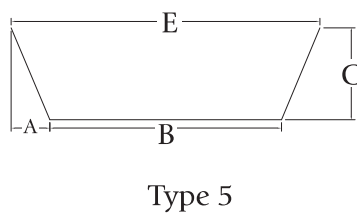
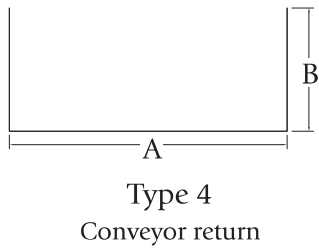
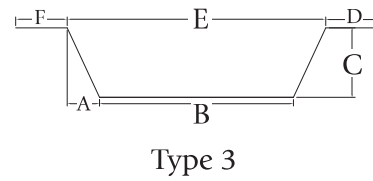
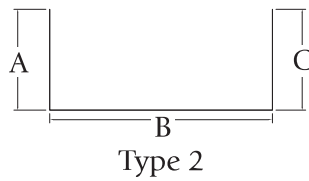
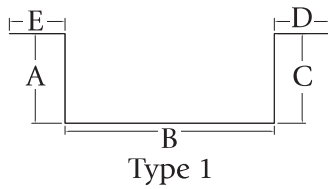


Poly Culvert

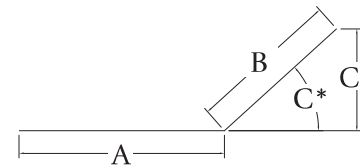
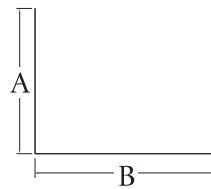
Easy to lift and handle without a tractor.
Withstands corrosive environment.
Easy to cut on-site; easy to install.
Single-wall available in 4", 6", and 8" diameters.
Double-wall available in 6" to 48" diameters.

**TELEPHONE ORDERING GUIDE
FOR FORMING**
Order by form number with complete dimensions

Forming Types for Conveyors

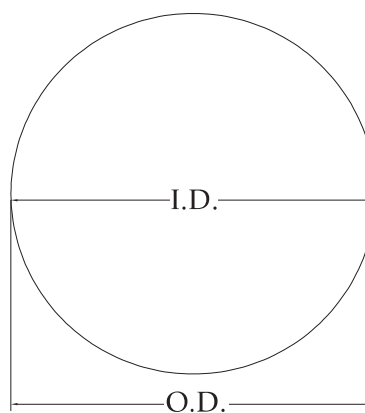
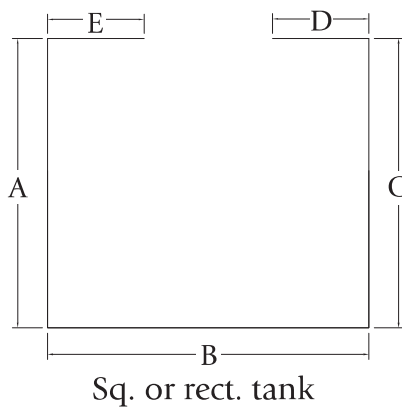


Angles



*Inches from level
plane or degree of angle

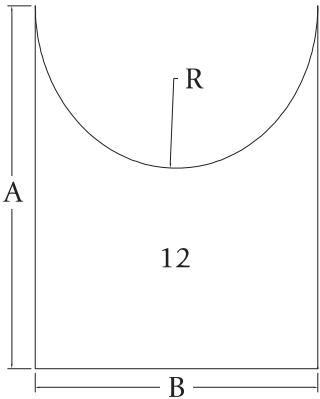
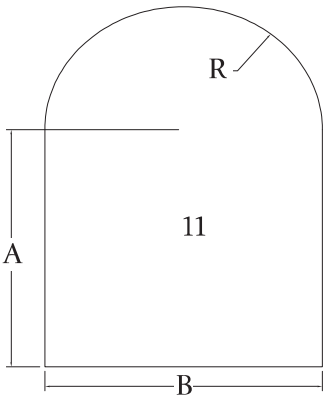
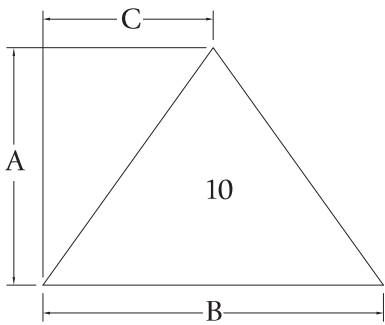
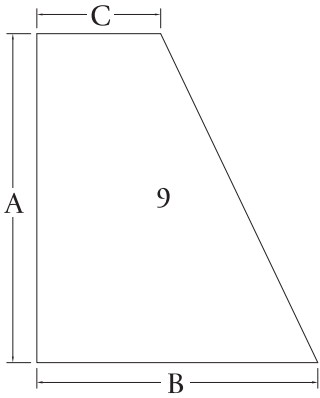
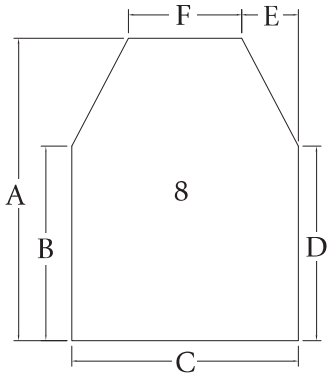
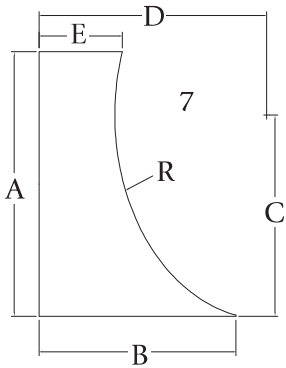
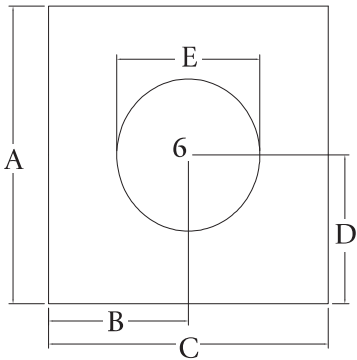
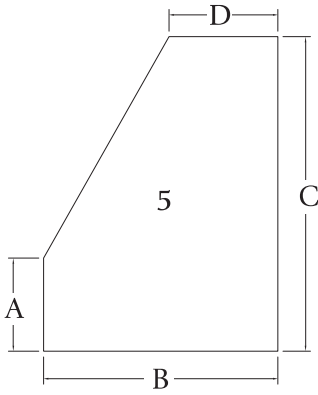
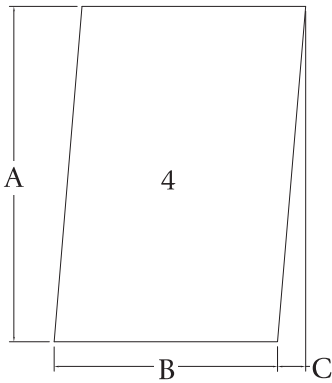
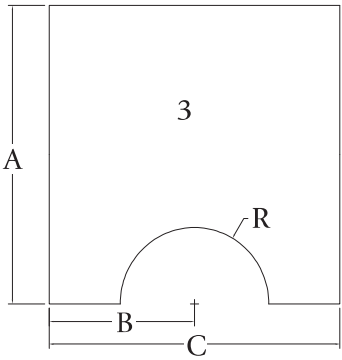
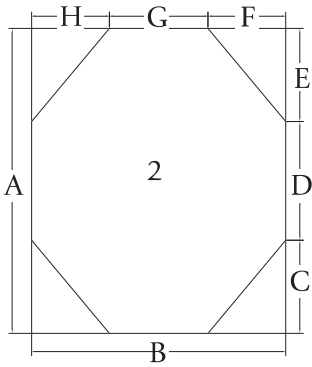
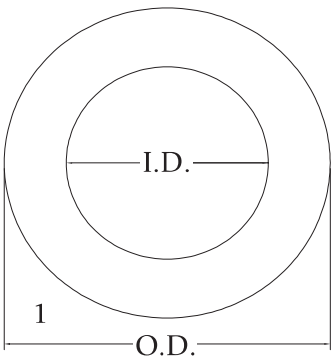
Types of Tanks



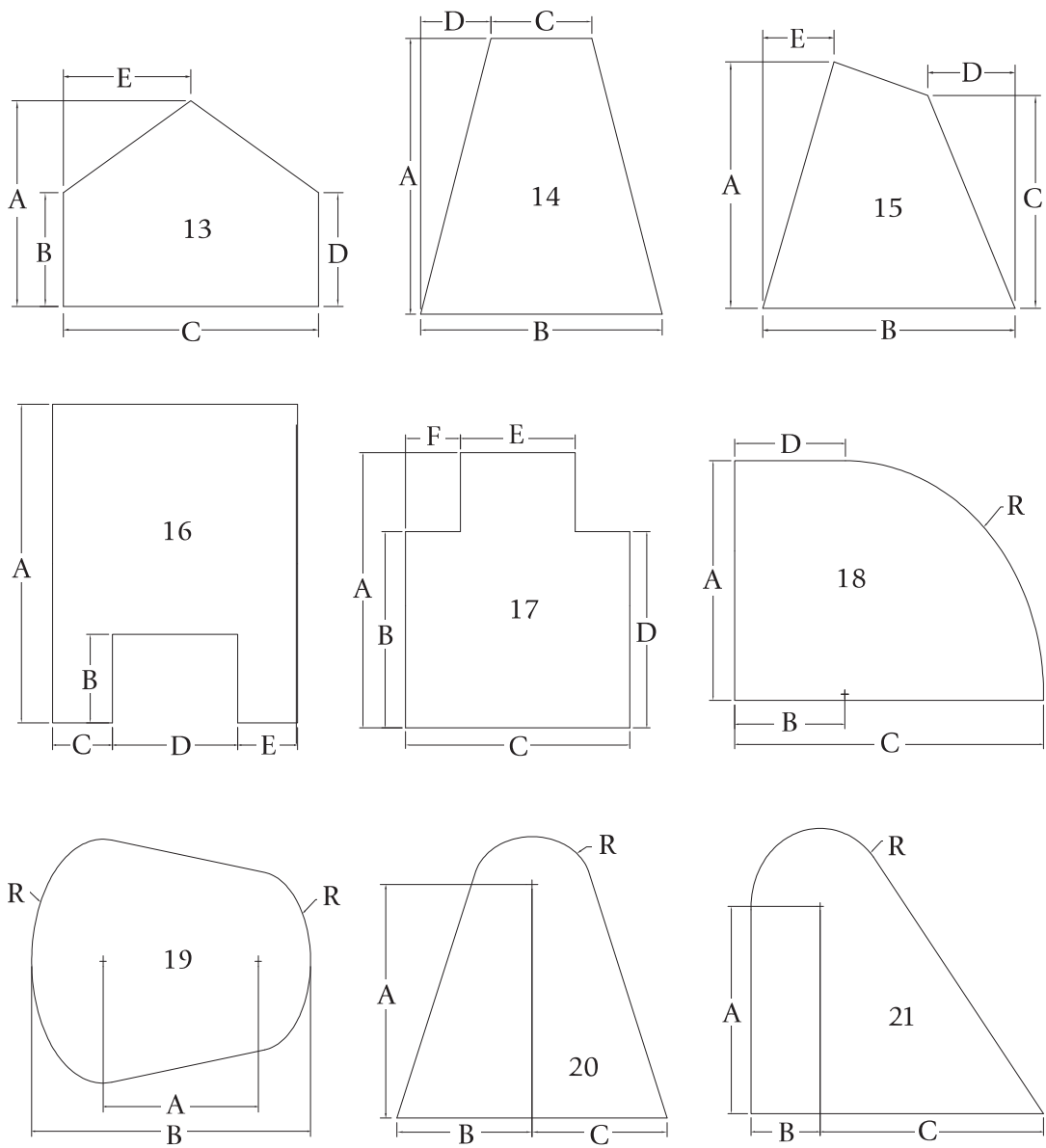
Rolling for
round tanks
can be done
to 12 inches

Please indicate if dimensions are
O.D. or I.D.

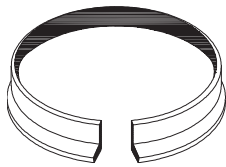
ORDER - BY - NUMBER GUIDE PATTERNS



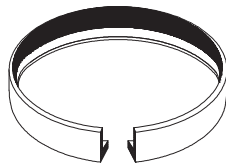
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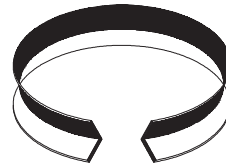
TELEPHONE ORDERING GUIDE FOR STRUCTURAL ROLLING



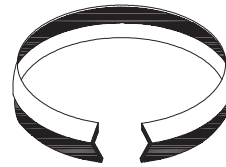
Leg Out



Leg In

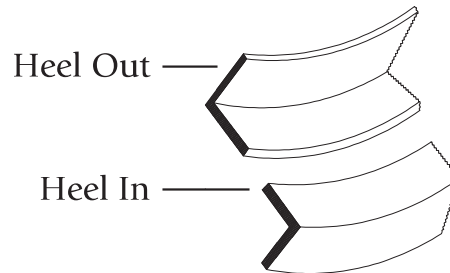
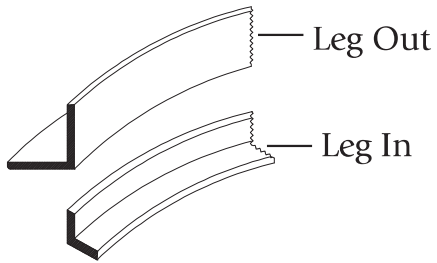


Both Legs Out



Both Legs In

Angles All Sizes



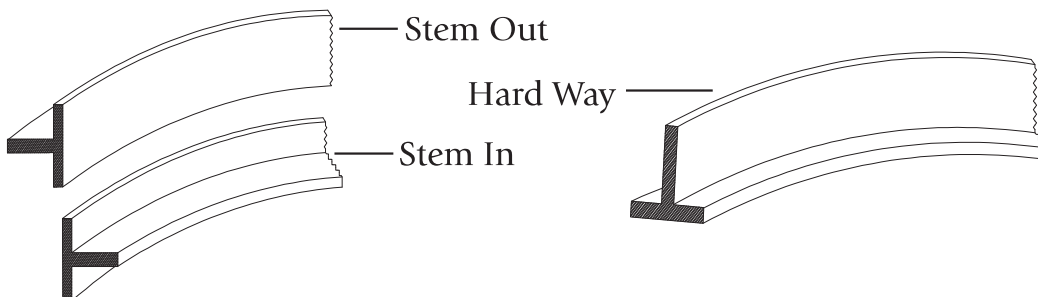
Channels



Beams

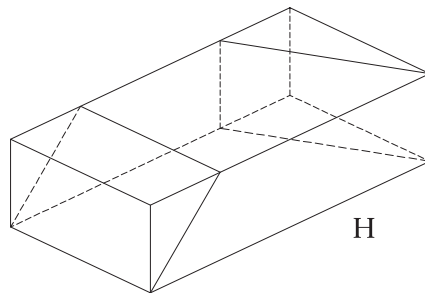
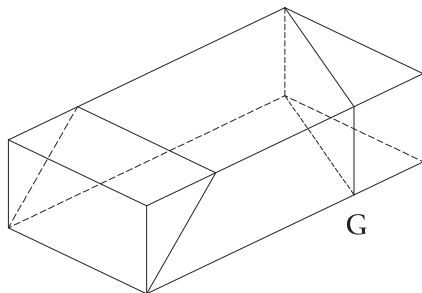
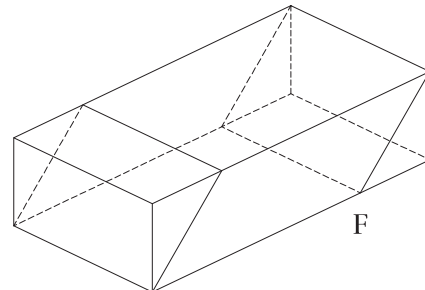
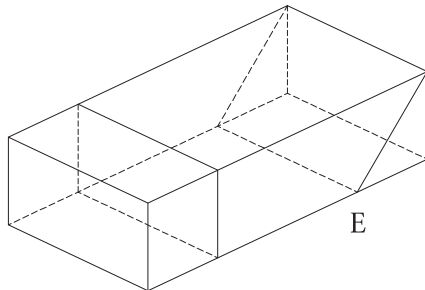
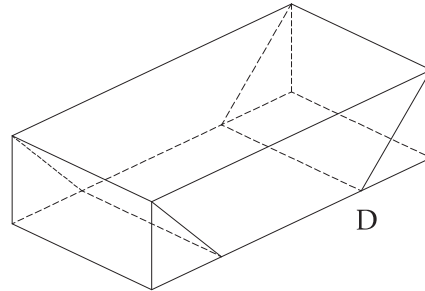
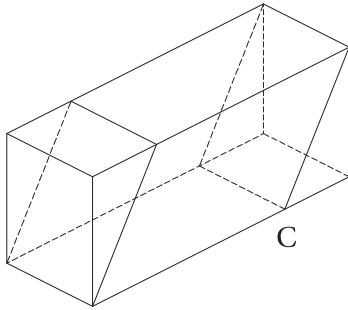
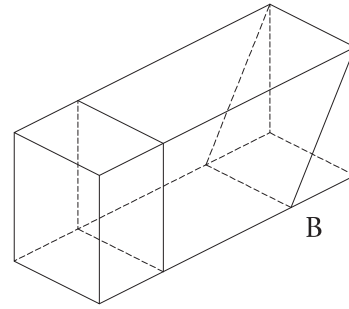
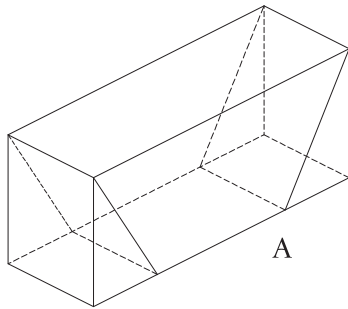


Tees All Sizes

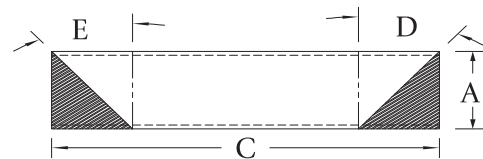


Ordering Cut to Size Tubing

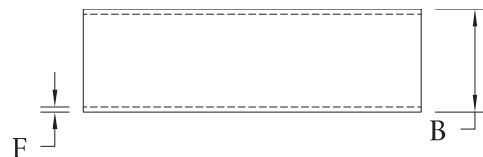
* Shaded areas show cutting bevel



Side view



Top view



Top view

a & b - O.D. dimensions of tube

c - overall length of cut piece

d & e - angle of cut (degrees right & degrees left of 0°)

f - wall thickness of tube

Typical order practice:

5 pcs., drawing C, 4 x 2 x .120, 24" overall length,

d = 35° R, e = 15° R, a = 4"

Rules Relative to the Circle, etc.

To Find Radius -

Multiply circumference by 0.15915.

Or divide circumference by 6.28318.

To Find Circumference -

Multiply diameter by 3.1416.

Or divide diameter by 0.3183.

Square -

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

A side multiplied by 3.3547 equals circumference of an equal circle.

Square inches multiplied by 1.273 equals circle inches of an equal circle.

To Find Side of an Equal Square -

Multiply diameter by 0.8862.

Or divide diameter by 1.1284.

Or multiply circumference by 0.2821.

Or divide circumference by 3.545.

To Find the Weight of Brass and Copper Sheets, Rods, and Bars -

Brass, 0.2972.

Copper, 0.3212.

Or multiply the length of the breadth (in feet) and product by weight in pounds per square foot.

To Find the Surface of a Sphere or Globe -

Multiply the diameter by the circumference.

Or multiply the square of diameter by 3.1416.

Or multiply four times the square of radius by 3.1416.

Ascertain the number of cubic inches in piece and multiply same by weight per cubic inch.

To Find Diameter -

Multiply circumference by 0.3183.

Or divide diameter by 3.1416.

To Find Side of an Inscribed Square -

Multiply diameter by 0.7071.

Or multiply circumference by 0.2251.

Or divide circumference by 4.4428.

To Find the Area of a Circle -

Multiply circumference by one quarter of the diameter.

Or multiply the square of diameter by 0.7854.

Or multiply the circumference by 0.7958.

Or multiply the square of $\frac{1}{2}$ diameter by 3.1416.

Fraction, Decimal and Metric Equivalents

Fractional Inch	Dec. Equiv.	Millimeters	Fractional Inch	Dec. Equiv.	Millimeters
1/64	— .0156	— .397	17/32	— .5313	— 13.494
1/32	— .0313	— .794	35/64	— .5469	— 13.891
3/64	— .0469	— 1.191	9/16	— .5625	— 14.288
1/16	— .0625	— 1.588	37/64	— .5781	— 14.684
5/64	— .0781	— 1.984	7/12	— .5833	— 14.817
1/12	— .0833	— 2.117	19/32	— .5938	— 15.081
3/32	— .0938	— 2.381	3/5	— .6000	— 15.240
1/10	— .1000	— 2.540	39/64	— .6094	— 15.478
7/64	— .1094	— 2.778	5/8	— .6250	— 15.875
1/8	— .1250	— 3.175	41/64	— .6406	— 16.272
9/64	— .1406	— 3.572	21/32	— .6563	— 16.669
1/6	— .1667	— 4.233	2/3	— .6667	— 16.933
11/64	— .1719	— 4.366	43/64	— .6719	— 17.066
3/16	— .1875	— 4.700	11/16	— .6875	— 17.463
1/5	— .2000	— 5.080	7/10	— .7000	— 17.780
13/64	— .2031	— 5.159	45/64	— .7031	— 17.859
7/32	— .2188	— 5.556	23/32	— .7188	— 18.256
15/64	— .2344	— 5.953	47/64	— .7344	— 18.653
1/4	— .2500	— 6.350	3/4	— .7500	— 19.050
17/64	— .2656	— 6.747	49/64	— .7656	— 19.447
9/32	— .2813	— 7.144	25/32	— .7813	— 19.844
19/64	— .2969	— 7.541	51/64	— .7969	— 20.241
3/10	— .3000	— 7.620	4/5	— .8000	— 20.320
5/16	— .3125	— 7.937	13/16	— .8125	— 20.638
1/3	— .3333	— 8.467	53/64	— .8281	— 21.034
11/32	— .3438	— 8.731	5/6	— .8333	— 21.167
23/64	— .3594	— 9.128	27/32	— .8438	— 21.431
3/8	— .3750	— 9.525	55/64	— .8594	— 21.828
25/64	— .3906	— 9.922	7/8	— .8750	— 22.225
2/5	— .4000	— 10.160	57/64	— .8906	— 22.622
13/32	— .4063	— 10.319	9/10	— .9000	— 22.860
5/12	— .4167	— 10.583	29/32	— .9063	— 23.019
27/64	— .4219	— 10.716	11/12	— .9167	— 23.283
7/16	— .4375	— 11.112	59/64	— .9219	— 23.416
29/64	— .4531	— 11.509	15/16	— .9375	— 23.813
15/32	— .4688	— 11.906	61/64	— .9531	— 24.209
31/64	— .4844	— 12.303	31/32	— .9688	— 24.606
1/2	— .5000	— 12.700	63/64	— .9844	— 25.003
33/64	— .5156	— 13.097	1"	— 1.0000	— 25.400

To convert a decimal to percentage, carry the decimal point two places to the right. Thus, 63/64, or .9844, equals 98.44%.

For additional metric conversion tables see index at right.

To convert inches into decimals of a foot, see preceding page.

Converting Inches Into Decimals of a Foot

Decimal Inches of a Ft.		Decimal Inches of a Ft.		Decimal Inches of a Ft.	
0"	1/16005208	4"	1/16338542	8"	1/16671875
	1/8 .010416		1/8 .343750		1/8 .677083
	3/16015625		3/16348958		3/16682292
	1/4 .020833		1/4 .354166		1/4 .687500
	5/16026042		5/16359375		5/16692708
	3/8 .031250		3/8 .364583		3/8 .697916
	7/16036458		7/16369792		7/16703125
	1/2 .041666		1/2 .375000		1/2 .708333
	9/16046875		9/16380208		9/16713542
	5/8 .052083		5/8 .385416		5/8 .718750
	11/16057292		11/16390625		11/16723958
	3/4 .062500		3/4 .395833		3/4 .729166
	13/16067708		13/16401042		13/16734375
	7/8 .072916		7/8 .406250		7/8 .739583
	15/16078125		15/16411458		15/16744792
1"	1/16088542	5"	1/16421875	9"	1/16755208
	1/8 .093750		1/8 .427083		1/8 .760416
	3/16098958		3/16432292		3/16765625
	1/4 .104166		1/4 .437500		1/4 .770833
	5/16109375		5/16442708		5/16776042
	3/8 .114583		3/8 .447916		3/8 .781250
	7/16119792		7/16453125		7/16786458
	1/2 .125000		1/2 .458333		1/2 .791666
	9/16130208		9/16463542		9/16796875
	5/8 .135416		5/8 .468750		5/8 .802083
	11/16140625		11/16473958		11/16807292
	3/4 .145833		3/4 .479166		3/4 .812500
	13/16151042		13/16484375		13/16817708
	7/8 .156250		7/8 .489583		7/8 .822916
	15/16161458		15/16494792		15/16828125
2"	1/16171875	6"	1/16505208	10"	1/16838542
	1/8 .177083		1/8 .510416		1/8 .843750
	3/16182292		3/16515625		3/16848958
	1/4 .187500		1/4 .520833		1/4 .854166
	5/16192708		5/16526042		5/16859375
	3/8 .197916		3/8 .531250		3/8 .864583
	7/16203125		7/16536458		7/16869792
	1/2 .208333		1/2 .541666		1/2 .875000
	9/16213542		9/16546875		9/16880208
	5/8 .218750		5/8 .552083		5/8 .885416
	11/16223958		11/16557292		11/16890625
	3/4 .229166		3/4 .562500		3/4 .895833
	13/16234375		13/16567708		13/16901042
	7/8 .239583		7/8 .572916		7/8 .906250
	15/16244792		15/16578125		15/16911458
3"	1/16255208	7"	1/16588542	11"	1/16921875
	1/8 .260416		1/8 .593750		1/8 .927083
	3/16265625		3/16598958		3/16932292
	1/4 .270833		1/4 .604166		1/4 .937500
	5/16276042		5/16609375		5/16942708
	3/8 .281250		3/8 .614583		3/8 .947916
	7/16286458		7/16619792		7/16953125
	1/2 .291666		1/2 .625000		1/2 .958333
	9/16296875		9/16630208		9/16963542
	5/8 .302083		5/8 .635416		5/8 .968750
	11/16307292		11/16640625		11/16973958
	3/4 .312500		3/4 .645833		3/4 .979166
	13/16317708		13/16651042		13/16984375
	7/8 .322916		7/8 .656250		7/8 .989593
	15/16328125		15/16661458		15/16994792

GLOSSARY OF STEEL TERMS

Abrasion - The process of rubbing, grinding or wearing away steel by friction.

Aging - In a metal or alloy a change in properties that generally occurs slowly at room temperature and more rapidly at higher temperatures.

Alloy - A mixture with metallic properties composed of two or more elements of which at least one is a metal.

Alloy Elements - Alloy elements in steel would be chromium, cobalt, nickel, molybdenum, tungsten and vanadium. These are added to steel to modify its properties. Other common elements added are copper, aluminum, titanium, columbium and boron. In each case established minimum percentages must be met to qualify the element as an alloy addition.

Annealing - The term annealing usually implies relatively slow cooling in a heat treating furnace. The more important purposes for which steel is annealed are as follows: to remove stresses, to induce softness, increase ductility and increase electrical and magnetic properties.

Anodizing - Forming of a conversion coating on a metal surface by anodic oxidation most frequently applied to aluminum.

As Rolled - A term used to describe steel bars or plate that are hot rolled only without any subsequent heat treating operation.

Bend Radius - The inside radius of a bent section.

Brinell Hardness - A test for determining the hardness of a metal by forcing a hard steel or carbide ball of specified diameter into the surface of the steel. The hardness number is a number in direct proportion to the diameter of the hole.

Carbon Equivalent - Various formulas used to determine the weldability of steel by adding the percentage of carbon plus the equivalent carbon of the other elements. It is assumed that if the carbon equivalent (CE) is not more than .45% the steel is considered weldable without preheating or postheating.

Carburizing - Increasing the surface carbon content of steel in a heat treating furnace. This process is used to increase water resistance.

Case Hardening - A heat treatment method of surface treating steel for wear resistance. The most common methods would be carburizing and nitriding. Both of these elements are added to the surface of the steel to increase wear resistance. The other two methods are flame hardening and induction hardening with electrical current.

Charpy - An impact test to determine the toughness of steels conducted on a Charpy Impact Machine. The test is conducted on a small steel bar with a V-notch. The test is abbreviated CVN.

GLOSSARY OF STEEL TERMS

Coil Breaks - Creases or ridges across a metal sheet transverse to the direction of coiling occasionally occurring when the metal has been coiled hot and uncoiled cold.

Cold Drawing - Reducing the cross section of steel bars by pulling the steel through a die of reduced size, usually 1/32". This process is done at ambient temperatures and is used to enhance the surface appearance, produce close tolerances and increase machinability.

Cold Rolling - Reducing the thickness of steel by rolling or ironing the steel below the recrystallization temperature. This method is used for sheet steel to produce lighter gauges and increase surface finish appearance.

Cold Working - Any method used to plastically deform or reduce the thickness or cross sectional size of steel at ambient temperatures.

Corrosion - The deterioration of a metal by chemical or electrochemical reaction with its environment.

Crown - A contour on a sheet or roll where the thickness or diameter increases from edge to center.

Decarburization - A loss of carbon on the surface of steel which accelerates at temperatures above 1400°F. All steels which are hot rolled, forged or heat treated in furnaces without controlled atmosphere will have a decarburized surface.

Deep Drawing - A process for stretching sheet steel in a die with a punch which is mounted in a stamping press.

Ductility - The ability of a material to deform plastically without fracturing. It is commonly evaluated by tensile testing.

Elastic Limit - The greatest unit stress to which a material may be subjected without permanent deformation remaining upon complete release of the stress.

Elongation - The percentage increase in the gauge length of a tensile specimen after it has been tension tested to failure.

Fatigue - The phenomenon leading to fracture under repeated or fluctuating stresses having a maximum value less than the tensile strength of the material.

Ferrite - Technical terms for the two types of iron occurring in steel.

Flame Hardening - Heating the surface of steel to its hardening temperature range and then immediately quenching the surface with water or a synthetic quenchant.

Forging - Plastically deforming metal, usually hot, into desired shapes with compressive force, with or without dies.

Free Machining - Pertains to the machining characteristics of steel to which an ingredient has been introduced to give small broken chips, lower power consumption, better surface finish and longer tool life.

GLOSSARY OF STEEL TERMS

Galvanizing - In steel terms to hot dip steel in a bath of molten zinc.

Hardenability - The property that determines the depth of hardness of steel after it has been heat treated by quenching and temperature.

Hardness - The ability of metal to resist penetration. The principal methods of hardness testing are the Rockwell and Brinell hardness testers.

Heat Affected Zone (HAZ) - That portion of the base metal which was not melted during grazing, cutting or welding but whose microstructure and physical properties were altered by the heat.

Honing - Removing stock generally on the internal cylindrical surface of a tube with an abrasive tool mounted in a holder.

Hot Rolling - Rolling bars, plate, sheet, structurals through a series of rolls for size reduction or shape at temperatures of 1550 to 2100 degrees F.

Impact Test - A test used to determine the toughness of steel by impact with a falling pendulum. The common test used is the Charpy or Izod impact test which is conducted on specially designed equipment.

Inclusions - Non-metallic impurities in steel in the form of oxides, sulfides, or silicates. These impurities are formed during the solidification of the steel in the ingot molds, or continuously cast blooms, billets or slabs.

Induction Hardening - This is a method of hardening the surface of a steel part electrically with high frequency current. The current is passed through a coil that is held very close to the surface to be hardened and the surface is immediately heated to approximately 1600° F. The surface is immediately quenched with water or a synthetic oil.

Killed Steel - Steel which is deoxidized or degassed in the melting operation to eliminate porosity and produce more sound steel products. Silicon and aluminum are two elements used to eliminate the gases in steel.

Laminations - The general term used for surface or internal defects parallel to the rolled surface of the steel product. Surface defects are slivers and laps; internal lamination is called piped steel and occurs in plate and sheet.

Longitudinal Direction - The principal direction of flow in a worked metal.

Mechanical Properties - Defined as tensile and yield strength, elongation, torsional strength and impact strength.

Modules of Elasticity - The ratio within the limit of elasticity of the stress to the corresponding strain. The stress in pounds per square inch is divided by the elongation in fractions of an inch for each of original gauge length of the specimen.

GLOSSARY OF STEEL TERMS

Normalizing - Heating steels to approximately 100°F above the critical temperature range followed by cooling to below that range in still air at ordinary temperatures. This heat treat operation is used to erase previous heat treating results in carbon steels and to produce a uniform grain structure in forged and cold worked steel parts.

Orange Peel - A pebble grained surface which develops in forming of metals having coarse grains.

Oxidation - A reaction with oxygen. In the case of steel, oxidation burns the carbon out of the surface of steel if the temperatures are above 1200°F. The resultant surface is termed decarburized.

Physical Properties - Are defined as electrical, magnetic, density coefficient of thermo expansion, etc.

Pickling - A chemical treatment with acids to remove the scale or iron oxides on the surface of hot rolled steel products.

Pitting - Forming small sharp cavities in a metal surface by nonuniform electro-deposition or by corrosion.

Post Heating - Heating the weld and weld area to slow down the rate of cooling to eliminate weld cracking or cracking in the heat affected area.

Pre Heating - A welding term used to designate heating steel to a specific temperature prior to welding to prevent weld cracks.

Quenching - Rapid cooling of a metal during a heat treating operation. The quenching coolant could be water, oil or air. This is the method used to increase the hardness and strength of steel.

Reduction of Area - The percentage reduction of area is the difference between the original cross-sectional area and the least cross-sectional area of a tensile test specimen after rupture.

Rimmed Steel - A method of producing very low carbon steels in an ingot mold by letting the steel form gases and solidify slowly. This results in a pure iron rim on the surface of the ingot which remains on the surface of the rolled product which is generally sheet steel.

Rockwell - Hardness testing device used to measure the resistance of metal to be indented. The numbers usually in Rockwell B or C hardness will designate the relative hardness and strength of the metal.

Scale - A complex iron oxide formed on the surface of steel when it is hot rolled or forged. Iron oxide will start to form at approximately 1100°F in air.

Seams - A defect on the steel surface which is always in the rolling direction and appears as a thin crack.

Semi-Killed - Steel that is partially deoxidized where some of the gases from the solidification in the ingot mold are still remaining. Semi-killed steels are intermediate between rimmed and killed.

GLOSSARY OF STEEL TERMS

Special Killed - Steel that has been completely deoxidized to prevent gases from forming during solidification in the ingot mold. Deoxidizing elements used to remove the gases are aluminum and silicon. The term "killed" is used because such additions cause the steel to be quiet in the molds instead of boiling from the gases.

Tensile Strength - The maximum load per unit of original cross-sectional area obtained before rupture of a tensile specimen.

Trepanning - A type of boring where an annular cut is made into a solid material with the coincidental formation of a plug or solid cylinder.

Transverse - Across, usually signifying a direction or plain perpendicular to the direction of working such as cold drawing or rolling.

Toughness - Ability of a metal to absorb energy and deform plastically before fracturing. It is usually measured by the energy absorbed in a notch impact test. The most common test is the Charpy V-Notch Test.

Yield Point - This is the load per unit area at which the tensile specimen starts to deform or elongate without increase of load. The yield point can also be defined as the stress at which a marked increase in strain occurs without an increase in stress.

Yield Strength - Stress corresponding to some fixed permanent deformation such as .1 or .2% offset from the modulus slope in the tensile test.

NOTES

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